

BUILDING AND ENGINEERING

CATALOGUE

1921
EDITION

DATA
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DATA

SPECIFICATION DATA, LIMITED
DOMINION BANK BUILDING,
TORONTO ~ CANADA.

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Grouped Catalogue of Building and Engineering Equipment



1921

Indexed According to Trades

Devised, Compiled and Edited by


Specification Data, Limited

Head Office: - Dominion Bank Building

Toronto, Canada

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SPECIFICATION DATA, LIMITED

INTRODUCTION

N publishing the tenth edition of "**Specification Data**" Building and Engineering Catalogue, now so extensively known throughout the Architectural, Engineering and Building communities of Canada, the publishers feel they have succeeded in creating a medium whereby the person who purchases building or engineering equipment may have constantly before him that vital information which is so essential to him at the time he most requires it.

The advertisements contained herein are drawn up in a purely technical manner, accompanied in many instances by detailed drawings giving sections of the materials advertised or showing the accepted method of installation.

While "**Specification Data**" does not contain information relating to every known product, the data submitted is nevertheless very comprehensive. Information relating to a certain product not listed herein can be obtained promptly, simply by writing out one of the information postcards and mailing same to the publishers. Users of this volume are cordially invited to make use of the Service Department, which is devised solely for the benefit and free use of users of "**Specification Data**" and advertisers therein.

Standard Specifications on Sewer Construction and Roadways will be found in the front pages, and it is hoped these will prove beneficial to Municipal Engineers.

Users of this volume are cordially invited to make criticisms and suggestions, as it is only by receiving such criticisms and suggestions that the publishers can produce a volume generally acceptable to its many users.

EDITOR.

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DATA
SPECIFICATION
DATA

MUNICIPAL ENGINEERING SPECIFICATIONS



THE Publishers desire to draw the attention of Municipal Engineers to the pages immediately following this announcement, wherein will be found specifications on Roadways and Sewers. These specifications have been drawn up by a competent Engineer and are "standard" in every respect. It is hoped that this addition will prove beneficial to Municipal Engineers.

Any criticisms and suggestions tending towards the improvement of these specifications will be greatly appreciated by the Publishers.

PAVEMENTS

NOTE—The cross section of a road should form a parabolic curve. The height of the centre of the road above the edge of the road is known as the crown. Let the width of the road in feet = W , the crown of the road in feet = C , and the grade of the road in feet per 100 = G , then for brick, stone block, and wood block pavements

$$C = \frac{W (100 - 4 G)}{6,000}$$

and for asphalt and bituminous pavements

$$C = \frac{W (100 - 4 G)}{5,000}$$

SUB-GRADE.

(1) The whole of the area to be paved shall be excavated or filled to a sub-grade at such a depth that after being compacted by the roller the surface will be inches below the pavement datum, and truly parallel thereto. In excavating, the earth must not be disturbed below the sub-grade. If the material at sub-grade is of an unstable character and unfit for foundation in the opinion of the Engineer, the Contractor shall make such additional excavation as may be determined by the Engineer and refill with approved material. After all necessary grading has been done to bring this surface to sub-grade, the street shall be thoroughly rolled with an approved road roller weighing not less than ten tons. Areas inaccessible to the roller shall be rammed until they are as well compacted as the rolled surface. When the rolling is completed in no place shall the finished surface vary more than $\frac{3}{8}$ of an inch from the true sub-grade.

(2) If, after rolling is completed, the surface shall be disturbed in any way it must be relaid and properly compacted.

(3) If settlement occurs the depressions shall be filled and then re-rolled until the surface is solid, uniform and parallel with the grade and cross-section of the finished pavement.

(4) Where the natural surface of the ground is below sub-grade or shall become so by the removal of old pavement or other structures, it must be filled to the sub-grade in layers not exceeding five inches in depth and each layer must be thoroughly rolled or rammed before the next layer is placed upon it.

SUB-DRAINAGE.

(5) Where the soil is of such a character that it retains an excessive amount of moisture, such as clay or sands similar to quick sand that do not afford a ready natural drainage, sub-drains should be provided by the Contractor as directed by the Engineer.

(6) Drains shall be of two kinds: first, tile drains of porous material or of vitrified tile laid with open joints; second, trenches filled with broken stone, gravel, cinders or other approved material.

(7) The kind of drains to use, the size, and the location of the drains shall be determined by the Engineer, and no drains constructed without the approval of the Engineer shall be paid for.

(8) In all cases the drains shall be connected to the existing sewers, catch basins or inlets.

MACADAM FOUNDATION.

(9) The macadam base, after being thoroughly consolidated by rolling with a roller weighing not less than 10 tons, shall have a thickness of inches and be inches below and parallel to the pavement datum.

(10) The broken or crushed stone shall be of hard, sound, durable rock.

(11) After the sub-grade has been carefully prepared a layer of clean stone passing a three inch screen and held on a two inch screen shall be spread to a depth sufficient, when thoroughly rolled, to form about two-thirds of the total thickness of the base. Over this layer stone screenings shall be spread with shovels in sufficient quantity to fill the voids between the larger stone.

The screenings shall be well rolled in during the process of spreading with a roller weighing at least ten tons.

(12) When the stone appears to be well filled the surface shall be watered and again rolled until the stone is compacted and no more screenings can be forced in.

(13) When the first layer is thus completed a second layer of clean stone passing a two-inch screen and held on a one-inch screen shall be

spread to a depth sufficient when thoroughly rolled to form the remaining one-third of the total thickness of the base. Over this area of stone, screenings shall be spread with shovels and rolled in with the application of water by sprinkling until the stone is well bonded and no more compression can be observed under the roller.

BITUMINOUS MACADAM FOUNDATION.

Use paragraphs 9, 10 and 11, omitting "about two-thirds of" in paragraph 11.

(14) When the stone appears to be well filled the surface shall be given a penetration coat of heavy asphalt or refined tar binder or as directed by the Engineer using not more than one and a half gallons, nor less than one gallon to a square yard.

CONCRETE FOUNDATION.

(15) Upon the sub-grade, a bed of concrete shall be laid to the depth and extent shown on the drawings. Concrete shall be composed of not less than one part best Portland Cement, of an approved brand, to three parts approved clean, sharp sand, and six parts approved broken stone. These ingredients to be measured in separate boxes, specially constructed by the contractor for the purpose. The Engineer reserves the right, however, to alter the above proportions at any time, but in no case shall the proportion of cement be less than one part of cement to nine parts of sand and broken stone.

(16) The Cement must be of some standard approved brand of Portland Cement and must conform in every respect with the latest specifications of the "American Society for Testing Materials" for Portland Cement.

Cement which at any time appears inferior or shows signs of deterioration or blowing will be rejected and any work done with such cement must be forthwith removed and replaced with approved cement at the Contractor's expense as and when the Engineer may direct.

The Cement will be tested by the Engineer or his agent from samples taken from time to time and no other test will be accepted.

All sand for concrete must be clean, coarse and sharp river sand, free from dirt, dust, and any other impurity or foreign matter.

Samples must be submitted to the Engineer for approval before starting the work, and any sand which shall vary from the approved sample shall be rejected.

No broken stone for concrete shall exceed $2\frac{1}{2}$ inches in any direction or be less than $\frac{3}{4}$ inch in any direction. All stone must be able to pass through a 2-inch ring and must be thoroughly screened and free from dust or dirt.

(17) After the concrete is laid it shall remain undisturbed for such a time as the Engineer may direct (usually two days where paving block surfaces are to be laid and six days for bituminous surfaces).

During this period no hauling over the concrete shall be permitted unless authorized by the Engineer when the surface must be covered by planks.

(18) Where shown on the drawings or directed by the Engineer, the contractor shall reinforce the concrete with wire mesh, expanded metal or other approved reinforcing of area satisfactory to the Engineer. The reinforcing shall be placed in the concrete at one-third from the surface of the total thickness of the concrete.

CONCRETE CURB AND GUTTERS.

(19) Concrete Gutters, Curbs, or combined curb and gutter must be constructed by the Contractor in exact accordance with the dimensions shown on the drawings and where directed by the Engineer.

(20) For the body of the work the proportions of the concrete ingredients shall be the same as used for the concrete base and of the same qualities of materials.

(21) For the finishing surface which shall be at least $1\frac{1}{2}$ inch thick, a mixture of two parts of approved Portland Cement to three parts of crushed granite or $\frac{5}{8}$ inch limestone shall be used. All dust shall be screened out of the crushed granite or limestone, and no particle shall be over $\frac{5}{8}$ inch in any dimension.

The entire surface, both of the curb and gutter, must finally be floated with neat cement and finished by skilled workmen accustomed to such work.

(22) Proper provision must be made for expansion and contraction, and the Engineer reserves the right to vary the height of the curb and the grade of the gutter as he desires.

ASPHALT.

(23) Samples of the asphalt and all ingredients and materials proposed to be used must be furnished to the Engineer at least ten days before commencing work, all of which must be approved by him, and no materials shall be used which are in any way inferior to the approved samples. Only the best qualities of well known brands of asphalts which can be made into a suitable paving mixture shall be used, and the Contractor must furnish the Engineer with proper certificates of shipment or other satisfactory evidence, showing the exact locality from which the crude asphalt or any of the ingredients used have been obtained, when so required by the Engineer.

(24) The crude asphalt, as obtained from the mines or natural deposits shall be refined by melting at a temperature not exceeding 450 degrees F. to drive off water and separate other substances.

Refined asphalt thus prepared shall be free from water, and shall not contain an injurious quality of light oils or other matter. It shall contain not more than four per cent. of organic matter and not more than thirty-five per cent. of mineral matter other than bitumen, and not less than fifty-six per cent. of bitumen soluble in carbon di-sulphide.

Refined asphalt may be prepared by the distillation of an asphaltic petroleum at a temperature not exceeding 700 degrees F.

(25) All refined asphalt shall comply with the following requirements:

It shall be homogeneous.

Melting point shall not be less than 130 deg. F., nor more than 145 deg. F.

Solubility in carbon tetrachloride shall not be less than 98½ per cent.

Penetration at 77 deg. F. shall not be less than 60 nor more than 100, the penetration test being made with a No. 2 needle for five (5) seconds under a load of 100 grams and the penetration at 100 deg. F. shall not exceed three times its penetration at 77 deg. F., the conditions of time and load being as above established.

Ductility at 77 deg. F. shall not be less than 40 centimeters, the rate of elongation being five centimeters per minute.

It shall not lose more than three per cent. by volatilization when maintained at a temperature of 325 deg. F. for five hours in a shallow dish, the bottom of which is covered with bitumen to a depth of ½ inch, nor shall the penetration of the residue after such heating be less than one-half the original penetration. It shall not contain more than 18 per cent. of fixed carbon.

Asphalts that are injuriously affected by water shall not be used.

FLUX.

(26) For softening and tempering refined asphalt, the following may be used:—Liquid asphalt or maltha, asphaltic petroleum residue, paraffine petroleum residuum, or other softening agent from which the lighter oils have been distilled, without cracking, until the flux has the following characteristics:

Specific gravity from 0.939 to 0.972 at 60 degrees F. loss on volatilization at 335 degrees F. in seven hours not more than 5 per cent.

The flux must be approved by the Engineer.

(27) The asphaltic cement shall be made of a mixture of the refined asphalt and flux, proportioned so as to show the presence of about 22 per cent. asphaltine and to have a penetration of from forty to eighty, as the Engineer may determine, when tested at a temperature of 77 degrees F. in a standard Dow penetration apparatus.

(28) When a cement of the desired qualities of consistency and hardness shall be determined upon and approved of by the Engineer, samples shall be kept as a standard and all subsequent batches must be made to conform thereto.

(29) To prepare the cement, the refined asphalt shall be heated to about 300 deg. F. or to such a temperature as will admit its agitation by forced introduction of air or by any suitable mechanical method approved of by the Engineer. When the asphalt is thoroughly melted the flux will be introduced and the whole shall be thoroughly mixed.

COAL TAR CEMENT.

(30) The coal tar cement shall be residue of the distillation of coal tar only, and shall be refined for the special purpose of making a paving cement.

No mixture of hard pitch with the lighter oils of coal tar will be permitted.

Its specific gravity shall be not less than 1.20 nor more than 1.29 at 69 degrees F.

The melting point determined by the cube method shall be not less than 100 degrees F. and not more than 115 degrees F.

It shall contain not less than 15 per cent., nor more than 30 per cent. of free carbon insoluble in benzol.

It shall be free from water as determined by distillation and shall show upon ignition not more than ½ per cent. of inorganic matter.

No distillate shall be obtained lower than 338 degrees F. and up to 600 degrees not less than 5 per cent., and not more than 20 per cent. of distillate shall be obtained. The distillate shall be of a gravity of not less than 1.03 at 60 degrees F. The residue shall have a melting point of not more than 165 degrees F. In making this distillation an 8 ounce glass retort shall be used and the thermometer suspended so that before applying the heat the bulb of the thermometer is one-half inch above the surface of the liquid. The melting point of the pitch shall be determined by suspending a ½ inch cube in a beaker of water 1 inch above the bottom. The temperature shall be raised 9 degrees per minute from 60 degrees F. The temperature recorded the instant the pitch touches the bottom shall be considered the melting point of the pitch. In testing the original materials the initial temperature shall be 40 degrees F.

WATER-GAS TAR CEMENT.

(31) The specific gravity at 25 degrees C. shall be between 1.155 and 1.170.

On extraction with cold carbon disulphide at room temperature for 20 minutes, not less than 97½ per cent. shall be soluble.

When tested in a penetrometer at 25 degrees C., with a No. 2 needle under 100 grams load for 5 seconds, it shall have a penetration of not less than 27.5 and not more than 32.5 mm.

When 100 cc. are distilled in a 250 cc. Engler flask according to the method proposed by the American Society for Testing Materials, the loss by weight shall be within the following limits:

From start to 170 degrees C.....	0.
170 to 225 degrees C.....	Not over ½%.
225 to 270 degrees C.....	From 2 to 6%.
270 to 300 degrees C.....	From 5 to 9%.
Residue.....	Not less than 84%.

SHEET ASPHALT PAVEMENT.

(32) Sub-grade—Use specifications given above.

(33) Foundation—Use concrete foundation as specified.

(34) Asphalt pavement surface shall be laid in two courses called the base course and the surface course. The base course may be from 1 inch to 1½ inches thick and the surface course may be from 1 inch to 2 inches thick. (The base course is usually 1 inch thick and the surface course 2 inches thick.)

(35) The asphalt cement shall be prepared from crude asphalt, refined and fluxed as hereinbefore specified.

(36) The sand shall be of a superior quality of sand, practically free from organic matter, mica, soft grains and other impurities. The grains shall be moderately "sharp" and must be of assorted sizes so that the voids in the sand shall not exceed 33 per cent. Not more than 10% shall be held on a No. 10 sieve and not more than 5% shall pass the No. 200 mesh. The sand shall vary from ¼ inch screen size to dust.

(37) The filler shall consist of Portland Cement or crushed stone or sand so fine that the whole will pass the No. 50 sieve, 90 per cent. will pass the No. 100 sieve, and at least 70 per cent. will pass the No. 200 sieve.

(38) The stone for base course shall be of crushed hard durable stone. All the stone shall be retained upon the No. 8 sieve and all the stone shall pass a square mesh screen whose lineal dimension of mesh is ¼ inch less than the thickness of the base course.

(39) The base course shall be formed of a mixture of the stone above specified heated by passing through revolving heaters to a temperature of not more than 325 degrees F., mixed with sand, filler and asphaltic cement.

The sand, stone and filler shall be thoroughly mixed at a temperature between 310 degrees and 325 degrees F. before the asphaltic cement at a temperature not above 325 degrees F. and not below 300 degrees is added.

The proportions of the mixture shall be as specified by the Engineer.

The following is a typical mixture by weight:

Crushed Stone.....	64
Sand.....	27
Pure bitumen (in asphalt cement).....	4.5
Pulverized stone or filler.....	4.75

(40) The mixture, while still hot, shall be carefully spread on the concrete with hot iron rakes to a thickness of at least twice the desired thickness of the course after rolling. Immediately after spreading it shall be rammed and rolled with a ten ton asphalt roller while in a hot and plastic condition until it has the specified thickness. The surface after rolling shall be exactly parallel with the finished surface of the pavement to be laid. The surface course must be laid within one day of the laying of the base course.

(41) The surface course mixture shall be composed of the asphalt cement, sand, and filler as hereinbefore specified, and the proportions shall be as specified by the Engineer to suit the purity of the asphalt cement, the character of the sand, the climatic conditions and the nature of pavement desired.

(42) The materials shall be mixed at the temperatures and in the manner specified for the base course mixture.

A typical mixture will contain by weight:

Sand.....	75
Pulverized mineral passing No. 200 screen.....	13.5
Pure bitumen in asphalt cement.....	10 to 10.5

(43) Before the surface course is spread the base course must be thoroughly cleaned. Care must be taken not to break or disturb the base course.

The material for the surface course shall be so evenly spread and graded with asphalt rakes that after it is properly compacted by rolling the surface will coincide with the pavement datum within the following limits:

(44) When completed the surface shall have an average depth of (.....) inches and must be so free from waves or irregularities that a template not less than 12 feet long, when applied to the street surface, shall nowhere show a divergence from the designed true surface of more than 3/16 inch and a template 16 feet long applied to the gutters shall show no divergency from the true gutter grade greater than 1/8 inch.

(45) Directly after the material is graded with the asphalt rakes it shall be rolled with a hand roller or light steam roller, to partly compress the material, and when so directed by the Engineer, the surface shall then be ironed with smoothing irons heated to a temperature that will melt, but will not burn the asphaltic cement.

A thin layer of Portland cement shall then be swept over the surface, which shall at once be rolled with a ten ton asphalt roller until the material is thoroughly compressed and its surface is brought to the grade and contour designed for the street surface.

(46) The work of the ten ton roller must begin before the material has cooled below 200 degrees F., and be continued until the roller makes no further impression on the surface.

Any portions of the surface not accessible to the roller shall be rammed with hot rammers until compacted equally with the rolled portion.

(47) Before the surface course is placed the gutter course and all exposed surfaces of curbs, cross walks, manholes, etc., with which the surface course will come in contact must be well painted with hot paving cement or approved pitch.

(48) The street shall not be open to traffic until the pavement is cold and hard.

(49) Asphalt pavement must not be laid in freezing temperatures or in very windy days when the temperature is below 40 degrees F.

(50) The concrete foundation must be perfectly dry, clean and free from loose material.

(51) All paving mixtures when unloaded on the street, should be at a temperature of 260 degrees F. or over, and any mixture whose temperature is below 240 degrees F. must be rejected.

STREET RAILWAY TRACKS.

(52) Where railroad tracks exist the sub-grade and concrete foundation should extend under the tracks. Concrete under the rails should be of a richer mixture than specified for the remainder of the foundation.

(53) When specified the asphalt surface shall be laid directly against the rails and must be thoroughly tamped along and against the rail and

under any projecting portions. The rail must be heated to a temperature of at least 60 degrees F. before the asphalt material is laid around the rail.

BITUMINOUS CONCRETE PAVEMENT.

(54) Bituminous concrete shall be laid upon a Portland cement concrete foundation or bituminous macadam foundation, as may be specified.

(55) The sub-grade shall be prepared as hereinbefore specified.

(56) The concrete foundation shall be (.....) inches deep and constructed as hereinbefore specified.

The bituminous macadam foundation shall be (.....) inches deep and constructed as hereinbefore specified.

(57) Upon the foundation shall be laid the bituminous concrete wearing surface consisting of a mixture of selected hard, tough, crushed stone, sand, filler and asphalt cement as specified for sheet asphalt pavement base, but when specified or authorized by the Engineer, Coal Tar Cement or Water Gas Tar Cement, or a mixture of either of these with asphalt cement may be substituted for the asphalt cement.

The wearing surface shall have a thickness of (.....) inches after thorough compression with a roller. (For heavy traffic a thickness of two inches is sufficient for all practical purposes, and often gives more stability than a greater thickness. For moderate and light traffic a thickness of 1 1/2 inch may be used.) When concrete foundation is used it should be given a light spray of bituminous binder of not more than one gallon to ten square yards before wearing surface is laid.

(58) Mineral Aggregate—Any sound, durable stone such as trap rock, limestone or granite may be used. It should be broken as nearly cubical as possible. Between two kinds of stone choice should usually be made of the one showing greatest toughness. The sand and filler shall be as specified for sheet asphalt pavement sand.

The proportions of the various ingredients composing the Bituminous Concrete shall be as follows:

Bitumen.....	7-9 per cent.
Passing 200 mesh Screen.....	7-10 " "
" 80 " " but retained on a 200.....	10-20 " "
" 40 " " " " " " 80.....	10-25 " "
" 20 " " " " " " 40.....	10-25 " "
" 8 " " " " " " 20.....	10-20 " "
" 4 " " " " " " 8.....	15-20 " "
" 2 " " " " " " 4.....	5-10 " "

The minimum of bitumen allowed shall be used only in mixtures containing the minimum total passing the 80 mesh.

(59) The method of mixing the materials shall be as specified for the base course of the sheet asphalt pavement except that the temperature should be varied to suit the bituminous cement used.

(60) Paving mixture shall be hauled into the street in dump carts covered with canvas and spread to the proper thickness and grade with hot iron rakes and while still pliable shall be rolled with a ten ton roller for not less than ten hours, so that when ultimate compression is accomplished the surface shall be even and true to grade. Along the curb, around the manholes and catch basins where roller cannot reach, the compression shall be made by the use of hot tampers.

(61) All contact surfaces along curb, around manholes, etc., shall be painted with bituminous cement before the paving mixture is laid.

(62) Immediately after rolling, and while the pavement is still warm, a thin seal of pure bitumen cement shall be spread over the surface by means of a rubber squeegee, or brooms, and upon this shall be spread a thin layer of torpedo sand, stone chips or other approved material. After applying this dressing the surface shall be again rolled until it presents a finished appearance subject to the approval of the Engineer.

(63) When a joint is unavoidable, the edge of the cold material shall be trimmed down to a rough feather edge and the surface where the joint is to be made painted over with bituminous cement, the hot material raked over the feathered edge and thoroughly rolled; or, instead, joint strips may be used consisting of strips of canvas about 18 inches wide with three parallel lines of 3/4 inch ropes sewed on the underside about three inches apart; the joint strips shall be laid on the feather edge of the freshly raked material with the upper rope at the line where the thickness begins to decrease and the rolling completed on top of the canvas as for the finished pavement.

(64) Adapt paragraphs Nos. 48, 49, 50, and 51.

BITULITHIC PAVEMENT.

(65) Bitulithic pavement shall be laid under the patent and rights of Warren Bros. Paving Co., Ltd., which the contractor shall obtain.

(66) The sub-grade shall be prepared as hereinbefore specified.

(67) The foundation may be either Portland cement foundation or bituminous macadam foundation, as hereinbefore specified.

(68) On the foundation shall be laid the bitulithic wearing surface and seal coat so as to have a thickness of two inches after thorough compression. The wearing surface shall be composed of hard crushed stone, sand and Bitulithic Cement.

(69) The Bitulithic Cement, besides being produced with ingredients approved by Warren Brothers Company, shall in all respects comply with the specifications for Asphalt Cement used for Sheet Asphalt Pavement as hereinbefore specified.

(70) The stone and sand shall be heated in a rotary dryer and while still hot be separated into the desired number of different sizes by means of a rotary screen having a minimum screen opening of about $\frac{1}{10}$ of an inch and a maximum opening of about $1\frac{1}{2}$ inch. The openings in the successive screen sections up to $\frac{1}{2}$ inch size shall not vary more than $\frac{1}{4}$ inch and not more than $\frac{3}{4}$ inch for the sizes larger than $\frac{1}{2}$ inch. The aggregate thus separated shall pass into a bin having sections or compartments corresponding to the screen sections. From these compartments the aggregate shall pass into a weigh box, resting on a multi-beam scale. The desired amount of aggregates from each of the above compartments shall be accurately weighed separately on the scale and the batch dropped into a "twin plug" mixer, where it shall be ultimately associated and thoroughly commingled with a pre-determined quantity of Bitulithic Cement sufficient to coat all particles of the aggregate and to fill the voids in same. The Bitulithic Cement shall be heated to a temperature ranging from 225 degrees F. to 325 degrees F. before being mixed with the aggregate.

The mixing shall be continued until the combination is a uniform bituminous concrete.

In this condition it shall be hauled to the street and there spread on the clean, dry foundation and thoroughly rolled with a ten ton roller.

(71) The proportions of the various sizes of stone and bituminous cement shall be such that the compressed mixture shall form a street paving structure consisting of mineral aggregate thoroughly permeated with Bitulithic Cement which completely fills all the voids and binds the particles of the aggregate together.

If the percentage of voids in the crushed stone and sand is not low enough a filler of any suitable fine mineral matter may be used to reduce the percentage of voids.

(72) There shall be spread over the Bitulithic surface mixture a seal coat, using per square yard of Bitulithic pavement approximately $\frac{1}{4}$ gallon of Bitulithic Cement, into which shall be incorporated approximately 25 pounds of mineral aggregate not larger than $\frac{1}{4}$ inch diameter. After spreading the seal coat it shall be thoroughly rolled into the Bitulithic surface mixture. A coarser aggregate may be used on grades.

CONCRETE PAVEMENT.

(73) The sub-grade shall be prepared as hereinbefore specified.

(74) Portland Cement—as hereinbefore specified.

(75) Sand—as hereinbefore specified. Use stone grading from 2 inch circular screen down to $\frac{1}{4}$ inch sieve.

(76) The proportions and thickness shall be as specified by the Engineer.

(77) The concrete shall be machine mixed in a continuous mixer, and shall be deposited continuously. Work may only be discontinued at a vertical joint. No concrete shall be mixed or placed when temperature is below freezing point or when the sub-grade is frozen.

(78) The concrete shall be finished to the desired crown of the roadway with wooden floats. Before complete hardening has taken place the surface may be roughened as desired by the Engineer. When a curb or combined gutter and curb is used an expansion joint shall be left between it and the roadway. This joint, which shall not exceed $\frac{1}{2}$ inch in width, must extend entirely through the concrete.

The joint shall be filled with any of the paving pitch cements hereinbefore specified.

(79) Contraction joints of not more than $\frac{1}{2}$ inch shall be provided at 25 feet intervals perpendicular to the centre line of the roadway and extending through the full thickness of the concrete and, if the curb

and gutter is built at the same time, these joints must continue through them.

The contraction joint may be filled with any of the bituminous fillers if so desired by the Engineer.

(80) The concrete must be covered by tarpaulins at the end of each day's work or in the case of rain, and twenty-four hours later a coating of sand shall be spread over the concrete and sprinkled with water daily for at least seven days in order to prevent the concrete drying too rapidly.

(81) If a bituminous surface is required this must be laid at least ten days after the concrete has been laid. Any of the bituminous cements hereinbefore specified may be used.

The bitumen shall be applied hot by means of a sprinkling wagon or hand sprinkling cans. The hot bitumen shall be brushed over the surface or spread by squeegees and shall then be covered with torpedo sand or fine stone chippings. This surface shall then be rolled by a heavy roller if so directed by the Engineer.

From $\frac{1}{3}$ to $\frac{1}{2}$ gallon of bitumen and 0.25 cu. ft. of aggregate shall be used to each square yard of surface.

GRANITE BLOCK PAVEMENT.

(82) Contractors shall file with the Engineer at the time of bidding a certificate showing the name and location of the quarry from which it is proposed to obtain the blocks, also a certified copy of a test made to show the toughness and "French Co-efficient of Wear" of the granite which he proposes to use.

(83) Ten days before starting work the contractor must furnish the Engineer with six specification blocks made from the granite he proposes to use, which blocks shall be accepted as the standard, and no blocks which are inferior in any way shall be used in the pavement.

(84) The blocks shall be of the following dimensions:

Not less than eight nor more than twelve inches long on top; not less than three and one-half nor more than four and one-half inches wide on top; not less than four and three-quarters nor more than five and one-quarter inches deep.

(85) The blocks shall be of medium grained granite, showing an even distribution of constituent minerals of uniform quality, structure, and texture, without seams, scales or disintegration, free from an excess of mica or feldspar, and equal in every respect to the samples in the office of the Engineer.

The granite shall have a toughness of not less than nine, and a "French Co-efficient of Wear" of not less than eleven when tested by the methods adopted by the U.S. Department of Agriculture, Office of Public Roads.

The average of three tests shall be used for determining toughness and the average of six tests for determining the "French Co-efficient of Wear."

(86) The blocks shall be so dressed that the faces will be approximately rectangular in shape, and the ends and sides sufficiently smooth to permit the blocks to be laid with joints not exceeding $\frac{1}{2}$ inch in width at the top, and for one inch downward therefrom, and not exceeding one inch in width at any other part of the joint. The top surface of the block shall be so cut that there will be no depressions measuring more than $\frac{3}{8}$ inch from a straight edge laid in any direction on the top and parallel to the general surface thereof.

The blocks shall be sorted and laid in courses of uniform width.

(87) The sub-grade shall be prepared as hereinbefore specified.

(88) The foundation shall be of Portland Cement concrete 6 inches thick as hereinbefore specified.

(89) On the concrete shall be spread a layer averaging one inch in depth, of clean, coarse, dry sand, free from all gravel exceeding one-quarter inch in size. Upon this sand bed the blocks shall be laid in courses at right angles to the line of the street, and in a straight line from curb to curb, except in special cases, when they shall be laid at such an angle as may be directed by the Engineer.

The blocks shall be laid as closely as possible, each block touching the adjoining one on sides and ends, and in courses of uniform width. All joints shall be broken with a lap of at least three inches. The blocks shall not be laid more than twenty-five feet in advance of the ramming.

(90) After the blocks are laid they shall be rammed to a solid bearing, the joints shall be adjusted, all unsatisfactory blocks shall be taken out with tongs and all low blocks shall be raised to an even and true surface.

Pinch bars shall not be used except by special permission of the Engineer, and no sand shall be placed in the joints except when mixed with bituminous concrete filler as specified.

(91) The joints may be filled with cement grout, tar pitch or asphalt pitch as desired and specified by the Engineer.

CEMENT GROUT FILLER.

(92) After the pavement has been brought to a uniform surface, Portland Cement grout shall be poured into the joints until it appears on the surface. The grout shall be broomed or scraped into the joints, if necessary to fill the same, and the operation shall be repeated as the grout settles and before the initial set has taken place, until the joints are thoroughly filled flush with the surface of the blocks. Immediately after this, the entire pavement shall be broomed to a smooth surface. The blocks shall be wetted immediately after applying the grout.

The cement grout shall be composed of one part Portland Cement, and one part of clean, sharp sand. The cement and sand shall be thoroughly mixed dry and only enough clean, fresh water shall be added to make a grout which will flow to the bottom of the joints.

After the grouting is completed and a sufficient time for hardening has elapsed so that a coating of sand will not absorb moisture from the cement mixture, one-half inch of sand shall be spread over the whole surface and shall be kept damp until the street is opened for traffic.

After the grouting is completed, the street shall be kept closed until at least seven days have elapsed.

TAR PITCH FILLER AND ASPHALT FILLER.

(93) The joint filler used shall be the (paving pitch) (asphalt cement) hereafter described thoroughly mixed with as much hot, dry sand as the (pitch) (cement) will carry, but in no case shall the volume of the sand exceed the volume of the (pitch) (cement). The sand shall be fine and clean and all of it shall pass a 20 mesh screen. It shall be heated to a temperature of not less than 300 degrees F., nor more than 400 degrees F., and shall be between these limits when mixed with the paving (pitch) (cement). The paving (pitch) (cement) shall be heated in kettles equipped with a thermometer to register the temperature of the (pitch) (cement).

(94) The mixture shall be flushed on the surface of the blocks and pushed into the joints with suitable tools, re-flushing or re-pouring, if necessary, until the joints remain permanently filled flush with the surface of the pavement. As little as possible of the mixture shall be left on the surface.

(95) Tar pitch shall comply with the following requirements:

(a) It shall have a specific gravity between 1.23 and 1.33 at 60 degrees F.

(b) It shall have a melting point between 115 and 135 degrees F., determined by the cube method in water.

(c) It shall contain not less than 20 per cent. nor more than 35 per cent. of free carbon insoluble in hot benzol or chloroform.

(d) It shall contain not more than $\frac{1}{2}$ per cent. of inorganic matter.

(e) It shall be free from water.

(f) It shall have a ductility of not less than sixty centimeters at 77 degrees F.

(96) Asphalt cement filler shall be prepared from refined asphalt as specified for asphalt as used in sheet asphalt pavement.

(97) The asphalt filler shall be used on the work at a temperature of not less than 275 degrees F., and shall at no time be heated above 350 degrees F.

(98) The tar pitch shall be used on the work at a temperature of not less than 250 degrees F., and shall at no time be heated above 325 degrees F.

(99) The (pitch) (cement) shall be delivered where directed by the Engineer in time to allow for examination and analysis.

(100) In applying the filler care shall be taken that the pavers are closely followed by the filler gang, and in no case shall work be left over night or stopped, without the filling of the joints being completed.

(101) In case of rain the joints shall be protected by tarpaulins or other approved method. Under no circumstances shall the filler be poured into wet joints.

STREET RAILWAY TRACKS.

(102) The sub-grade and pavement foundation shall extend under the rails free from interruption except by the ties or other structures connected with the railroad track.

(103) For a distance of (.....) inches on outside of rail and (.....) inches inside measuring from the centre of the rail, a layer of mortar from 1 to $1\frac{1}{2}$ inch thick shall be spread.

The mortar shall consist of one part Portland cement to three parts sand.

Upon this bed of mortar, before it has begun to set, paving blocks shall be bedded against the rail on both sides. The blocks shall break joint with the blocks of the adjoining pavement.

(104) Selected blocks with well dressed surfaces shall be used.

The blocks shall be set with their tops level with the top of the rail. The blocks shall be bedded into the mortar by the use of paving hammers, but they shall not afterwards be rammed. As the blocks are set any spaces between them and the web of the rail shall be filled with cement mortar.

(105) The joints shall be filled in the same manner as specified for the remainder of the pavement.

(106) Where required by the Engineer, blocks of special size or shape shall be furnished. (Note—The width of mortar bed outside the rail is usually from 13 to 19 inches and about 15 inches inside.)

SIDE-WALKS.

(107) The side-walk shall be laid in sections of not less than (.....) square feet and of not more than (.....) square feet as the Engineer may direct, or as an alternative, the side-walk shall be laid in blocks adjoining each other with a strip of wood $\frac{1}{2}$ inch thick and 4 inches deep entirely separating each block. These strips shall be removed ultimately and the joints filled with sharp sand.

(108) The joints shall be straight, narrow, smooth and at right angles to each other.

(109) The side-walk shall have a pitch towards the curb of (.....) inch to the foot, (generally $\frac{3}{8}$ inch to the foot).

After the roadway is completed as hereinbefore specified the side-walk shall be laid.

(110) The sub-grade shall be (.....) inches below and parallel with the top of the finished side-walk, and on this sub-grade a foundation of broken stone, screened gravel, or soft coal clinkers shall be laid and rammed until it has a thickness of (.....) inches when completed.

(111) Upon this foundation a concrete base (.....) inches thick shall be laid. The concrete shall consist of one part Portland cement, to two parts sharp sand, and five parts broken stone, graded from $1\frac{3}{4}$ inches in greatest dimension to $\frac{1}{4}$ inch in greatest dimension. All materials to be of same quality as hereinbefore specified for Portland cement concrete.

The concrete shall be mixed in an approved manner, placed, and thoroughly rammed and allowed to set for a time specified by the Engineer before being walked or worked upon.

(112) Upon this base, before it has commenced its initial set, a wearing surface one inch deep shall be laid. The wearing surface shall consist of concrete made of one part Portland cement, and one part of fine crushed trap or granite rock screened through $\frac{1}{2}$ inch mesh, or as an alternative one part of clean, sharp sand, moderately coarse, which shall all pass the 10 mesh screen and not more than 5 per cent. shall pass the 30 mesh screen.

(113) All concrete shall be fitted around coal holes, posts, etc., in such a manner as to allow of their removal without injury to the concrete.

(114) The sidewalk shall be given an indented finish if required by the Engineer.

(115) The color of the wearing surface when laid shall be as specified by and satisfactory to the Engineer, and coloring substances shall contain nothing injurious to the concrete.

(116) Any defective work which occurs in any section or block caused by bad materials, faulty construction, settlement, or lack of proper protection of the work, within (.....) years after the date of completion must be immediately replaced and made good in conformity with these specifications by the Contractor and at the Contractor's expense when notified to do so by the Engineer.

SEWER CONSTRUCTION

GRAVEL.

The work to be done consists of (specify fully the work required).

The price bid includes the necessary labor and material for removing the pavement and foundation for all earth excavation, and refilling, all sheeting and bracing, clearing the ground, fencing, constructing temporary bridges, furnishing and handling all material, making all connections (replacing all pavements) (and constructing the concrete) (brick) (sewer) laying (the concrete) (vitrified) (cast iron) (steel) pipe sewer, building manholes and basins, laying drains, making basin connections, constructing spurs, and doing all work shown on the plans and in exact conformity therewith and as hereinafter specified to the satisfaction of the engineer.

(A special price for rock excavation should be included in the contract.)

TRENCHING.

Trenches shall be excavated to the depths shown on the plan and to such additional depths as may be directed by the engineer.

The minimum width of trenches in earth for pipe sewers, basin connections, house connections, and other drains not over 18 inches in diameter, shall be sufficient to give a clearance of 8 inches on each side of the pipe and for those of larger diameters a minimum clearance of 10 inches is required. Where cradles to be used have a maximum width greater than the minimum widths above specified the trench must be excavated at least as wide as the cradles.

For other types of sewers the width shall be the greatest external width of the structures, including the forms.

The excavation in earth for brick receiving basins, catch basins and flush tanks, shall be of sufficient size to give a clearance of one foot inside the sheeting on all sides and to include the foundation as shown on the plans.

Not more than feet of trench shall be open at any time ahead of the completed sewer and not less than feet of trench shall be excavated to its full depth ahead of the minimum length of sewer permitted to be laid.

Trenches for basin connections and house connection drains shall be fully excavated for their entire length before any pipes are laid therein.

SHEETING.

Where necessary, the sides of the trenches and excavations shall be supported by timber sheeting and bracing. Sheeting against which concrete is placed shall not be removed, but such sheeting shall not be paid for. Where sheeting is ordered by the engineer in writing to be left in place such sheeting shall be paid for at the contract price for such material.

The contractor will be responsible for the sufficiency of all sheeting and bracing used and for all damage to persons or property resulting from the improper quality, strength, placing, maintaining or removing of the same.

Where required by the engineer, the sheeting shall be driven to such depth below the bottom of the sewer as he may direct.

No tunneling shall be done except with the consent of the engineer.

The contractor shall clear the surface and remove all stumps, stones and other encumbrances affecting the prosecution of the work and shall remove them from the site.

The excavated material and construction materials shall be so deposited, and the work shall be so conducted as to leave open and free all cross walks at least 3 feet in width of all sidewalks and a roadway at least 10 feet wide. All hydrants, water valves, fire alarm boxes and letter boxes shall be available for use at any time.

Any surplus of excavated material beyond which can be stored on the sidewalks and roadway must be removed from the work and stored and after the construction of the sewer as much of this material as is of satisfactory quality and necessary for the purpose shall be brought back and used for back filling the trench.

FENCING.

Where required by the engineer, suitable fences shall be placed along the sides of the trenches to keep the streets safe for traffic.

TEMPORARY BRIDGES.

Crosswalks, where intersected by trenches, shall, if required by the engineer, be temporarily replaced by timber bridges at least 3 feet wide with side railings.

Where required for vehicles temporary bridges shall be provided of a width specified by the engineer.

WATER.

The contractor shall keep the trenches and excavations free from water at all times. The water shall be disposed of to the satisfaction of the engineer.

ROCK EXCAVATIONS.

Rock excavations shall include the excavation and removal of the following materials:

Rock which requires to be blasted in order to insure the proper prosecution of the work.

Boulders and pieces of rock, masonry, and concrete which contains $\frac{1}{3}$ cubic yard or more.

Any rock, masonry or concrete which slides or falls into the trench from beyond the lines thereof will not be measured and any such material must be disposed of by the contractor at his own expense.

The required width of trench in rock or pipe sewers, basin connections, house connections and other pipes will be sufficient to allow of a clearance of one foot on each side of the pipe, exclusive of spurs and hubs.

The required width of trench in rock for other sewers will be sufficient to allow of a clearance of one foot on each side of the structure to be built therein. For receiving basins, catch basins and flush tanks the required dimensions of the excavation must be sufficient to give a clearance of one foot on all sides above the foundations.

Rock shall be excavated to the depths required for the cradles and foundations of the structures as shown on the plans and not less than 4 inches below the outside of the barrel for the pipe sewers.

The volume of rock to be paid for will be that contained in prisms with vertical sides and of such dimensions as to give the widths and clearances hereinbefore specified from the bottoms of the trenches as specified and as shown on the plan to the surface of the rock.

Wherever a branch for a proposed sewer or extension of a sewer is built in rock the required trench shall be excavated for at least 5 feet beyond the end of such branch.

All blasting operations shall be conducted in strict accordance with existing ordinances and regulations relative to rock blasting and the storage and use of explosives. If directed by the engineer, any excavation within 10 feet of a water main shall be done without blasting.

All exposed sewers, manholes and other structures shall be carefully protected from the effects of blasts. Any damage done to such structures shall be promptly repaired by the contractor at his own expense.

BACK FILLING.

All trenches and excavations shall be back filled immediately after the structures are built therein. For a depth of at least 2 feet over sewers, connections and drains, the material used shall be clean earth, sand or rock dust. This material shall be carefully deposited and solidly tamped with suitable tools in layers of 6 inches or less in depth.

The remainder of the filling shall be of approved material free from organic matter and containing no stones over 10 inches in size.

Back filling shall, if required by the engineer, be puddled with water instead of being tamped.

All cavities around sheeting or left after sheeting is withdrawn shall be solidly filled as directed.

Unless otherwise shown on the plans or required by the engineer, all trenches and excavations shall be backfilled to the original surface of the ground and any additional approved material required for this purpose shall be supplied by the contractor.

All street pavements, sidewalks and other surfaces, opened or damaged by the works herein specified shall be replaced and made good by the contractor to the satisfaction of the engineer.

No sewer, drain, connection or other work shall be covered until the engineer has inspected, measured and located the same and given permission to backfill the trenches over them.

As trenches are backfilled the contractor shall remove all surplus material and, if required, shall dispose of it where and in the manner directed by the engineer.

The contractor, until the date of the final payment, shall maintain in good and safe condition the surface of the street over the trenches and fill all depressions caused by settlement of back filling. If the contractor fails to maintain the roads, streets, and sidewalks as specified herein within 24 hours of being instructed to do so in writing by the engineer, the (city) (town) may furnish all materials and do all work required and charge the contractor with the cost thereof, deducting such cost from any moneys due or to become due the contractor under this contract.

CONCRETE SEWERS.

(Specify Portland cement requirements as found under "Pavements.")

Use broken stone which will pass a 1 inch mesh screen and be retained on $\frac{1}{8}$ inch mesh screen.

Use for Class A. concrete a mixture of 1 part of cement, 2 parts of sand, and 4 parts of broken stone.

For Class B. concrete use a 1:2 $\frac{3}{4}$:5 mixture.

INVERTS.

Inverts of concrete sewers shall be formed between transverse templets and shall be screeded unless other material is used for lining. The templets shall be placed at approved intervals and the concrete shall be deposited in alternate sections and allowed to set before the remaining sections are poured. Unless otherwise shown on the plans, a layer of mortar $\frac{1}{2}$ inch thick shall be spread smoothly upon the concrete as soon as the concrete is in place.

Where the radii of inverts are too short to permit screeding between templets, the inverts shall be shaped by means of suitable forms, which shall be removed as soon as the concrete has a sufficient set and the surfaces shall be floated to a smooth finish, if required.

Where shown on the plans, inverts shall be lined with brick, tile, or other material which shall be laid at such times and in such manner as the engineer may direct.

SIDE WALLS.

Concrete in the side walls shall be deposited continuously to the height directed and in convenient longitudinal distances.

ROOF.

Concrete in the roofs shall be deposited continuously for the full depths and widths of the roofs and in convenient longitudinal distances.

BULKHEADS.

Temporary bulkheads used for confining concrete as it is deposited shall be designed to give an approved shape to the end of the section of concrete under construction, shall be secured in place before concrete is deposited, and shall remain until concrete is sufficiently set to retain its shape.

REINFORCEMENT.

Where shown on the plans, concrete sewers shall be reinforced with metal of the dimensions and shapes shown and which shall conform to the latest revised specifications for steel reinforcement adopted by the American Society for Testing Materials.

All reinforcing bars shall be as long as can be conveniently used and when a joint is required it shall be made by means of approved clamps, or by looping the ends of the bars around each other in such a manner as to produce and maintain tension on the joint during construction, or by lapping the ends of the bars as directed, and wiring them together in an approved manner or by lapping the ends of the bars for a distance of 21 times their nominal diameters for deformed bars and 40 times their nominal diameters for plain bars and with a space not less than 2 inches between them.

Joints in longitudinal bars shall be staggered as directed.

GENERAL.

Unless otherwise permitted or ordered by the engineer, not less than 16 feet of foundation or invert for sewer shall be built at one operation.

All connections and branches shall be built in where shown on the plans or where directed and these connections and branches shall be closed with bulkheads as shown on the plans or directed.

The lengths of concrete sewers will be determined by measurements along their inverts parallel to the centre lines. No deductions will be made for openings at branches or manholes. The measurement of a branch concrete sewer will be made from the inner surface of the wall of the main sewer to which it connects. A reducer will be paid for at the contract price for the sewer at the larger end thereof.

PRICES TO COVER.

The contract prices for concrete sewers shall cover the cost of all necessary excavation (except rock, when there is a contract price for rock excavation); of furnishing, maintaining and removing all forms, centres, templets, and temporary bulkheads; of all openings and bulkheads; also the removal of all bulkheads in the ends of sewers to which connection is made by the sewers in this contract; of all back filling and repairing streets and sidewalks; of all embankments required; and of all labor and materials required to construct concrete sewers as shown by the normal sections on the plans and as specified.

BRICK SEWERS.

QUALITY OF BRICKS.

All bricks shall be sound and hard burned throughout and of uniform size and quality. They shall be specially selected and no bats shall be used except for closers.

Where shown on the plan, vitrified bricks of approved size and quality shall be furnished and laid. After having been thoroughly dried and then immersed in water for 24 hours they shall not absorb more than 4 per cent. of their weight of water.

Bricks shall be laid wet and each brick shall be laid in mortar so as to form full bed, end and side joints in one operation. The joints shall be not wider than $\frac{3}{8}$ inch. Brickwork shall be laid with an approved bond and wherever possible the joints shall be struck and pointed on the inside.

Inverts of brick sewers shall conform to lines drawn between transverse templets. The arches shall be built on substantial centres and shall be keyed with stretchers in full joints of mortar. The centres shall be true to the required shapes and sizes and shall be of ample strength and properly secured in place. The extrados of the arches shall be smoothly and evenly plastered with a layer of mortar $\frac{1}{2}$ inch thick. The centres shall be left in place until the trench is back filled for its full width to a height of at least 1 foot above the crown of the extrados of the arches. No centre shall be struck or removed without the engineer's permission.

Mortar used in the haunch walls of brick sewers shall be composed of 1 volume Portland cement and 3 volumes of sand. All other mortar shall be composed of 1 volume of cement and 2 volumes of sand. The sand shall be clean and sharp, free from dirt, loam, mica, and organic matter, and shall contain not more than 8 per cent. by volume of clay.

All fresh brickwork shall be carefully protected from freezing and shall be sprinkled with water at such intervals as directed by the engineer to prevent too rapid drying.

LENGTH OF CRADLE.

Unless otherwise permitted or ordered, not less than 16 feet of foundation or cradle shall be built at one operation.

GENERAL.

All connections and branches shall be built in where shown on the plans or where directed and these connections and branches shall be closed with bulkheads as shown on the plans or directed.

The lengths of concrete sewers will be determined by measurements along their inverts parallel to the centre lines. No deductions will be made for openings at branches or manholes. The measurement of a branch concrete sewer will be made from the inner surface of the wall of the main sewer to which it connects. A reducer will be paid for at the contract price for the sewer at the larger end thereof.

PRICES TO COVER.

The contract prices for concrete sewers shall cover the cost of all necessary excavation (except rock, when there is a contract price for rock excavation); of furnishing, maintaining and removing all forms, centres, templets, and temporary bulkheads; of all openings and bulk-

heads; also the removal of all bulkheads in the ends of sewers to which connection is made by the sewers in this contract; of all back filling and repairing streets and sidewalks; of all embankments required; and of all labor and materials required to construct concrete sewers as shown by the normal sections on the plans and as specified.

VITRIFIED PIPE SEWERS.

Vitrified pipe sewers and house connections shall be built of shale or clay hub and spigot pipes. They shall be of a tough vitreous material without warps, cracks, or other imperfections, and shall be fully and smoothly salt-glazed over the entire inner and outer surfaces, except that the inside of the hub and the outside of the spigot may be unglazed for two-thirds of the depth of the hub. Vitrified pipe shall be of such toughness that it can be worked with a chisel and hammer, and when struck with a hammer, it shall have a metallic ring.

Each pipe shall have the name of the manufacturer and of the factory where made clearly impressed on its outer surface.

The sizes of the pipes are designated by their interior diameters. Each pipe shall be a cylinder with a circular section and shall have a uniform thickness.

The approximate weight and dimensions for the respective sizes of vitrified pipes shall be as follows:

STANDARD STRENGTH SEWER PIPE.

Calibre.	Weight per ft.	Depth of Socket.	Annular Space.	Thickness.
4 in.	10 lbs.	1 $\frac{5}{8}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.
6 "	15 "	1 $\frac{7}{8}$ "	$\frac{3}{8}$ "	$\frac{5}{8}$ "
9 "	30 "	2 "	$\frac{3}{8}$ "	13-16 "
12 "	45 "	2 $\frac{1}{4}$ "	$\frac{1}{2}$ "	1 "
15 "	65 "	2 $\frac{1}{2}$ "	$\frac{1}{2}$ "	1 $\frac{1}{8}$ "
18 "	95 "	2 $\frac{3}{4}$ "	$\frac{1}{2}$ "	1 $\frac{1}{4}$ "
21 "	120 "	3 "	$\frac{1}{2}$ "	1 $\frac{1}{2}$ "
22 "	130 "	3 "	$\frac{1}{2}$ "	1 $\frac{5}{8}$ "
24 "	150 "	3 $\frac{1}{2}$ "	$\frac{1}{2}$ "	1 $\frac{5}{8}$ "

DOUBLE STRENGTH SEWER PIPE.

Calibre.	Weight per ft.	Depth of Socket.	Annular Space.	Thickness.
15 in.	80 lbs.	2 $\frac{1}{2}$ in.	$\frac{1}{2}$ in.	1 $\frac{1}{4}$ in.
18 "	115 "	2 $\frac{3}{4}$ "	$\frac{1}{2}$ "	1 $\frac{1}{2}$ "
21 "	150 "	3 "	$\frac{1}{2}$ "	1 $\frac{3}{4}$ "
22 "	160 "	3 "	$\frac{1}{2}$ "	1 5-6 in.
24 "	200 "	3 $\frac{1}{4}$ "	$\frac{1}{2}$ "	2 in.

CURVES, BENDS, ETC.

Where curved pipes are required they shall be furnished in either one-eighth or one-quarter bends of their respective sizes. Curved pipes, bends, siphons, and special pipe of the sizes and forms shown on the plans shall be provided and laid.

SAMPLES.

For the purpose of making tests as may be required the contractor shall furnish and deliver to the engineer at the place required one length of pipe for each 200 feet of pipe sewer to be laid.

Any or all of the following tests may be applied to samples selected by the engineer.

CRUSHING TESTS.

When supported at the bottom upon a knife edge one inch in width in such a manner that an even bearing is provided throughout the whole length, exclusive of the socket, and pressure is applied at the

crown uniformly through a similar knife edge, the various sizes of pipes shall withstand the following pressures:

Diameter Inches.	Pressure lbs. per lin. ft.	Diameter Inches.	Pressure lbs. per lin. ft.
6	900	22	1750
12	1050	30	2350
15	1250	33	2500
18	1400	36	2800
21	1550	42	3200

DROP WEIGHT TEST.

When supported on a dry sand bed 2 inches deep, all pipe shall withstand without cracking the impact from 2 blows of a cast iron ball weighing 8 pounds falling 18 inches. Spurs shall resist without fracture the impact from 2 blows of such a ball falling 6 inches and striking on the extreme end of the hub of the spur.

HYDROSTATIC TEST.

When subjected to an internal hydrostatic pressure of 10 pounds per square inch, vitrified pipe shall show no percolation.

ABSORPTION TEST.

After having been thoroughly dried and then immersed in water for 24 hours, sample pieces of vitrified pipe about 10 square inches superficial area with all edges broken shall not absorb more than 5 $\frac{1}{2}$ per cent. of their weight of water.

FACTORY REJECTION.

The entire product of any factory may be rejected when, in the judgment of the engineer the methods of manufacture fail to guarantee uniform results or where the pipes under test fail to comply with the requirements specified herein.

Where required by the plans, pipes shall be laid in concrete cradles, in beds of gravel, broken stone, or sand. When the sewer is to be laid in a concrete cradle, the concrete for the full width of the cradle shall be deposited continuously, to the height of the bottom of the pipe, and before the concrete has set the pipe shall be evenly bedded therein and the remainder of the concrete immediately deposited and carefully tamped.

All pipes shall be laid with ends abutting and true to line and grade. The pipes shall be fitted together and matched so that they will form a sewer with a smooth and uniform invert.

JOINTS.

(1) Plain mortar joints shall be made as follows: Before a pipe is laid the lower half of the hub of the preceding pipe shall be plastered with a stiff 1 to 1 mortar. After the pipe is laid the remainder of the hub shall be thoroughly filled with similar mortar and the joint wiped inside and finished to a smooth bend outside.

(2) Gasket and mortar joints shall be made as follows: A closely twisted hemp or oakum gasket of approved diameter in no case less than $\frac{3}{4}$ inch and long enough to pass around the pipe and lap at the top shall be solidly rammed into the annular space between the pipes. Before being placed the gasket shall be saturated with neat cement grout. The remainder of the space shall then be completely filled with plastic mortar mixed 1 to 1 and the joint wiped inside and finished to a smooth level outside.

(3) Joints of sanitary pipe sewers below the normal water table shall be made with a compound approved by the engineer. The compound shall have a bituminous base, shall adhere firmly, shall melt and run freely at a temperature of 250 degrees F., and when set shall be sufficiently elastic to permit of a slight movement of the pipes without injury to the joints. The compound shall not deteriorate when submerged in water or domestic sewage.

The joint shall be made by ramming a gasket into the annular space as specified hereinbefore. The compound heated to about 400 degrees F. shall then be poured into the annular space in such a manner as to completely fill it to within $\frac{1}{2}$ inch of the outer run of the pipe.

All sanitary pipe sewers below the normal water table shall be laid in concrete cradles.

After the joints are run and the concrete cradle is placed these portions of the joints not embedded in the cradle shall be encased in a 1 to 1 cement mortar which shall extend at least two inches from the face and outside of the bell.

INSPECTION.

Unless otherwise specified at least four finished joints shall be left exposed for inspection throughout the working day. Suitable staging and ladders shall be provided to facilitate this inspection.

SUB-GRADE TO BE TESTED.

No pipe or cradle shall be laid until the sub-grade has been tested and found correct.

SEWERS TO BE KEPT CLEAR.

The interior of the sewer shall, as the work progresses, be cleared of all dirt and other materials.

BRANCH PIPES.

Branch pipes and connection pipes shall conform with all the requirements specified herein for vitrified sewer pipes. Dead ends of pipes shall be closed with bulkheads of brick masonry 8 inches in thickness.

BACKFILLING.

(Adopt backfilling as specified for concrete sewers.)

CONNECTION WITH EXISTING WORK.

Wherever the proposed sewer is to connect with an existing manhole in which there is a branch pipe which is damaged or of unsuitable size or in improper position, such pipe shall be removed and be replaced with a pipe of suitable size or be reset in the proper position. The pipe so substituted will be paid for at the contract price for the corresponding size of pipe sewer.

The ends of pipes which enter masonry shall be neatly cut to fit the face of the masonry.

The contract prices for pipe sewers shall cover the cost of all necessary excavation (except rock when there is a contract price for rock excavation); of all sand, gravel, broken stone, or concrete cradles required; of the making of all joints as specified; of all necessary trimming, fitting and building into masonry; of all bulkheads, also the removal of all bulkheads in the end of sewers to which connection is made by the sewers in the contract; of all back filling and repairing streets and sidewalks; of all embankments required; of all samples furnished, and of all labor and materials required to furnish and lay the sewers complete in place, and shown on the plans and as specified herein.

CAST IRON PIPE SEWERS.

Cast iron pipe for sewers shall conform with all the requirements specified hereinbefore for Cast Iron Water Pipes and Special Castings, and all tests required shall be made in accordance therewith.

The thickness of shell and weight of the several classes of pipe, and the allowable variations of diameter and weight shall be as follows:

Nominal Inside Diam. Inches	CLASS A. 100 foot head 43 lbs. pressure		CLASS B. 200 foot head 80 lbs. pressure		CLASS C. 300 foot head 130 lbs. pressure		Allowable Variations Diam. Inches Weight	
	Thickness Inches	Weight Pounds	Thickness Inches	Weight Pounds	Thickness Inches	Weight Pounds		
4	0.42	240	0.45	260	0.48	280	0.06	5%
6	0.44	370	0.48	400	0.51	430	0.06	5%
8	0.46	515	0.51	570	0.56	625	0.06	5%
10	0.50	685	0.57	765	0.62	850	0.06	5%
12	0.54	870	0.62	985	0.68	1100	0.06	5%
14	0.57	1075	0.66	1230	0.74	1400	0.06	5%
16	0.60	1300	0.70	1500	0.80	1725	0.06	5%
18	0.64	1550	0.75	1800	0.87	2100	0.08	4%
20	0.67	1800	0.80	2100	0.92	2500	0.08	4%
24	0.76	2450	0.89	2800	1.04	3350	0.08	4%
30	0.88	3500	1.03	4000	1.20	4800	0.10	4%
36	0.99	4700	1.15	5450	1.36	6550	0.10	4%
42	1.10	6150	1.28	7100	1.54	8600	0.10	4%
48	1.26	8000	1.42	9000	1.71	10900	0.12	4%
54	1.35	9600	1.55	11200	1.90	13700	0.15	4%
60	1.39	11000	1.67	13250	2.00	16100	0.15	4%

The above weights are for 12 feet laying lengths and standard sockets; proportionate allowance will be made for any variation therefrom.

Joints of cast iron pipe shall be of the kind shown on the plan.

LEAD JOINTS.

When lead joints are required the inner portion of the annular space between the pipes shall be packed with clean, sound jute packing yarn and the remaining portion shall be run full of pure, soft lead, and calked with suitable tools. Unless otherwise shown on the plan the depth of the lead joints shall be 2½ inches for 6" to 8" pipe; 3 inches for 12" to 24" pipe, and 3½ inches for 30" to 48" pipe.

MORTAR JOINTS.

When gasket and mortar joints or plain mortar joints are required they shall be made as hereinbefore specified for vitrified pipe sewer joints. All the requirements, as hereinbefore specified, relating to excavation, laying, backfilling and measurements of vitrified pipe sewers shall apply, as far as they are applicable, to cast iron pipe sewers.

PRICES TO COVER.

The contract prices for cast iron pipe sewer shall cover the cost of all necessary excavation (except rock when there is a contract price for rock excavation); of all sand, gravel, broken stone, or concrete cradles required; of the making of all joints; of all bulkheads; of all backfilling; of all embankments required; of repairing all streets and sidewalks; and of all labor and materials required to furnish and lay the sewers complete in place, as shown on the plans and as specified.

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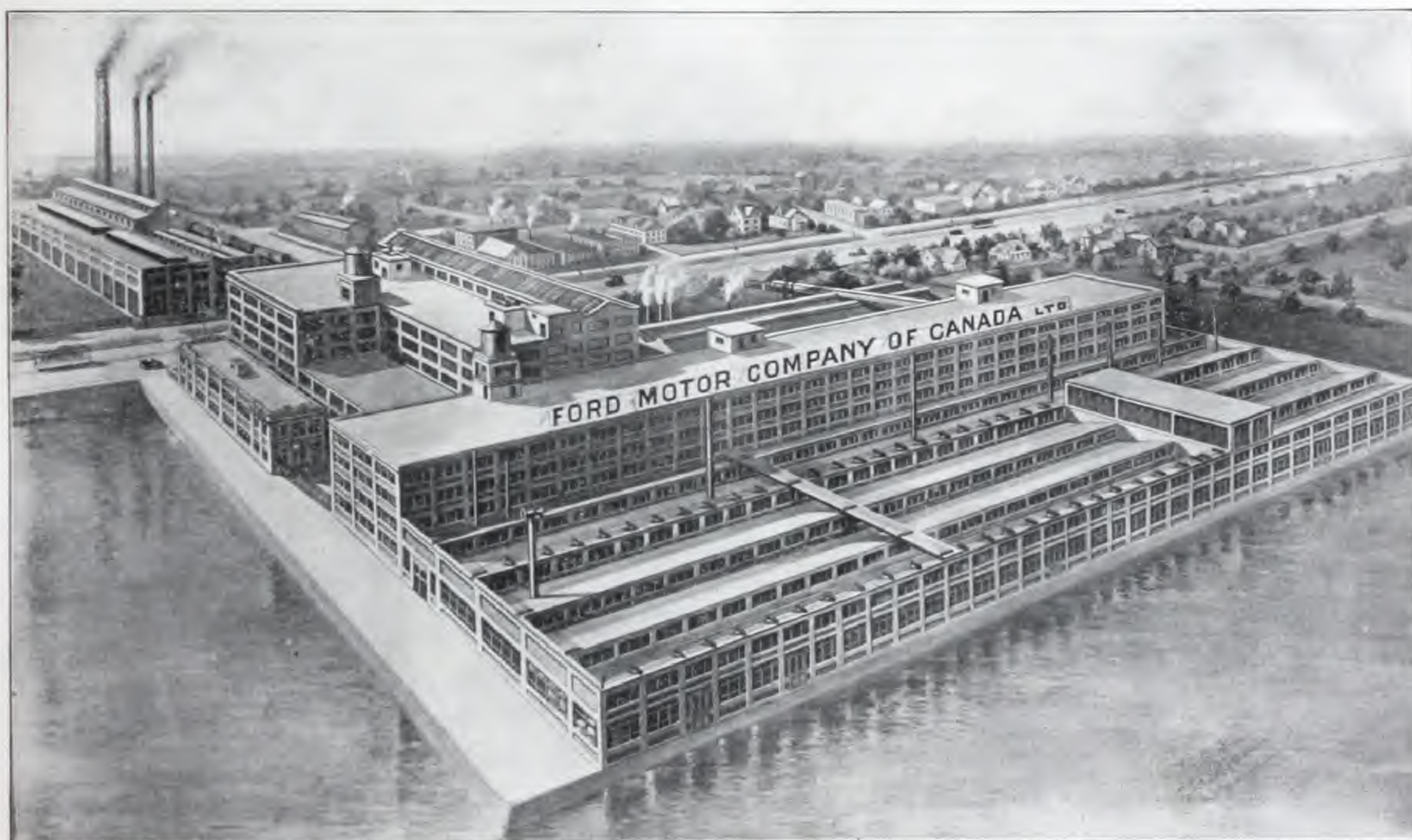
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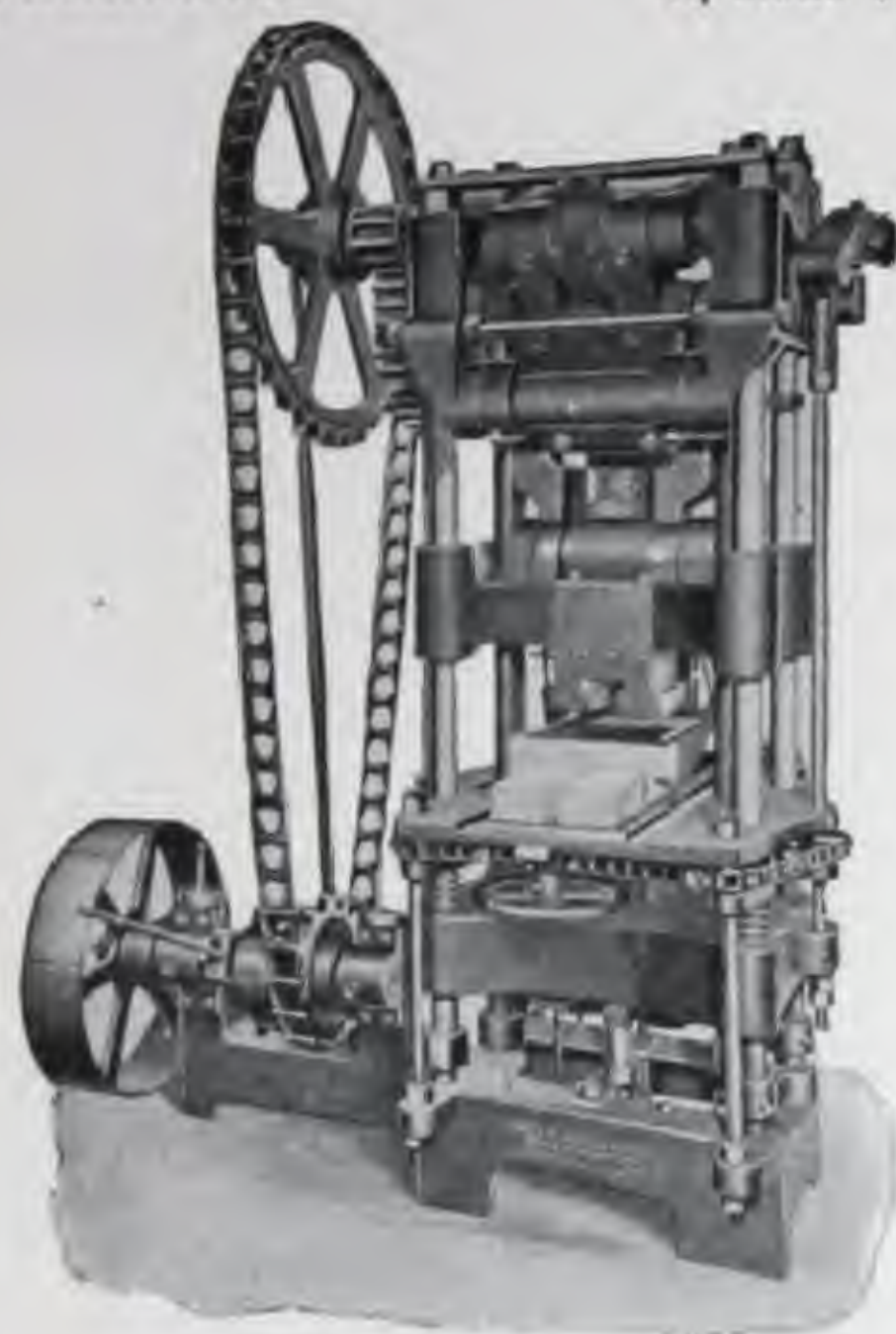
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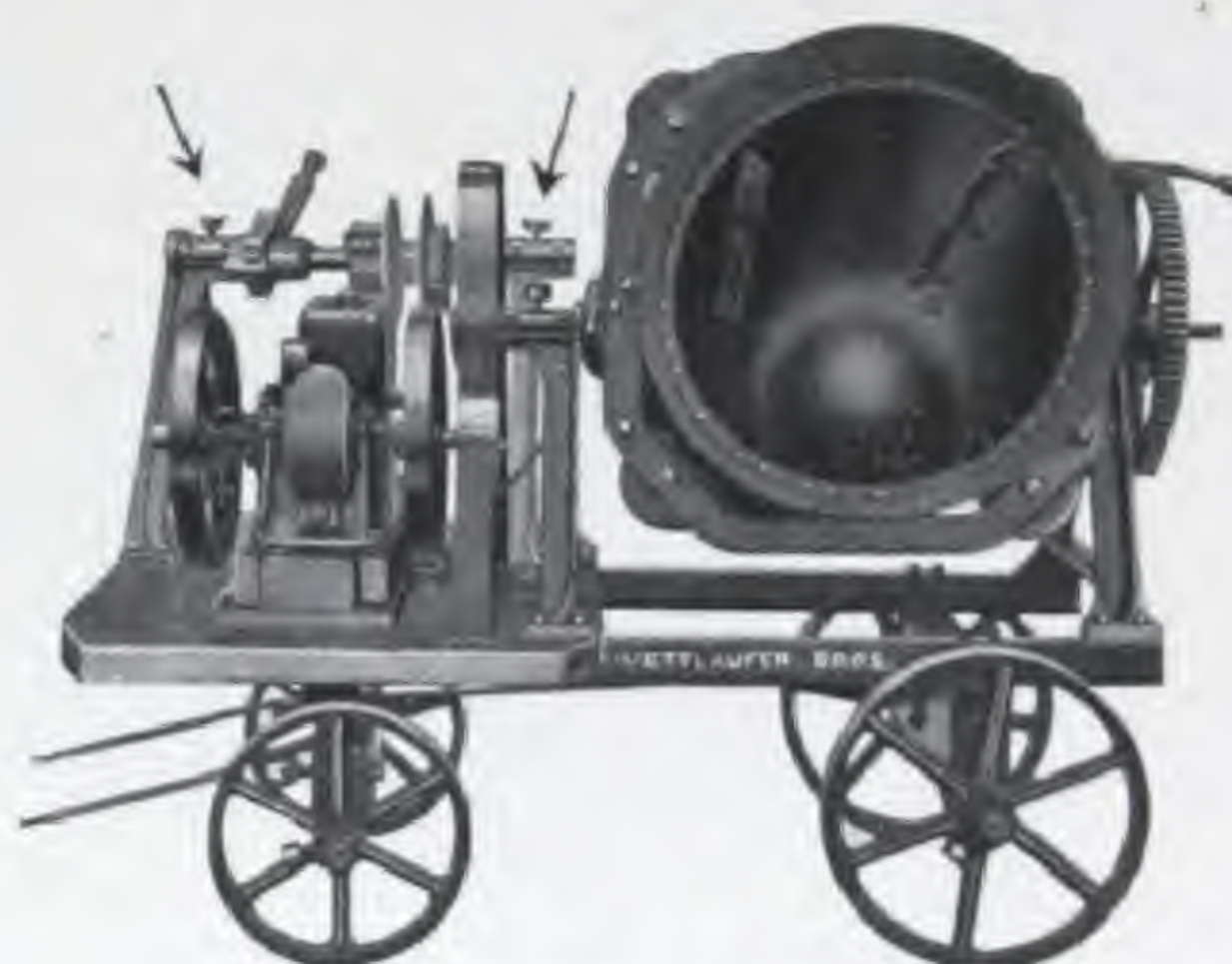
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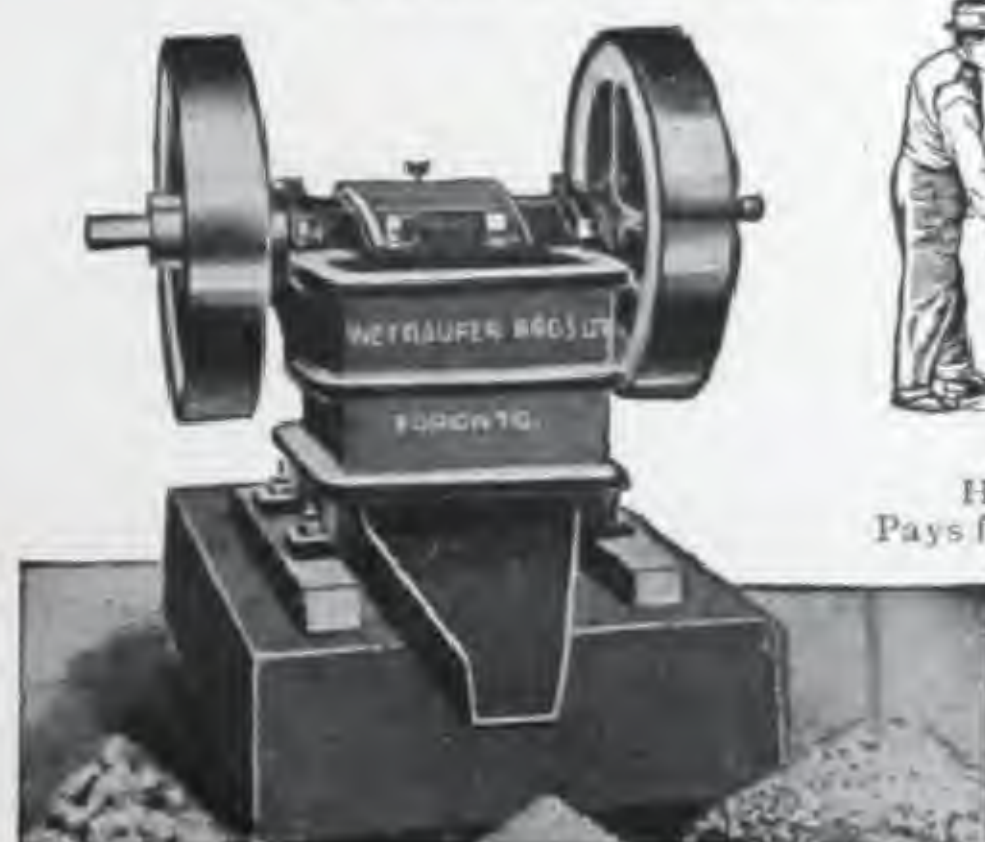
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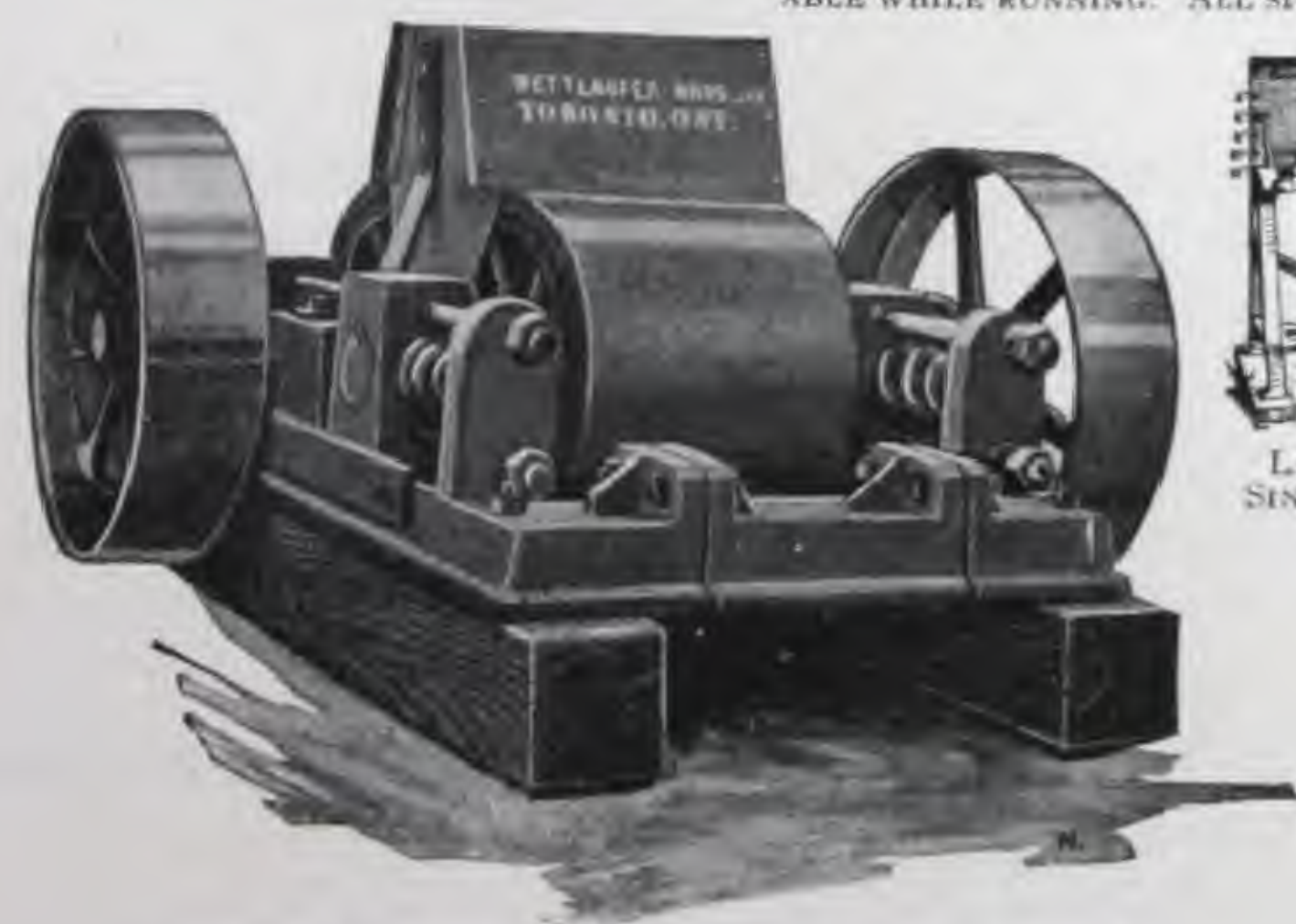
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Pays for itself in 7 days.



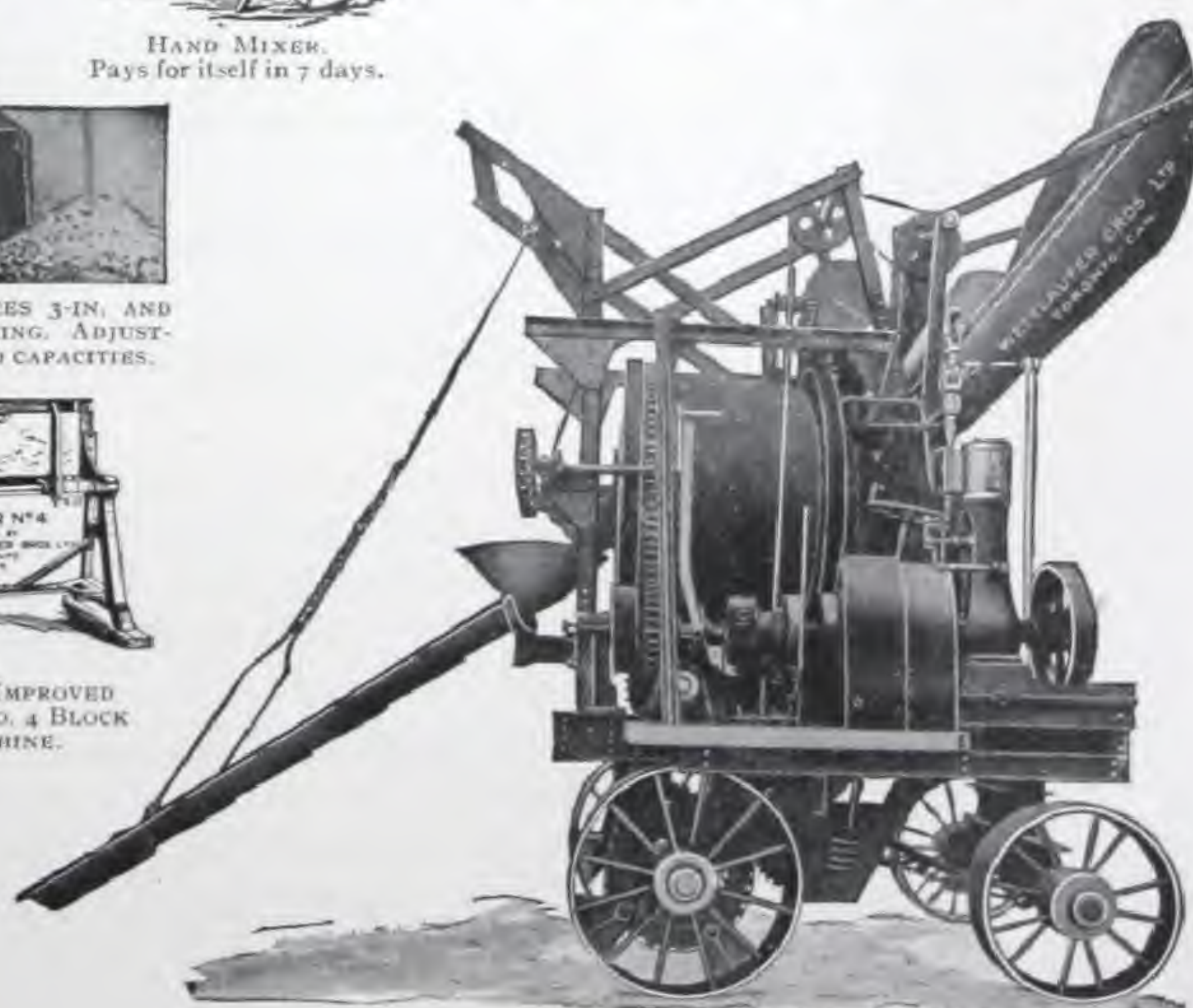
DRAIN TILE AND SEWER PIPE MACHINES. ALL SIZES.



LATEST IMPROVED CRUSHING OR PULVERIZING ROLLS.
FROM 36 TO 4000 TONS PER 10 HOURS.



LATEST IMPROVED
SINGER NO. 4 BLOCK
MACHINE.



LATEST MODEL ROAD PAVING MIXER.
Built in two sizes. Side view showing hopper up discharging into drum.

INFORMATION.

Our new Catalogue with prices and full information will be forwarded upon request.

THE DON VALLEY BRICK WORKS

HEAD OFFICE, DOMINION BANK BUILDING,
TORONTO, ONT.

MONTREAL AGENT:
DAVID MCGILL,
320 LAGAUCHETIERE STREET.

WORKS:
DON VALLEY, TORONTO.

PRODUCTS.

We are the largest manufacturers in the Dominion of High-Grade BURNT CLAY PRODUCTS, and have exceptional facilities for turning out PRESSED BRICKS, ENAMELLED BRICKS, ordinary KILN RUN STOCK BRICKS and TERRA COTTA HOLLOW TILES for fireproofing.

PRESSED BRICKS.

Our Standard Red and Buff Pressed Bricks are of the highest grade, and we are prepared to supply Bricks for special work that are selected from the finest stock.

SPECIAL BRICKS.

We carry in stock large quantities of Bullnoses and Base Bricks, and are prepared to make Specially Moulded Bricks or Arch Bricks from Architects' drawings.

STOCK BRICKS.

We also manufacture and carry large quantities of Red and Gray Stock Bricks of excellent colour, hard-burned, with faces and arrises true.

CLINKER BRICKS.

We make hard-burned Clinker Bricks, vitrified throughout, suitable for paving and heavy foundations.

SIZES.

Standard size Pressed Bricks, approximately: Red, $8\frac{3}{8} \times 2\frac{3}{8} \times 4\frac{1}{8}$; Buff, $8\frac{1}{2} \times 2\frac{1}{2} \times 4\frac{1}{4}$.

Standard size Stock Bricks, approximately: $8\frac{5}{8} \times 2\frac{1}{2} \times 4\frac{1}{4}$.

FACILITIES.

Our facilities are exceptional for turning out first-class material. The extensive clay-beds in the Don Valley are so widely known as being one of the few clay deposits that are suitable in quality, free from lime, and having the necessary ingredients to form a good Brick.

CAPACITY.

Our total annual capacity is 75,000,000; we always carry a large stock and can fill orders promptly. We have excellent shipping facilities and will be pleased to quote prices, including freight.

We will gladly supply samples of our bricks to prospective users, express prepaid.

ENAMELLED
BRICKS.

We manufacture High-Grade ENAMELLED BRICKS in the following colours: Yellow, Brown, Chocolate, Sage Green, Light Green, Dark Green, Cobalt Blue, Robin's Egg Blue, Dark Blue, Light Buff, Dark Buff, Granite, Mottled, Black Manganese, White and Red.

UNIFORMITY OF
SHADES.

We guarantee uniformity of shades.



ADAPTABILITY.

Enamelled Bricks are used where light and cleanliness are essential; for instance, Light Shafts and Courts, Elevator Shafts, Bakeries, Restaurants, Markets, Subways, Tunnels, Railway Depots, Fire Engine Houses, Bank Vault Interiors, Sanitariums, Mausoleums, Stables, Swimming Pools, Turkish Baths, Kitchens, Laundries, Smoking Rooms, Power Houses, etc.

SPECIAL SHAPES
AND COLOURS.

We are at all times pleased to make special and ornamental Enamelled Bricks in any colours or shapes desired by Architects to fill peculiar conditions, and invite correspondence in regard to same.

See also our advertisement on pages 28-29.

HOCKING VALLEY FIRE CLAY CO.

MANUFACTURERS OF SALT GLAZED BRICK, NELSONVILLE, OHIO.

SALES AGENCIES IN ALL PRINCIPAL CITIES OF UNITED STATES AND CANADA.

PRODUCTS

ATHENA SALT GLAZED BRICK

ATHENA SALT GLAZED BRICK, EVERWEAR PAVING TILE, SANITARY FLOOR BRICK.

SIZE— $8\frac{1}{4}$ by 4 by $2\frac{1}{4}$ ins.

SHADE NUMBERS, ETC.—Made in beautiful shades of mahogany (105), brown (106), golden (107), buff (108), thoroughly vitrified and salt glazed on both faces and ends, and rich in both color and glaze. All standard shapes carried in stock and special shapes made on order.

INTERIOR USES.—For facing entire interior walls or wainscot work wherever sanitary conditions are desired. Principal places: Schools, hospitals, gymnasiums, swimming pools, stables, garages; office, factory and warehouse buildings; prisons, power plants, city market houses; acid rooms and vats; fire engine houses, packing plants; subways, passenger and freight depots.

FEW IMPORTANT JOBS (INTERIOR)

World's Largest Electric Generating Station, United Electric Light & Power Co., 201st Street, New York City (see illustration).
Lincoln Park Lion House, Chicago, Ill.
Roseland and Mayfair Pumping Stations, Chicago, Ill.
Twin Market Houses, Pittsburgh, Pa.
Fire Engine Houses, Chicago, New York and Boston.
General Chemical Co. Plants (many parts of United States).
Swift & Armour Packing Plants (various places).
Pennsylvania Railroad Stations and Tunnels.
Ohio Penitentiary, Columbus, Ohio.
Both High and Grade Schools in all principal cities of United States and Canada.



201ST STREET GENERATING STATION, UNITED ELECTRIC LIGHT & POWER CO., NEW YORK, N.Y.
W. E. MCCOY, ENGINEER. F. F. NESBIT & CO., CONTRACTORS.
650,000 brick used, shades 103 and 102 (Interior).

EXTERIOR USES.—For facing all exterior walls where a beautiful sanitary and permanent wall is desired, and not affected by acids or the elements.

FEW IMPORTANT JOBS (EXTERIOR).

6-Story Moose Building in Loop District, Chicago, Ill. 3-Story Business Block, Marvin DeMaine, Pomeroy, Ohio.
3-Story Business Block, Dr. J. E. Pickett, Minersville, Pa. Apartment buildings in all principal cities.
These brick have been furnished for exterior facing in almost every conceivable class of building.

EVERWEAR PAVING TILE

SIZE—10 by 5 by $2\frac{1}{4}$ ins. Extensively used for paving floors of engine and boiler rooms, power and industrial plants, basements of public buildings, schools, warehouses and battery rooms, paving around electric and steam railway passenger and freight depots. Thoroughly vitrified and only one side glazed, and unsurpassed for beauty and wearing qualities. 50% saving over cement floors on original cost, and with many times life of a cement floor. These tile have been upon the floors of boiler and engine rooms of the New York Life Insurance Building, New York, for 20 years and show scarcely any wear.

FEW OF MANY CONCERNS USING SAME.

Chicago Edison Electric Co., Chicago, Ill. Cleveland Electric Railway Co., Cleveland, Ohio.
Cincinnati Gas & Electric Co., Cincinnati, O. Ford Motor Co., Detroit, Mich.
Aluminum Castings, Co., Detroit, Mich. Hocking Valley Railway Co., Columbus, Ohio.

SANITARY FLOOR BRICK

SIZE— $8\frac{1}{4}$ by 4 by $1\frac{3}{8}$ ins. This product is usually embedded in cement and adapted to practically the same class of floors as those above named for our Everwear paving tile, but where the desire is for lighter weight material. Especially desirable in packing house floors, and is being used extensively for such purposes. Only one side is glazed and either side can be turned up as desired.

FEW SPECIAL JOBS.

Cincinnati Abattoir Co., Cincinnati, Ohio. Detroit Edison Co., Detroit, Mich.
Wm. Davies, Ltd. (Packing Plant), Toronto, Ont.

GENERAL QUALITIES OF SALT GLAZED MATERIAL

All shades of the standard brick and three classes of floor brick are burned to about 2,200 deg. Fahr.; thoroughly vitrified and salt glazed; absolutely acid-proof; non-absorbent of moisture; will not craze, crack or peel; withstand all the elements of the air besides heavy crushing strain, and always look fresh and clean.

SAMPLES

Communicate with us, and we will direct the nearest sales agency to submit samples and prices at once.

FACILITIES

With a daily capacity of 50,000 brick, or approximately, 15,000,000 annually, and a large and well-selected stock for quick shipment, all business is given prompt attention.

AMERICAN ENAMELED BRICK AND TILE CO.

(INCORPORATED 1893.)

MANUFACTURERS OF
ENAMELED AND FIRE BRICK.52 VANDERBILT AVE.,
NEW YORK, N.Y.DEALERS IN FACE BRICK
OF ALL COLORS AND TEXTURES.

AGENTS IN ALL PRINCIPAL CITIES OF THE UNITED STATES, AND IN

MONTREAL, OTTAWA, TORONTO, HAMILTON, LONDON, WINDSOR, WINNIPEG, CALGARY AND VANCOUVER, CANADA.

PRODUCTS.

ENAMELED BRICK White, Mottled and Standard Colors in Standard Sizes and Ornamental Shapes. (See plates.) We are the largest manufacturers of this commodity in North and South America.

FIRE BRICK, Standard 9 in. and 9 in. Series Shapes, as adopted by the Members of the Refractories Manufacturers Association, and Special Shapes.

FIRE CLAY, packed in bags or in bulk.

FACE BRICK, all colors and textures.

TERRITORY.

The business operations of this firm cover North and South America, Europe, Asia and Australia.

PERSONAL
REPRESENT-
ATIVES.

For the convenience of our customers in the United States and Canada, we have, in order to keep in closer touch with them, located representatives in all the principal cities to attend personally to inquiries, orders and deliveries.

DISPATCH OF
SHIPMENTS.
SHIPPING
FACILITIES.

Factory and office are in constant telephone connection with each other, and we have a local telephone exchange connecting every department of the factory for quick and systematic dispatch of business.

Our works, located but an hour's travel from the New York Office, are situated so as to enable shipping over two of the largest railroads, viz., the Pennsylvania and the Central of New Jersey, and their connecting lines. We are also situated on tide water, so that shipments can be made by vessel for the coastwise and export trade.

PRECAUTION
AGAINST DELAY.

Every part of our factory, including machinery, has its duplicate, which prevents any possibility of delay caused by breakdowns, should they occur.

CAPACITY.
STOCK.

Our present capacity is 12,000,000 brick per annum, which will be increased as occasioned by the demand.

The average stock on hand at our factory is more than 2,000,000 brick, giving a large assortment for immediate shipment.

ILLUSTRATIONS
OF STOCK
DESIGNS OF
ENAMELED
BRICK.

Much delay is saved by use of stock design of moulded brick.

In the following pages are shown designs that we recommend as being most satisfactory in manufacturing results.

We try to keep a stock of these on hand, in standard colors.

These designs are chosen to reduce manufacturing difficulties and delays to a minimum; to enable composite mouldings to be made up; and to enable prompt filling of orders.

DETAILS
REQUIRED FOR
SPECIAL
ENAMELED
ARCH BRICK
WORK.

When ordering special arches, please consult the accompanying cuts and give all necessary information as to details. Furnish details as long as possible in advance of time the arches will be required. We should be allowed from four to six weeks' time to make up arch brick to conform with detail. We keep no arches in stock.

We cannot always guarantee uniformity of shade in arches as in regular deliveries of first quality plain stock brick, therefore strongly recommend the use of stock specials for lintels of doors and windows. (See study of window opening on third page.)

COLORS—

BRIGHT, MEDIUM
OR MATT FINISH
ENAMEL.

In addition to our regular white and standard colors, such as our sage green, red brown, etc., we have made a specialty of mottles in the following colors:

Gray, brown, black, blue and blue brown, which give a very fine appearance for both interior and exterior work, having a finish more on the type of marble than enameled brick.

If you have in mind, at any time, a particular color, shade or finish of enameled brick for interior or exterior purposes, advise us your ideas and requirements and we will be pleased to submit samples.

UNIFORMITY OF
SHADE OF
ENAMELED
BRICK.

We guarantee uniformity of shade in all first quality deliveries to the limit of practicability. Colors and effects giving most uniform results are, in order of degree of uniformity, white, mottled gray, mottled brown, mottled black, sage green and red brown. Other colors follow in irregular positions.

We will try on orders of moderate size, or on larger orders, if ample time be given, to match in shade the moulded and stretcher stock, but cannot always guarantee to uniformly shade shipments of specials, particularly on rush shipments.

SPECIAL
FEATURES AND
ADVANTAGES
OF OUR
ENAMELED
BRICK.

In making our product we follow the English and Scotch systems, working by the soft mud process. This is without question the only process which insures durability and the closest relation of bond obtainable between body and glaze.

Our brick are burnt in but one fire, thus making the chemical change in the body and the glaze simultaneous.

Where manufacturers use the dry pressed process, the brick have to be burnt first as front brick before the enamel can be applied, and fired again for the fluxing of the glaze.

Where the enamel is applied on an already burnt brick and fluxed in a second fire, the bond is weak and peeling is sure to follow.

We use hard and durable glazes, not soft lead glazes frequently seen on inferior grades of enameled brick and tile.

There has not been a single case during our twenty-eight years of business where any peeling or discoloring has been seen or reported.

This is better than any guarantee which we might be asked to give, as it covers a distributed output of over 115,000,000 brick, located all over the United States and elsewhere and subject to all varieties of climatic conditions.

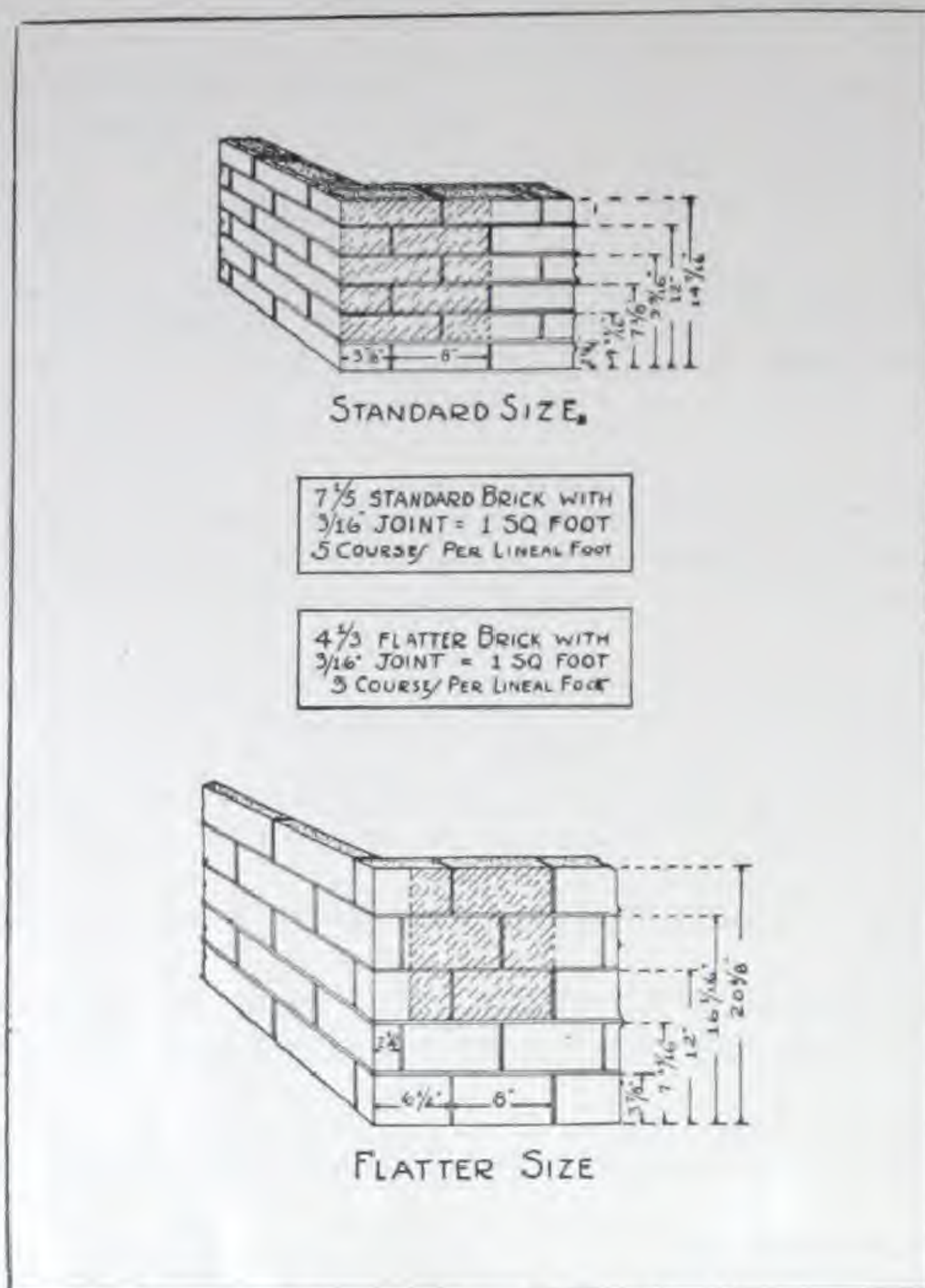
CLEANING.

Enameled Brick are best cleaned with some alkaline solution, such as caustic soda or sodium carbonate. This cleans the enamel and does not affect the cement or lime mortar.

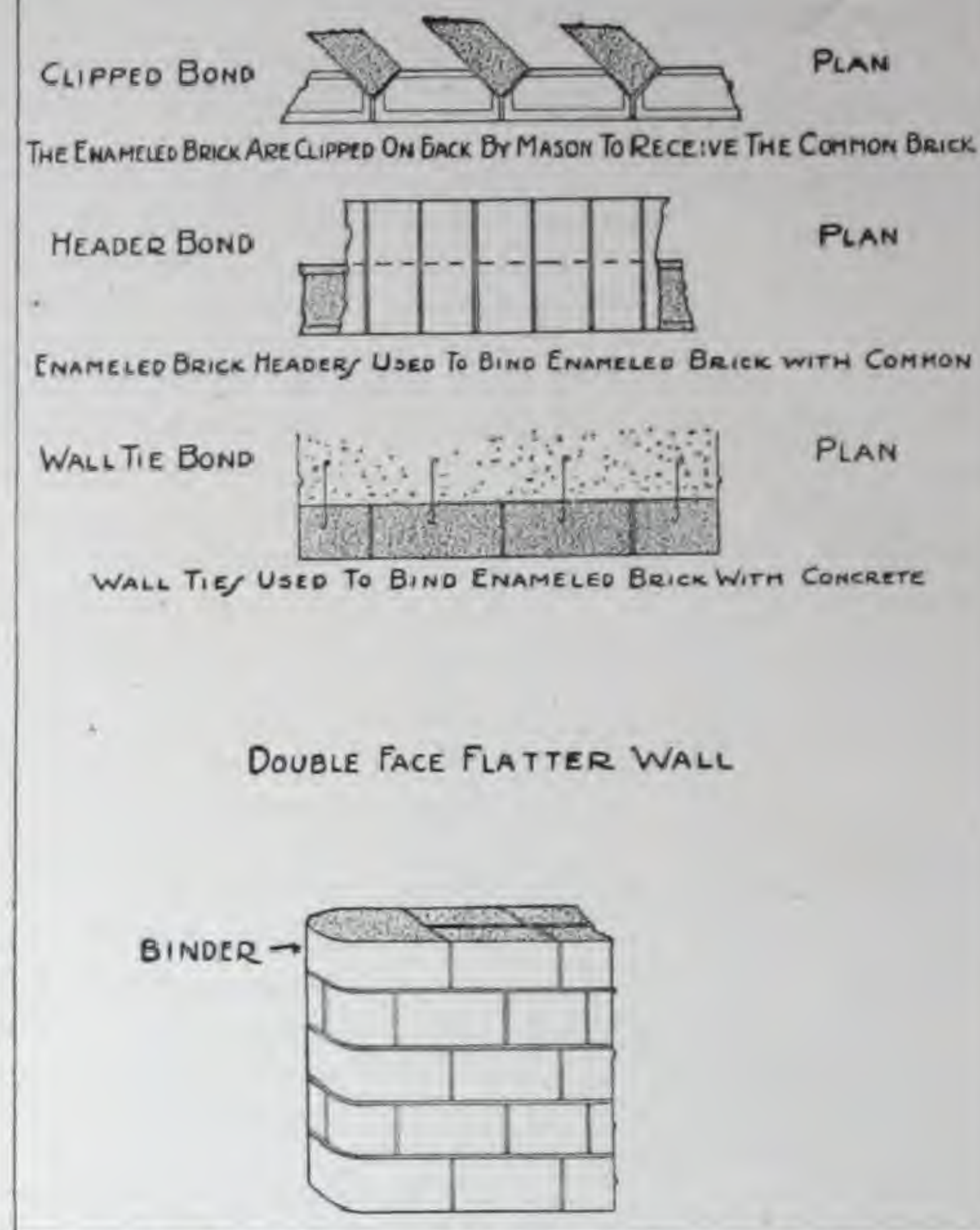
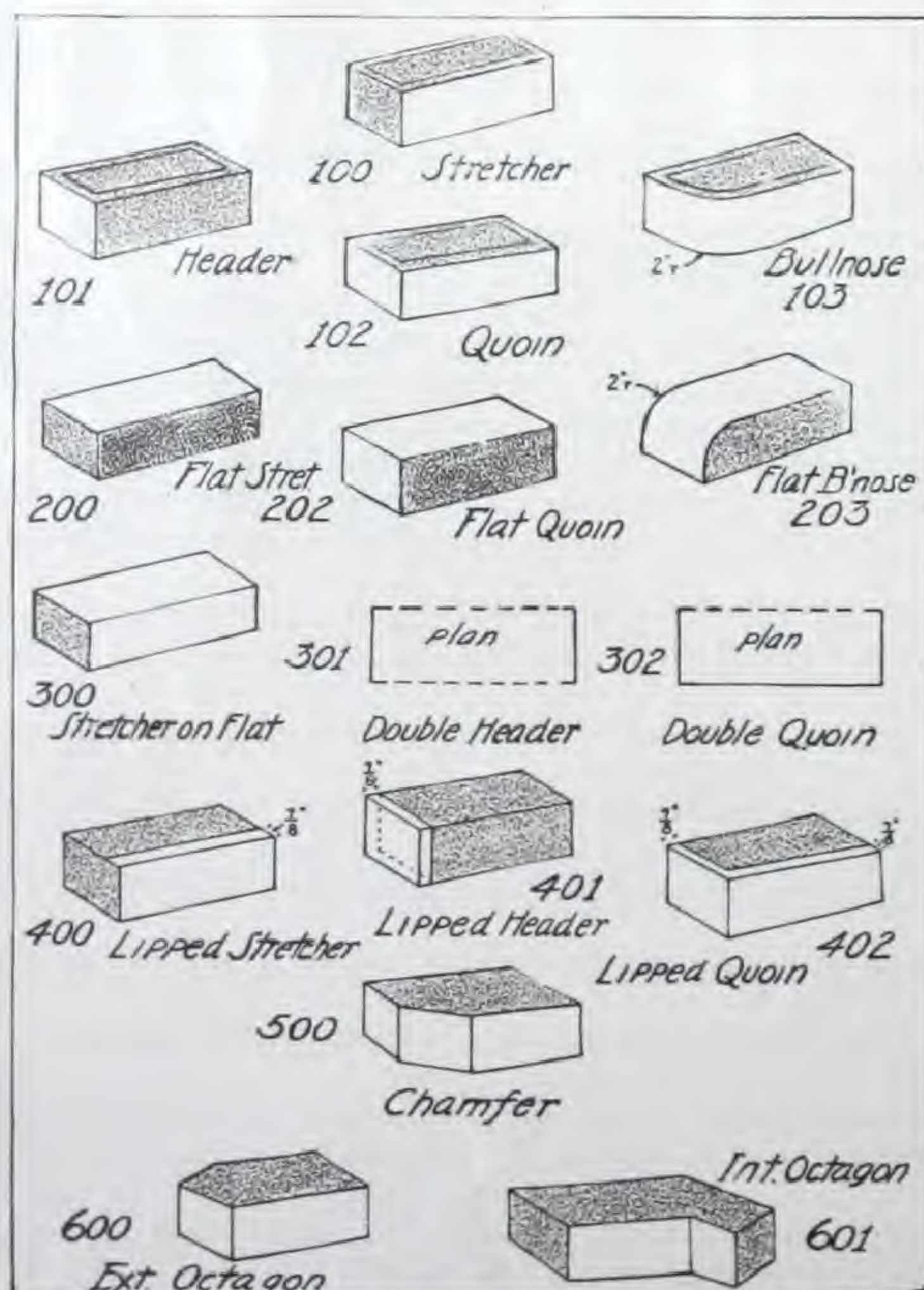
ACIDS.

Sulphuric, nitric, or hydrochloric acids, even in concentrated form, will not affect our glazes; but if used as a wash, even when diluted, they will attack the cement or lime mortar.

The only commercial acids which will attack and destroy our enamel are hydrofluoric and hydrofluorsilicic.

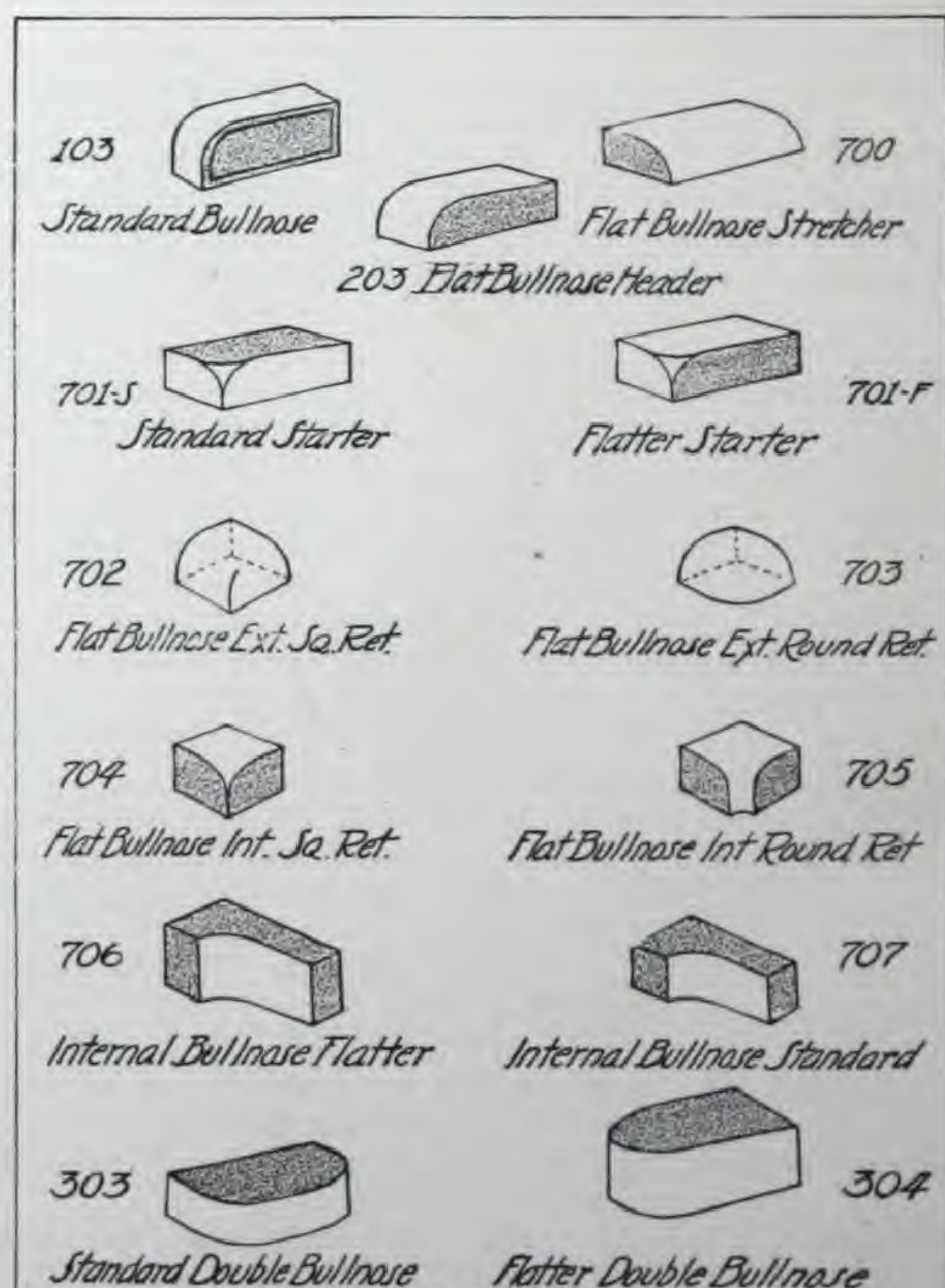
COMPARISON OF SIZES SHOWING
NUMBER OF BRICKS PER SQUARE FOOT

All dimensions are approximate.

SYSTEM OF BONDING OR TYING ENAMELED BRICK
TO COMMON BRICK OR CONCRETE BACKING, also
METHOD OF BONDING FLATTER BRICK FOR PARTITIONS

ILLUSTRATIONS OF TYPES

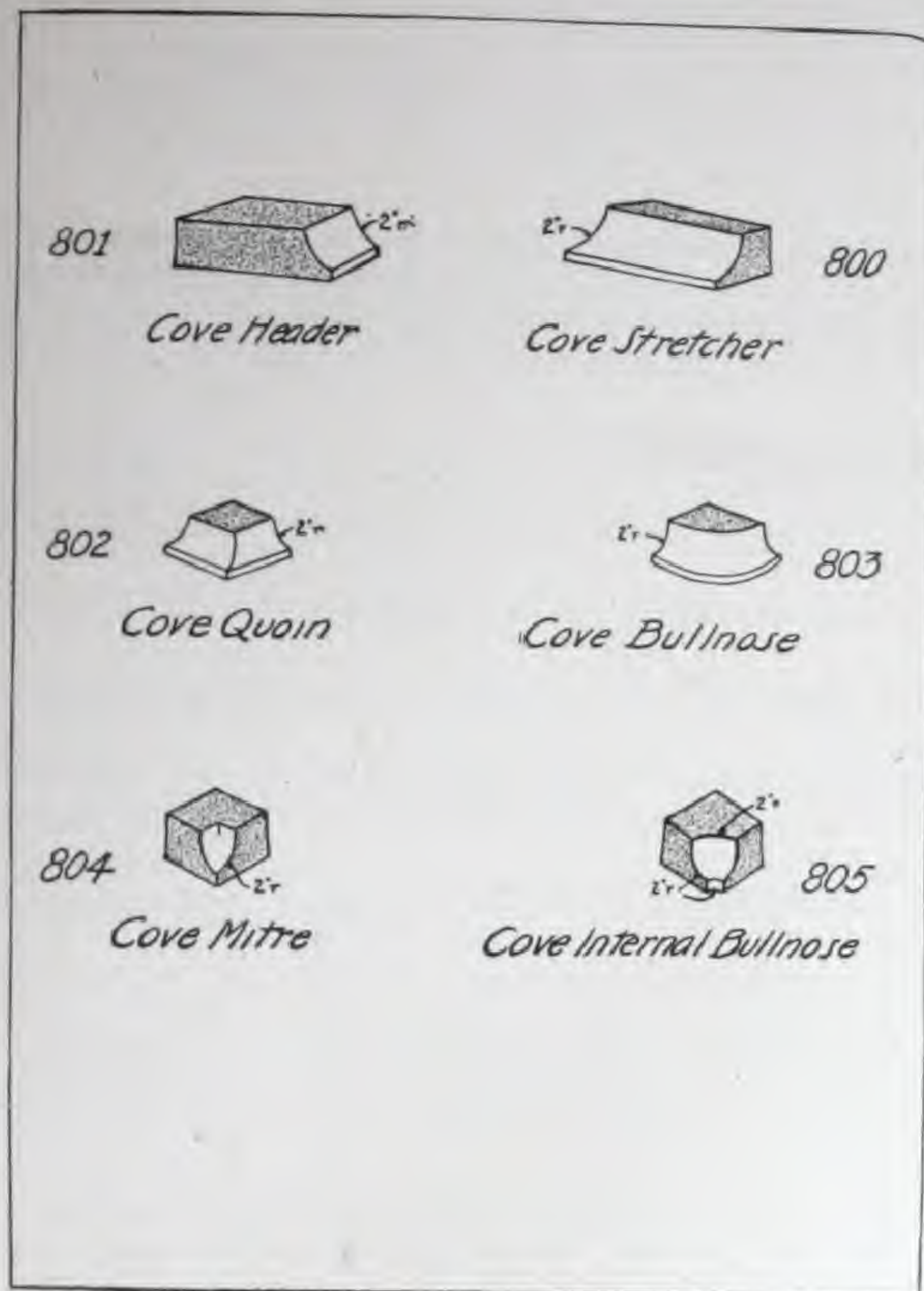
For projection and dimensions see next page.



BULLNOSE SPECIALS

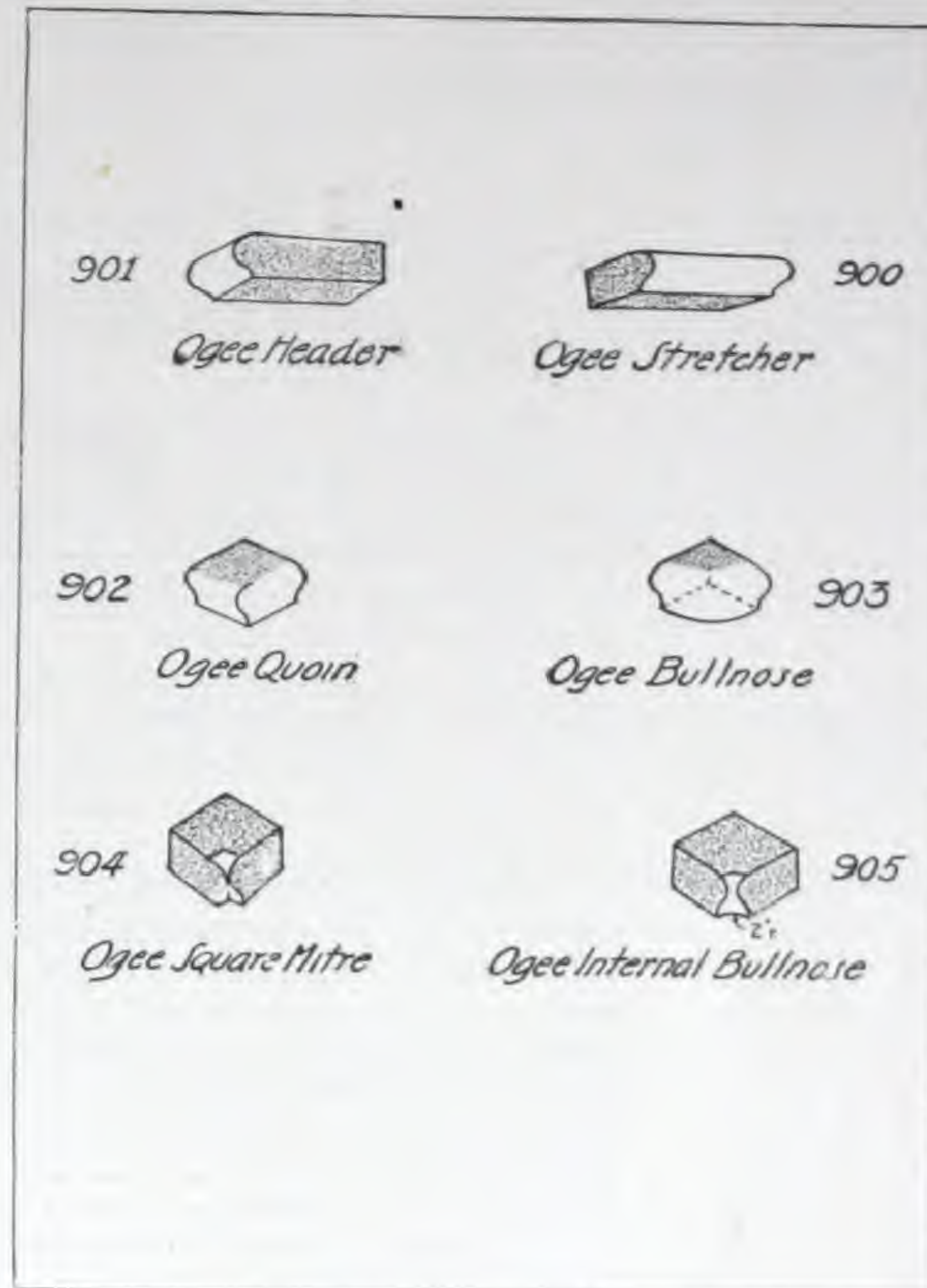
For projection and dimensions see next page.

All Brick shown have 2-inch Radius.



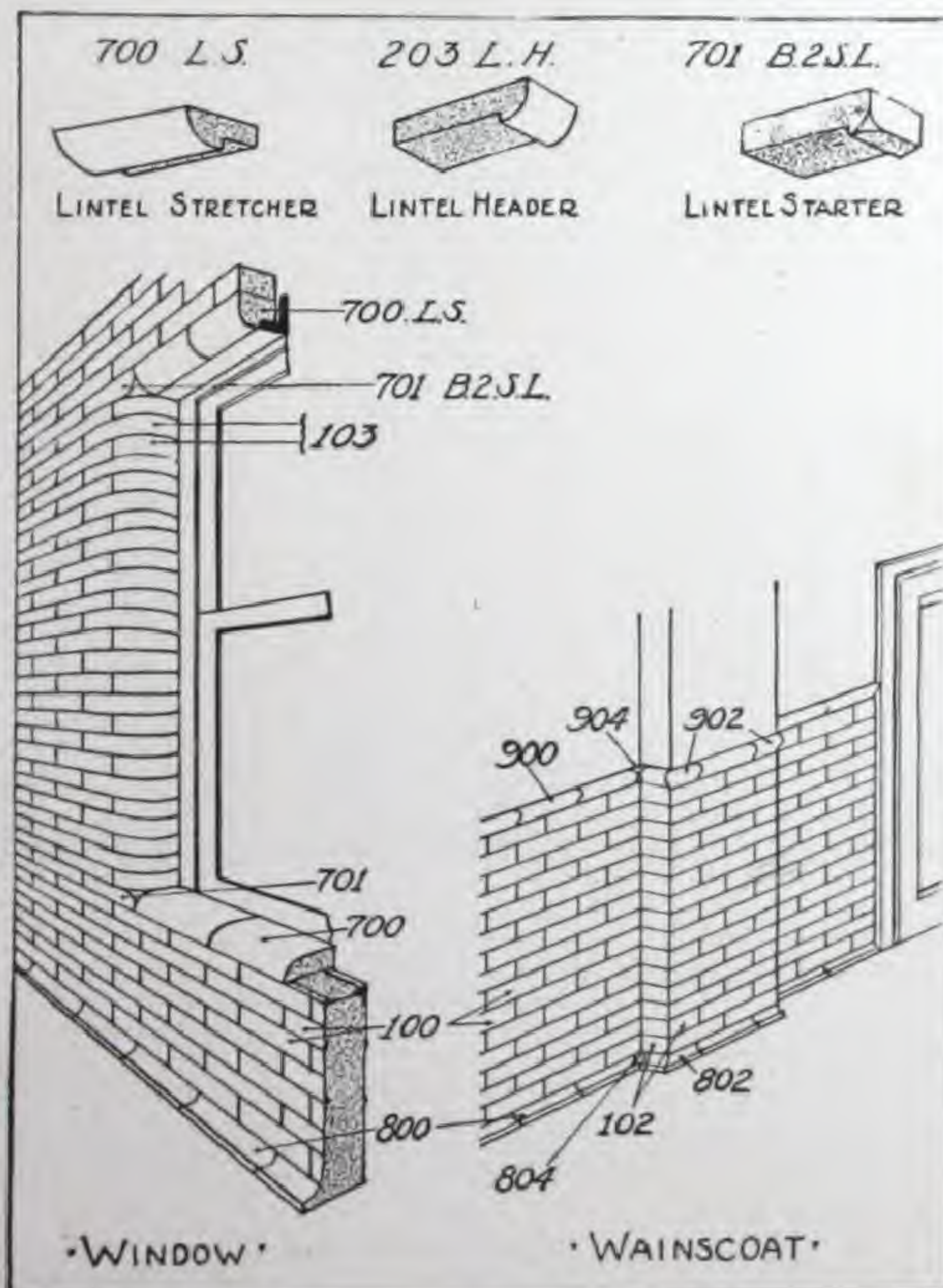
COVE MOULD

For projection and dimensions see cut below.



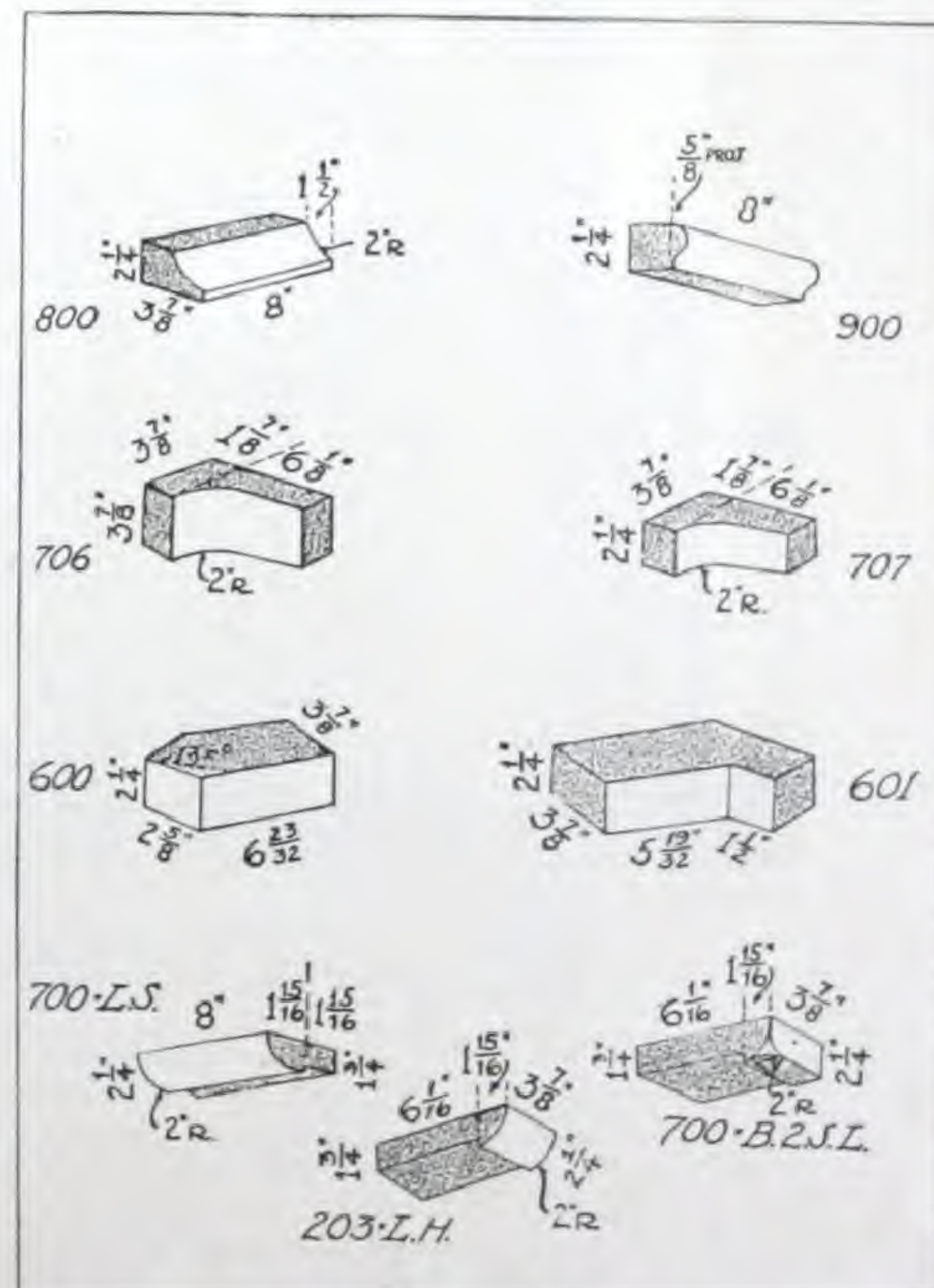
OGEE MOULD

For projection and dimensions see cut below.



STUDY OF A WINDOW OPENING

STUDY OF A BASE AND CAP COURSE



PROJECTION AND DIMENSIONS OF SPECIAL SHAPES

CANADIAN MACARTHUR CONCRETE PILE COMPANY, LTD.

W. J. BANKS,
203 St. John Street,
QUEBEC, QUE.

10 CATHCART ST., MONTREAL, P.Q.
FOUNDATION ENGINEERS AND CONTRACTORS.

JOHN LINDSAY,
253 Richmond St. West,
TORONTO, ONT.

SERVICES.

The purpose of the company is the construction, under contract, of various types of foundations. The company specializes in the design and construction of foundations where the low bearing value of the surface soils requires the use of piling. It is equipped to install pre-moulded reinforced concrete piles; steel pipe concrete filled piles, moulded in place straight piles, or the patented MacArthur PEDESTAL PILE.

If you have a difficult foundation problem just remember:—

THAT WOODEN PILING must be cut off below permanent water level, which probably means excavation, sheeting and pumping. That even when properly installed, the water table may change; the pile tops rot and the whole structure be ruined.

THAT THE USE OF CAISSONS is only commercially feasible when very large concentrated loads have to be carried direct to rock.

THAT PRE-CAST CONCRETE PILES are always liable to fracture during driving and that they cost more than cast-in-place piles.

THAT A TAPERED PILE with a small point must depend chiefly on skin friction, unless carried to rock, and that the friction between the pile and the sustaining soil depends largely on the roughness of the pile surface.

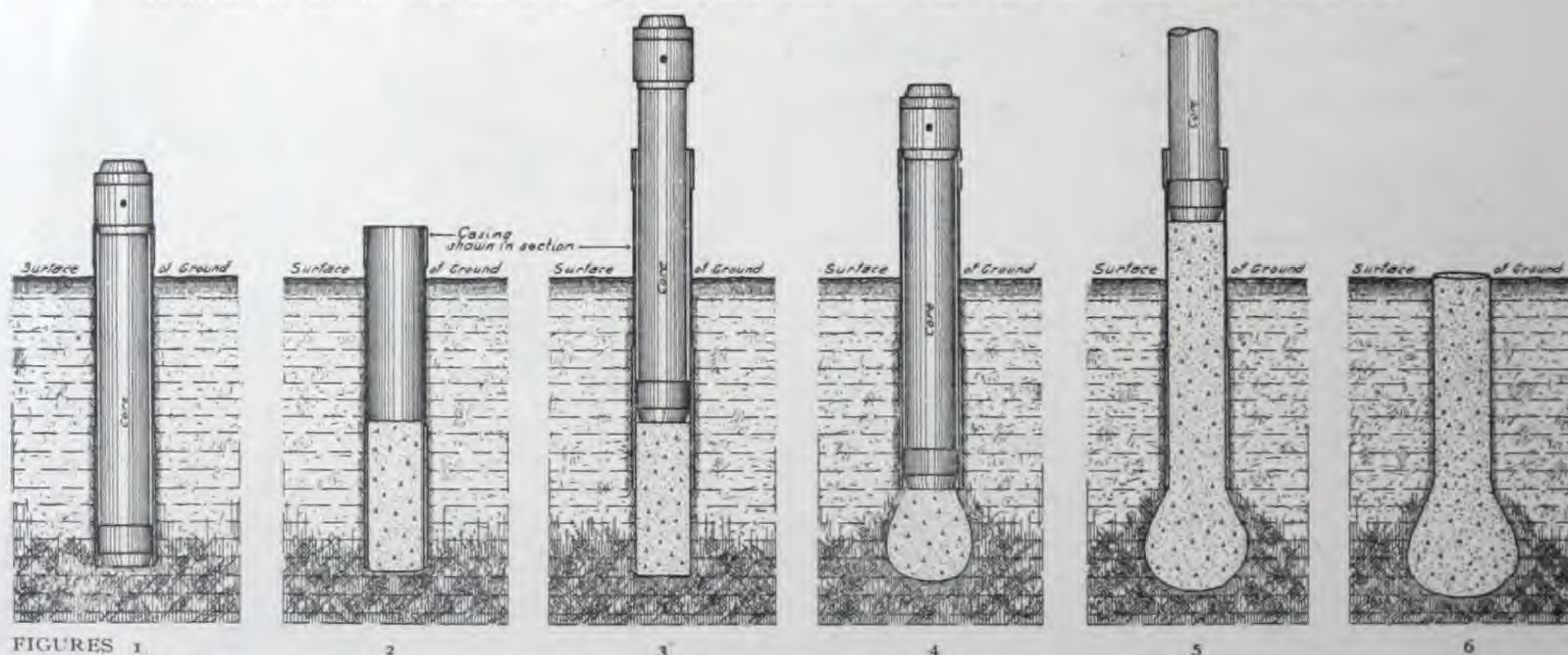
THAT IN THE PEDESTAL PILE both the enlarged foot and the shaft are formed under great pressure which is exerted through concrete in direct contact with the earth. This means: First, that the soil in which the pile stands is compacted and its bearing value increased. Second, that the concrete is pressed into the earth and therefore forms an almost perfect friction surface with it. Third, that the pile and pedestal may be and are formed of a dry mixed, thoroughly tamped concrete of unusual density and 25% greater strength than an ordinary poured mix. Fourth, that owing to the density and stiffness of this concrete and the packed earth layer contiguous to it infiltration of water or possible deformation of the pile is prevented.

THAT THE SUBSOIL to which the foot of a pile reaches is nearly always of much higher bearing value than the soil which surrounds the shaft of the pile and that the Pedestal Pile alone gives you a spread footing on that firmer subsoil.

THEN IF YOU HAVE A DIFFICULT FOUNDATION PROBLEM WHY NOT LET US LOOK IT OVER AND GIVE YOU AN OPINION? The service will not cost you anything. It will probably point the way to a saving in first cost and a big added safety factor for future satisfaction.

METHOD OF FORMING THE PEDESTAL CONCRETE PILE.

AS APPROVED BY THE "BETTER BUILDING" COMMITTEE OF ARCHITECTS AND ENGINEERS, NEW YORK CITY.



- Figure 1. A core and cylindrical casing are first driven to the required depth.
Figure 2. The core is now removed and a charge of concrete dumped to the bottom of the casing.
Figure 3. The core is now placed on the charge of concrete and the casing is raised to permit the forming of the pedestal.
Figure 4. The core is now used as a rammer, to compress this concrete into the surrounding soil. The process is repeated until the base is as large as can be formed under the compression caused by the action of a Vulcan steam hammer.
Figure 5. The enlarged base being completed, the casing is filled to the top with concrete and the core and hammer (approximately 6 tons) are rested on the concrete.
Figure 6. The final step is to withdraw the cylindrical casing from the ground, while the weight of core and hammer remain on the concrete. The completed pedestal pile, consisting of a monolithic concrete column 16 inches in diameter surmounting a broad base or pedestal, is thus left in the ground.

REFERENCES.

DEPT. OF PUBLIC WORKS . . .	Dom. of Can.	OLIVER CHILLED PLOW CO. . .	Hamilton.
HARBOR COMMISSIONERS . . .	Montreal.	ALGOMA STEEL CO.	Sault Ste. Marie.
HARBOR COMMISSIONERS . . .	Quebec.	STEEL CO. OF CANADA . . .	Hamilton.
E. G. M. CAPE CO. LTD. . . .	Montreal.	DORCHESTER ELECTRIC CO. .	Quebec.
	CANADIAN VICKERS, LTD. . .	Montreal.	

FEDERAL TERRA COTTA CO.

101 PARK AVENUE (ARCHITECTS BUILDING), NEW YORK.

BOOK BUILDING, DETROIT, MICH.

MANUFACTURERS OF THE SUPERIOR GRADE OF
ARCHITECTURAL TERRA COTTA.

REPRESENTED BY

JOHN LINDSAY, 34 Victoria St., TORONTO.
B. & S. H. THOMPSON CO., LTD., MONTREAL.

FACTORY: WOODBRIDGE, N.J.

EAGAR, COOMBS & CO., LTD., HALIFAX.
MONCTON SUPPLY CO., MONCTON.

PRODUCT.

ARCHITECTURAL TERRA COTTA for EXTERIOR and INTERIOR USE in complete lines of unglazed standard colours, such as gray, buff, red, etc., with hard-burned vitreous surface; matt and full glazed white, cream, and polychrome finish; all finishes are hard-burned and impervious to weather conditions, and permanently durable.

SPECIALTIES.

TERRA COTTA GRANITE and TERRA COTTA MARBLE, reproducing exactly the colour, texture and general appearance of the natural material. Samples furnished upon request.

SERVICE.

Samples and development of preliminary drawings to show adaptability of Terra Cotta and construction.



CANADIAN BANK OF COMMERCE, BELLEVILLE, ONT.
V. D. HORSBURGH, F.R.I., B.A.

Facades above Base Course of FEDERAL TERRA COTTA, with Vitreous Surface, in Limestone Colour.

OTHER REPRESENTATIVE CONTRACTS.

BUILDING.	LOCATION.	ARCHITECT.
Ritz Carlton Hotel.....	Montreal.....	Warren & Wetmore.
Metropolitan Bank.....	Toronto.....	Darling & Pearson.
Central Technical School.....	Toronto.....	Ross & MacDonald.
Bishop Street Apartment.....	Montreal.....	Charles A. Mitchell.
Union Bank.....	Toronto.....	Bond & Smith.
Imperial Bank.....	Toronto.....	Darling & Pearson.

BUILDING.	LOCATION.	ARCHITECT.
Real Estate Exchange.....	Detroit.....	Louis Kamper.
Equitable.....	New York.....	Ernest R. Graham.
Biltmore Hotel.....	New York.....	Warren & Wetmore.
Canadian Bank of Commerce.....	Vancouver.....	V. D. Horsburgh.
Royal Connaught Hotel.....	Hamilton.....	Esenwein & Johnson.
Bank of Nova Scotia.....	St. Johns, N.F.....	Darling & Pearson.

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION

P.O. BOX 600.

BEDFORD, INDIANA.

Representing the following quarry operators in the Bedford-Bloomington District, producers of the well-known INDIANA OOLITIC LIMESTONE (sometimes called "Bedford Stone"):

Bloomington-Bedford Stone Co. -	Bloomington, Ind.	Indiana Quarries Co. - - -	Bedford, Ind.
Chicago & Bloomington Stone Co. -	Bloomington, Ind.	J. Hoadley & Sons Co. - - -	Bloomington, Ind.
Consolidated Stone Co. - - -	Bedford, Ind.	W. McMillan & Son - - -	Bedford, Ind.
Crescent Stone Co. - - -	Bedford, Ind.	Mathers Stone Co. - - -	Bloomington, Ind.
Empire Stone Co. - - -	Bloomington, Ind.	Monroe County Oolitic Stone Co. -	Bloomington, Ind.
Furst-Kerber Cut Stone Co. - -	Bedford, Ind.	National Stone Co. - - -	Bloomington, Ind.
Hunter Bros. Stone Co. - - -	Bloomington, Ind.	Perry Stone Co. - - -	Ellettsville, Ind.
Imperial Stone Co. - - -	Bedford, Ind.	Shea & Donnelly Co. - - -	Bedford, Ind.
	Star Stone Co. - - -		Bloomington, Ind.



PRODUCTS.

GRAY (or "blue"), BUFF and VARIEGATED (or "mixed") INDIANA LIMESTONE. In addition to the classification by color, the stone is further classified by texture, as follows:—

"SELECT." Uniform fine grain; most suitable for carving, interior and special work, and of a finer texture than generally required for average exterior work.

"STANDARD." The grade most frequently used for exterior work, both plain and monumental, and for all general purposes. The grade that is always furnished unless another grade is clearly specified.

"RUSTIC." (Buff only.) Distinctly variable in texture and less uniform in color than the "standard" variety. Specially suitable for use where antique or rustic effects are wanted and for residences and other buildings where the effect is more dependent upon texture and tone than upon carving and tooled work. Also used very extensively for heavy cornices and other work placed at some elevation above the eye.

"RANDOM ASHLAR." Rough sawed-four-side Quarry-run Indiana Limestone of short length stock is one of the specialties furnished for Random Ashlar wall facing.

COST.

The present cost of this material compared with substitute products is such as to make it economically available for use in all classes of buildings, including most ordinary commercial structures, as well as in the more monumental work for which a natural stone is always used.



Transportation Bldg., Montreal.
ROSS & MACFARLANE, ARCHITECTS.



Drummond Bldg., Montreal.
H. C. STONE, ARCHITECT.

SERVICES.

The services rendered by this Association are both promotional and educational and comprise general publicity, investigation and research work, technical service and assistance to the Architectural profession and to the Trade, for which purpose an Architects' Service Bureau is maintained. Standard Specifications, data on setting mortars and cleaning, and other information will be furnished gratis upon request.

LITERATURE AND SAMPLES.

Literature of considerable value to Architects in the form of service publications, including technical information, construction details and service plates, etc., is constantly being prepared and as published will be furnished free to those requesting same.

Samples of the stone will also be cheerfully furnished to architects and others interested.

The Cut Stone Specifications for Indiana Limestone, as published in this edition of SPECIFICATION DATA, are now in course of final revision and will be ready for distribution in printed form by the time this publication reaches the architectural profession in Canada. Considerable information and data of interest to both architects and the trade will be included. Architects should also obtain copy of the Association (Masonry) Specifications for Random Ashlar Wall Facing.

INQUIRIES FOR CURRENT LITERATURE ARE SOLICITED.

PHYSICAL
CHARACTERISTICS.

Indiana Limestone is NOT CRYSTALLINE; the aggregate, filler and matrix are all pure carbonate of lime.

CHEMICAL ANALYSIS (AVERAGE).

Carbonate of Lime.....	97.26
Silica.....	1.69
Oxide of Iron.....	.49
Magnesia.....	.37
Water and Loss.....	.19
	100.00

While not a hard or brittle stone it can be split with equal ease in any direction and for all practical purposes is considered a free stone, having no evidence of grain. It possesses far greater strength than required for any ordinary building purposes, having an average crushing strength of more than 10,000 lbs. per square inch and a remarkably uniform modulus of rupture whether tested parallel to or at an angle with the grain, making it safe for long lintels, etc., and also making it unnecessary to always set the stone on its natural quarry bed. In spite of its great strength no other commercial stone is so easily worked.

Indiana Limestone is to all intents and purposes fireproof. It calcines above 1,500 degrees F., and will not spall, crumble, split or check at temperature up to 1,000 degrees F. when drenched with cold water.

It possesses a wonderful internal elasticity, adapting itself without damage to extreme temperature changes and other conditions of permanence that exist in modern building structures, and for this reason alone is particularly well adapted to use in Canada and the colder northern sections of the U.S.A.

PERMANENCE.

Its durability and resistance to atmospheric action is proven by the exposed quarry ledges that are centuries old and by existing structures of considerable age. Its soft light color tones are permanent, and no other building material remains clean so long or better resists the accumulation of grime from the smoke laden atmosphere of manufacturing cities. Many fine monumental and commercial buildings in Canada may be referred to as attesting the beauty, adaptability, permanence and genuine value of this fine natural building stone.

FINISHES.

Any hand tooled or machine finish, including rubbing, may be applied; but bush hammering and other so called "Hard Stone" finishes are rarely used, except for special purposes.

AVAILABILITY TO
ALL PARTS OF
CANADA.

Stone for the largest operation can be promptly delivered. The vast supply of the deposit and thoroughly modern quarry and mill equipment give unequalled facilities for rapid production on a large scale. Blocks of any size, including monolithic columns up to 40' 0" in length, may be obtained.

Transportation connections from the quarries to all Canadian points are excellent, and good sized stocks of this stone are also carried by the Cut Stone Trade in Canada.



Lewis Bldg., Montreal.
KENNETH REA, ARCHITECT.



New Birks Bldg., Montreal.

NOBBS & HYDE, ARCHITECTS.

PARTIAL LIST OF REPRESENTATIVE INDIANA LIMESTONE BUILDINGS IN CANADA.

Drummond Building, Montreal.
Transportation Building, Montreal.
Dandurand Building, Montreal.
Lewis Building, Montreal.
New Birks Building, Montreal.
Gravel Building, Montreal.

Board of Trade Building, Montreal.
Imperial Oil Building, Toronto.
Journal Building, Edmonton.
Chateau Laurier Hotel, Ottawa.
Fort Garry Hotel, Winnipeg.
Canadian Pacific Hotel, Calgary.

McDonald Hotel, Edmonton.
Empress Hotel, Victoria.
Union Station, Ottawa.
Union Station, Toronto.
St. Alban's Cathedral, Toronto.
Parliament Building, Winnipeg.
Interior work, Parliament Bldgs., Ottawa.

Many of the fine bank buildings, both large and small, housing the leading Canadian banking institutions and their numerous branches are also built of Indiana Limestone.

In addition to the buildings that are entirely faced with Indiana Limestone, this material has also been used extensively in Canada for the trim of school, commercial and residence buildings.

ALFRED ROGERS, LIMITED

28 KING STREET WEST,
TORONTO, ONT.



MILLS:
ST. MARY'S, ONT.

CAPACITY:
1,000,000 BARRELS ANNUALLY.

UNIFORMLY
HIGH QUALITY.

Rogers' Cement is scientifically prepared under the strictest supervision, to insure exact proportioning, absolute uniformity and the highest possible quality. Rogers' is everywhere recognized as a cement of superior quality, strength and durability.

STRENGTH.

Rogers' Cement does not weaken after 28 days. It grows stronger with age—continually, indefinitely.



CONCRETE BRIDGE OVER LITTLE CURRENT RIVER, PORT ARTHUR, ONT.

OUTSTANDING
EXAMPLES.

The superiority of Rogers' Cement is proved by the many cases in which it has been successfully used in important construction work.

Outstanding examples of these are:—

BUILDINGS.

New Government House, Toronto; Power Dam, Eugenia Falls; Royal Bank Building, Toronto; C.P.R. Building, Toronto; C.P.R. Elevator, Midland; Don Section, Bloor St. Viaduct, Toronto; New Bridge over Red River, Winnipeg; 16,000 Hydro Electric Cement Poles, and hundreds of others. In fact, those best qualified to judge cement on its merits are convinced of the superiority of Rogers' Cement.

ROADWAYS.

Pyramid Cement has been tested and approved for use on the roadways to be constructed in the following towns and cities:—

Galt.
St. Thomas.
Stratford.
Niagara Falls.
Meaford.
Walkerton.

Dundas.
Woodstock.
Wallaceburg.
St. Catharines.
Brantford.
Guelph.
Orillia.
Bothwell.
Elmira.
Kitchener.
Sarnia.

DISTRIBUTORS
FOR

SUPER CEMENT
Waterproof—Absolutely

THE PRODUCT.

SUPER CEMENT is not a brand of ordinary Portland Cement. It is a distinct and different product—possessing many superiorities that it alone can claim.

MANUFACTURE.

SUPER CEMENT is made by a new and improved process, from a special formula, involving the addition of a specially treated gypsum to the cement clinker. This promotes a perfect combination of the cement and mixing water.

WATERPROOF-
NESS.

SUPER CEMENT does not need the addition of a waterproofing compound of any kind—it is an ABSOLUTELY WATERPROOF cement—because of its dense, homogeneous composition.

USES.

For all purposes where cement could be used, SUPER CEMENT is eminently satisfactory. Mortar, Stucco and concrete made from SUPER CEMENT possess increased strength, density, waterproofness, adhesion and durability.



THE PEDLAR PEOPLE LIMITED

EXECUTIVE OFFICES: OSHAWA, CAN.

FACTORIES: OSHAWA AND MONTREAL

BRANCHES AT

QUEBEC,
263 St. Paul St.

MONTREAL,
26 Nazareth St.

OTTAWA,
Banque Nationale Bldg.

TORONTO,
473 College St.

*HAMILTON,
Clyde Block,
King & Hughson Sts.

WINNIPEG,
80 Lombard St.

Sole Sales Agents in Canada for CLINTON ELECTRICALLY WELDED WIRE FABRIC, Manufactured by WICKWIRE SPENCER STEEL CORPORATION, Worcester, Mass., U.S.A., and Buffalo, N.Y., U.S.A.



CLINTON FABRIC REINFORCEMENT.

THE IDEAL REINFORCING FOR SLAB CONSTRUCTION.

THE ELECTRIC WELD.

CLINTON FABRIC FLOORS.

THE MATERIAL.—Clinton Electrically Welded Wire Fabric is a wire mesh reinforcement fabricated from a special grade of steel wire having an ultimate tensile strength of from 60,000 to 85,000 lbs. per square inch.

USES.—The material is especially adapted for reinforcement in concrete floors, roofs, walls, sewers, reservoirs, levees, and all kinds of slab construction. It is also used to special advantage as a wrapping for steel in all kinds of work involving the covering or protection of steel with concrete.

THE RECTANGULAR MESH.—There are no zigzag or diagonal members. When used in floor or roof slabs, the longitudinal wires resist the main tensile stresses, while the transverse wires, which act as spacers for the longitudinals, serve to distribute concentrated loads and to prevent cracking due to changes in temperature.

THE PERFECT BOND.—The transverse wires, which are securely and absolutely connected to the longitudinals, provide at each welded point an absolute barrier against movement in the concrete.

THE ELECTRIC WELD.—Transverse and longitudinal wires are connected by an absolute and perfect cross-weld actually fused together.

UNBROKEN CONTINUITY.—In floor and roof slabs perfect continuity is obtained—no laps, no splices, no misplaced steel, but always the full value of the reinforcement, representing exactly what the plans call for.

EASE AND ACCURACY OF INSTALLATION.—It eliminates expense and uncertainty involved in the placing and wiring of loose rods. Great quantities can be laid in a very short time by the most unskilled labourer with absolute assurance that every reinforcing unit is in its proper position.

GALVANIZING.—Clinton Welded Wire Fabric is furnished either galvanized or with plain steel longitudinals.

The various floor slabs of the type as shown by sketch and as herewith tabulated in the table have actually been tested in New York City and officially approved by the Bureau of Buildings for the live loads as given.

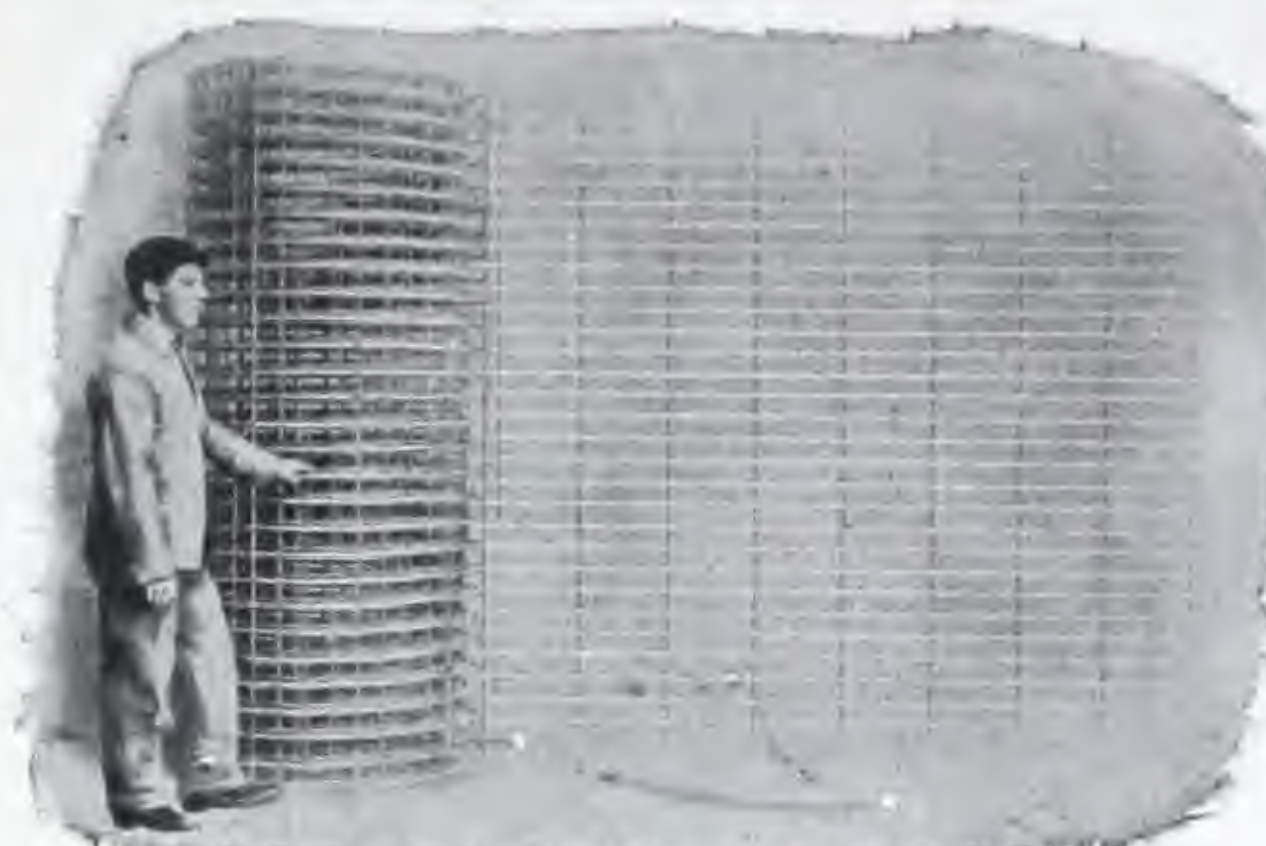


PHOTO OF ROLL OF CLINTON ELECTRICALLY WELDED WIRE FABRIC.



THE CLINTON ELECTRIC WELD.

In this view the two wires have been cut through at their point of union, revealing a perfectly smooth surface. It is a perfect weld; the two wires are actually fused together.

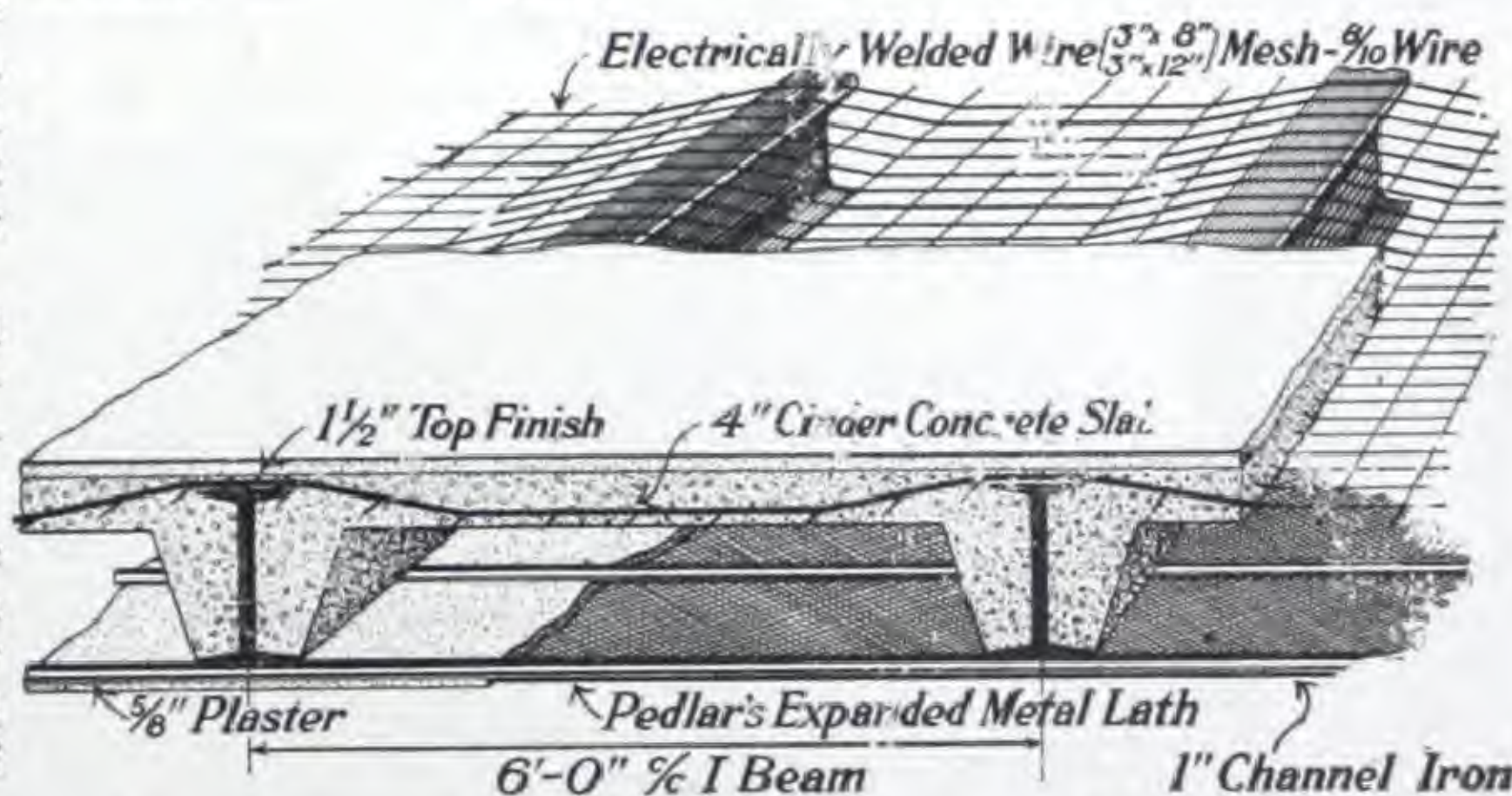


ILLUSTRATION SHOWS POSITION CLINTON FABRIC TAKES IN REINFORCING SLAB.

APPROVED CLINTON FLOOR SLABS.

Span C/C Beams.	Approved Live Load Lbs. per Sq. Ft.	Thickness of Slab.	Concrete.	Clinton Welded Wire Fabric Reinforcement.				
				Longitudinals.		Transverses.		How Specified.
				Gauge.	Spacing.	Gauge.	Spacing.	
6' 0"	150	4"	1 : 2 : 5 Cinder	No. 8	3'	No. 10	12"	3 x 12 8/10
6' 6"	300	4"	1 : 2 : 5 Cinder	No. 5	4"	No. 9	12"	4 x 12 5/9
6' 6"	400	4"	1 : 2 : 5 Cinder	No. 4	3'	No. 9	12"	3 x 12 4/9
7' 6"	300	4"	1 : 2 : 5 Cinder	No. 7	4"	No. 10	12"	4 x 12 7/10
8' 0"	250	4"	1 : 2 : 5 Cinder	No. 5	3'	No. 9	12"	3 x 12 5/9
15' 0"	150	6"	1 : 2 : 5 Stone	No. 3	2'	No. 8	8"	2 x 8 3/8

We carry in stock a large assortment of Clinton Fabrics, and can make immediate shipment at prices which will prove interesting.

For information, printed matter and prices, address home office of The Pedlar People Limited, or any of their various branches.

See also our advertisements pages 60 and 77.



THE PEDLAR PEOPLE LIMITED

EXECUTIVE OFFICES; OSHAWA, CAN.

FACTORIES: OSHAWA AND MONTREAL

ADDRESS NEAREST BRANCH.

QUEBEC,
263 St. Paul St.

MONTREAL,
26 Nazareth St.

OTTAWA,
Banque Nationale Bldg.

TORONTO,
473 College St.

HAMILTON,
Clyde Block,
King & Hughson Sts.

WINNIPEG,
80 Lombard St.



PEDLAR'S "RIB FABRIC" AFFORDS ECONOMICAL FIREPROOF CONSTRUCTION FOR ALL PURPOSES.

Pedlar's "Rib Fabric" is cut and drawn from one sheet of steel into a series of five heavy cold-drawn ribs spaced at 4" centres, connected by a diamond-shaped mesh expanded metal, affording a perfect mechanical bond for concrete and a continuous reinforcement correctly located in the slab.

Pedlar's "Rib Fabric" supplied in either flat or curved sheets in all gauges.

PEDLAR'S
"RIB FABRIC"
FOR REINFORCING
ROOFS, CEILINGS,
FLOORS,
PARTITIONS,
COLUMNS, Etc.

For roofs and floors it makes a light, strong, fireproof construction, without forms or centering.

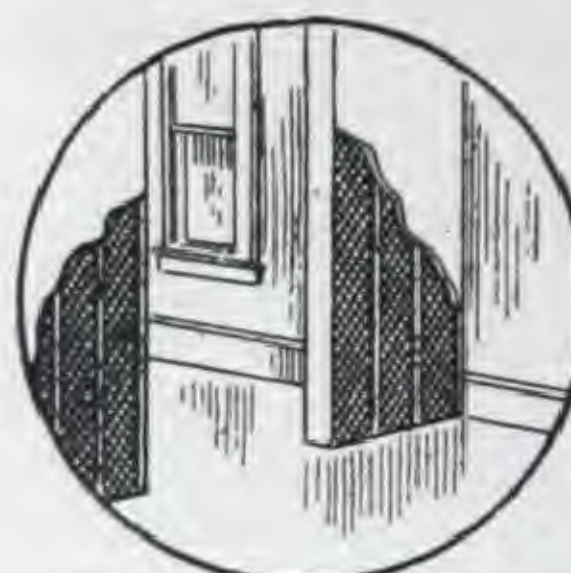
For ceilings it is a combination metal lath and furring, facilitating rapid erection and permanence.

For walls and partitions the rib does away with permanent studding, making a light, strong, thin wall that is sanitary and fireproof.

Pedlar's "Rib Fabric" for all kinds of high-grade construction, combines strength, safety and durability with economy.

Made in painted or galvanized stock.

Send for complete Fireproofing Catalogue for full particulars.



"RIB FABRIC" PARTITION.



"RIB FABRIC" FLOOR.

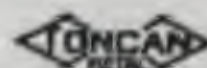


NO FORM WORK OR CENTERING NECESSARY.



FIVE "RIB FABRIC."
Ribs 15/16 in. high, 4 inches apart. Sheets, 16 in. wide. Standard lengths, 6, 8 and 10 feet. Gauges, 22, 24, 26 and 28.

PEDLAR'S FERRO-DOVETAIL PLATES FOR LOW DEAD LOAD IN CONCRETE CONSTRUCTION AND FIRE-PROOF—ACID-PROOF—TIME-PROOF ROOFS AND FLOORS.

Pedlar's Ferro-Dovetail Plates are made of 28 to 22 gauge steel or anti-corrosive  and formed into a series of 10 lateral corrugations, dovetailed in shape, one inch wide on top, 13/16 inch wide at the base, and 1/2, 5/8 and 3/4 inch deep; width after forming is 20 inches, or wider if so desired (up to 24 inches).

The covering width of a plate is 20 inches, and they can be furnished in any length up to 10 feet.

Made in black, painted, or galvanized to specification.

PEDLAR'S
FERRO-DOVETAIL
PLATES

(CURVED AND
STRAIGHT) FOR
BRIDGE FLOORS,
ROOFS AND EXTRA-
ORDINARY
BUILDING.

FERRO-DOVETAIL PLATES—CURVED.

Ferro-Dovetail Curved Plates for floors, placed between the beams, show no deflection under loads far exceeding any possible requirements.

The leading road engineers and contractors have adopted Pedlar's Ferro-Dovetail System of Interlocking Concrete Reinforcement for Bridge Floors and for extraordinary building.

The plates are laid between the beams or on bearings and a light mixture of concrete is applied and tamped in. On this, the paving brick, stone, asphalt or other finish is applied, after which the under side of the metal is plastered.

The tapered sides of the dovetail shaped corrugations make an infallible clinch for the concrete and plaster.

The plates thus protected from the influences of the air, water, gas and acid fumes, cannot corrode. The concrete and plaster thus reinforced makes an everlasting slab. The expansion and contraction are provided for by the expansion joints when the cement is applied.

For further information write for free catalogue, "Ferro-Dovetail Plates."

See also our advertisements on pages 60 and 77.



CONCRETE APPLIED TO CURVED PLATE LAID BETWEEN BEAMS.

FERRO-DOVETAIL PLATE.
Concreted on Top, Plastered
Underneath.

FIRST COST—
FINAL COST.

NO FORM WORK
REQUIRED.



THE PEDLAR PEOPLE LIMITED

EXECUTIVE OFFICES: OSHAWA, CAN.

FACTORIES: OSHAWA AND MONTREAL

ADDRESS NEAREST BRANCH.

QUEBEC,
263 St. Paul St.

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473 College St.

HAMILTON,
Clyde Block,
King & Hughson Sts.

WINNIPEG,
80 Lombard St.



HAS THE FOLLOWING DISTINCTIVE ADVANTAGES:

Great unit strength combined with a high elastic limit.

A uniformity of quality and stiffness which makes a reinforcing so taut that it requires no stretching or placing to eliminate "waves."

Because of its sheet form it is handled with great ease, thus permitting greater use of unskilled labor with a resultant saving in cost.

"Steelcrete" is made in an extensive range of sizes by the cold drawn process. Special machinery first slots the steel sheet and then expands it into a diamond-shaped mesh.

Expressed in pounds, the weights run from 20 pounds per 50 square feet to 2 pounds per 50 square feet.

The approximate size of the strands vary from $1/16 \times 7/64$ inches to $13/64 \times 23/64$ inches. In these dimensions the first fractional figure represents the thickness of the gauge, while the second fractional figure represents the thickness of the strand.

Figuring on the short way of the mesh across the sheet, the widths of the sheets vary from 4 feet 8 inches to 8 feet. Eight feet is the arbitrary maximum made necessary by the limitation of floor space in railroad cars.

In length sheets run from 8 to 16 feet.

MADE IN CANADA.

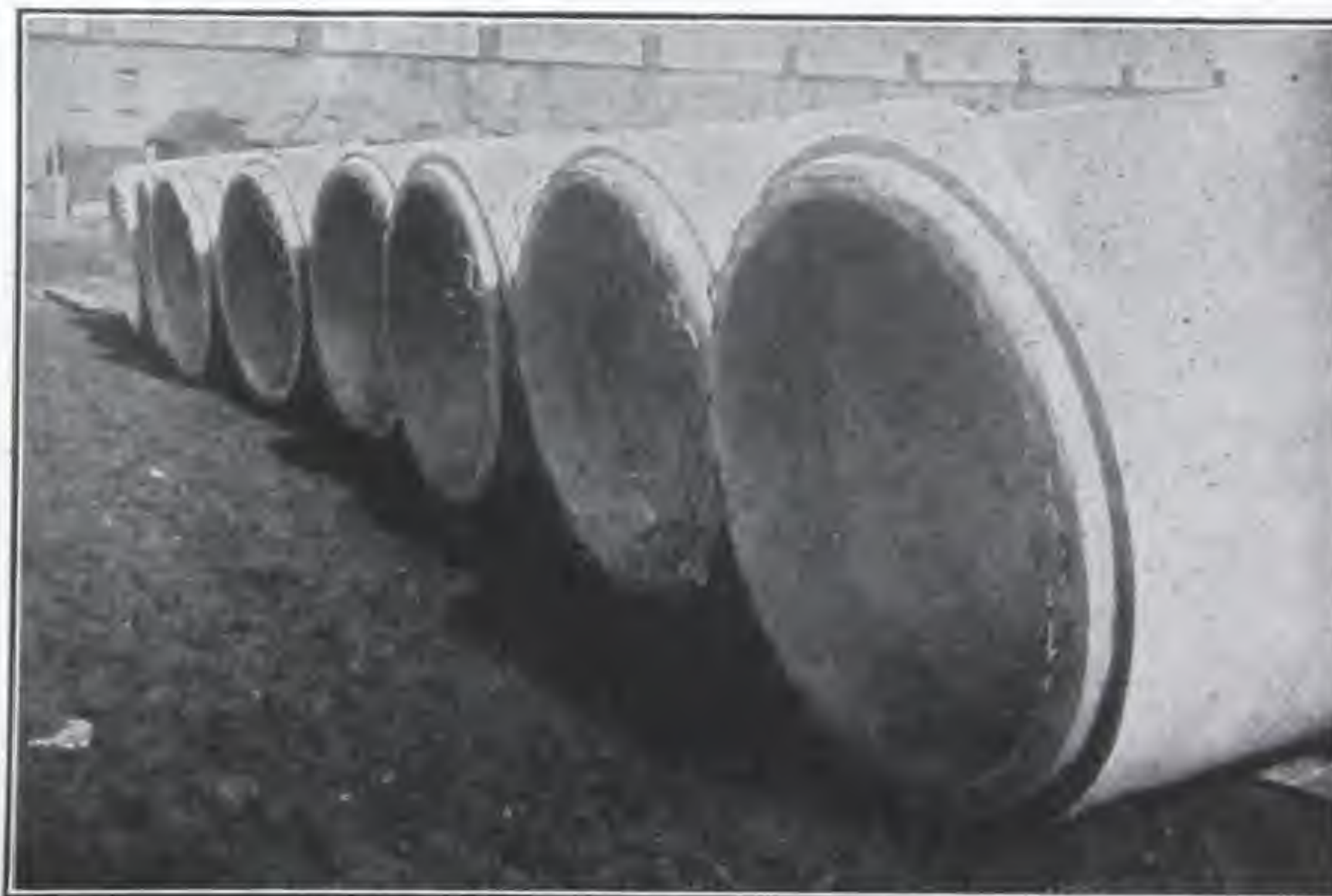
~DIMENSION TABLE

STYLE NUMBER	WEIGHT PER 50 SQ. FT. IN LBS.	APPROXIMATE SIZE OF STRANDS	SECT. AREA PER S.F. OF WIDTH	WIDTH IN FT. SHORT WAY OF MESH	WIDTH IN FT. LONG WAY OF MESH
X 31606	20	$\frac{1}{16} \times \frac{7}{64}$	0.06	8'-0"	8 and 16 feet
31608	27	$\frac{1}{8} \times \frac{1}{16}$	0.08	5'-0"	"
X 31610	34	$\frac{1}{8} \times \frac{1}{8}$	0.10	4'-9"	"
31211	37	$\frac{1}{8} \times \frac{1}{8}$	0.11	7'-0"	8, 12 and 16 feet
312125	41	$\frac{1}{8} \times \frac{1}{8}$	0.125	6'-3"	"
312135	46	$\frac{1}{8} \times \frac{1}{8}$	0.135	5'-9"	"
X 31015	51	$\frac{1}{8} \times \frac{1}{8}$	0.15	6'-3"	"
310176	60	$\frac{1}{8} \times \frac{1}{8}$	0.176	5'-9"	"
X 31020	68	$\frac{1}{8} \times \frac{1}{8}$	0.20	4'-9"	"
310215	73	$\frac{1}{8} \times \frac{1}{8}$	0.215	8'-0"	"
X 31025	85	$\frac{1}{8} \times \frac{1}{8}$	0.25	7'-6"	"
310265	90	$\frac{1}{8} \times \frac{1}{8}$	0.265	7'-0"	"
31030	1.02	$\frac{1}{8} \times \frac{1}{8}$	0.30	6'-9"	"
310324	1.10	$\frac{1}{8} \times \frac{1}{8}$	0.324	6'-3"	"
31035	1.19	$\frac{1}{8} \times \frac{1}{8}$	0.35	5'-9"	"
310375	1.28	$\frac{1}{8} \times \frac{1}{8}$	0.375	5'-3"	"
X 3640	1.38	$\frac{1}{8} \times \frac{1}{8}$	0.40	7'-0"	"
3645	1.53	$\frac{1}{8} \times \frac{1}{8}$	0.45	6'-3"	"
3650	1.70	$\frac{1}{8} \times \frac{1}{8}$	0.50	5'-9"	"
3655	1.87	$\frac{1}{8} \times \frac{1}{8}$	0.55	5'-3"	"
3660	2.00	$\frac{1}{8} \times \frac{1}{8}$	0.60	4'-9"	"

STYLES MARKED X IN STOCK.

STYLES NOT MARKED CUT TO ORDER.

STOCK SIZES CAN BE SUPPLIED IN 10' LENGTHS.



GENERAL
SHEET METAL
WORK.

Pedlar's Sheet Metal Building Materials include Metal Shingles, Sidings, Roofings, Metal Ceilings, Metal Tiles, Stamped Ornamental Zinc and Copper Work, Eavetrough and Conductor Pipe, Portable Buildings, Garages, Piping for Ventilating and Heating Installations, "Saino" All Metal Fire Doors, etc. Made from any desired material.

GET OUR GENERAL CATALOGUE No. 24R.

See also our advertisements on pages 60 and 77.



TRUSSED CONCRETE STEEL COMPANY

OF CANADA, LIMITED

WALKERVILLE, ONTARIO

MONTREAL

TORONTO

WINNIPEG

CALGARY

VANCOUVER

TORONTO

WAREHOUSES AT

WINNIPEG

CALGARY



Truscon BUILDING PRODUCTS

type; Metal Lath for Plaster and Stucco; Concrete Highway Reinforcement; Waterproofings, etc.

For modern permanent construction cover Reinforced Concrete in all its phases; Steel Window Sash of every

Truscon TRUSSED BARS.

With rigidly attached Shear members. Ideal for Beams and Girders.



TRUSSED BAR.

Furnished in 5 sections, viz.:

$\frac{1}{2}'' \times 1\frac{1}{2}''$	$\frac{3}{4}'' \times 2\frac{3}{16}''$	$1\frac{1}{2}'' \times 2\frac{1}{4}''$	$1\frac{3}{4}'' \times 2\frac{3}{4}''$	$2'' \times 3\frac{1}{2}''$
Sec. Area . . 0.41 in.	0.79 in.	1.41 in.	2.00 in.	3.00 in.

Truscon RIB BARS.

Furnished in 8 sizes, varying by $\frac{1}{8}$ in. from $\frac{3}{8}$ in. to $1\frac{1}{4}$ in. The sectional area is the same as the square for the same dimensions.

RIB BAR.

Truscon RIB METAL.

Rib Metal consists of a series of nine straight bars or ribs rigidly connected by cross members formed from the same sheet of steel. These cross members accurately space and thoroughly anchor the main bars in the concrete, providing a perfect reinforcement against temperature and shrinkage strains. The ribs span in the direct line of the greatest strain and are stiff and rigid, assuring their accurate location in the concrete.

Rib Metal is furnished in flat sheets for floors, roofs, walls, vaults, etc., or bent to exact curve of arches, conduits, sewers, reservoirs, tanks, etc.

Area of one Rib = .075 sq. in. Furnished in 7 sizes varying by 1" from 2" to 8". All lengths up to 18 feet.

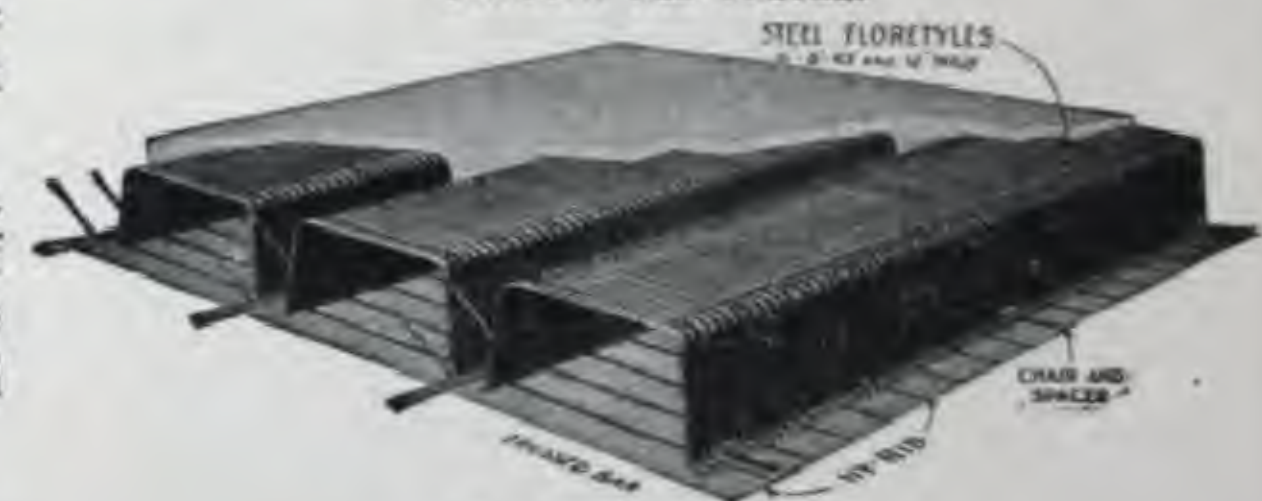


TRUSCON RIB METAL.

Truscon STEEL FLORETYLE.

Steel Floretype Construction is the most advanced type of Reinforced Concrete Floor Construction, and is particularly adapted for Apartments, Office and Public Buildings. It consists of rows of specially formed steel Floretypes separated by Reinforced Concrete Joists and covered with a thin layer of concrete. The deep narrow joists carry the loads directly to the supports while the Floretypes act merely as a filler, eliminating the dead weight of large masses of concrete and producing a light floor of great rigidity.

Standard Heights: 6 in., 8 in., 10 in., and 12 in. Approximate Width at Base: $20\frac{1}{2}$ in., exclusive of flanges along bottom edges. Standard Lengths (nominal) of all sizes, 4 ft. and 3 ft. Actual Lengths are 4 ft. 1 in. and 3 ft. 1 in. to provide for end lap.



STEEL FLORETYPE.

Truscon HY-RIB.

Hy-Rib is a steel mesh, stiffened by rigid ribs, all manufactured from a single plate of steel. The mesh of Hy-Rib provides a perfect key for the plaster, and a rigid surface to work against. In concrete floors and roofs Hy-Rib provides thorough reinforcement and eliminates forms. In sidings, partitions and ceilings Hy-Rib permits wide spacing of supports, saving in channels and wiring. For arches and tanks Hy-Rib is furnished curved by our factory.

PROPERTIES OF HY-RIB.

Type of Hy-Rib.	Gauge Nos.	Height of Ribs.	Spacing of Ribs.	Width of Sheets.
$\frac{1}{4}''$ Hy-Rib	24 26 28	$\frac{1}{4}''$	4"	28"
$\frac{3}{8}''$ Hy-Rib	24 26 28	$\frac{3}{8}''$	4"	24"

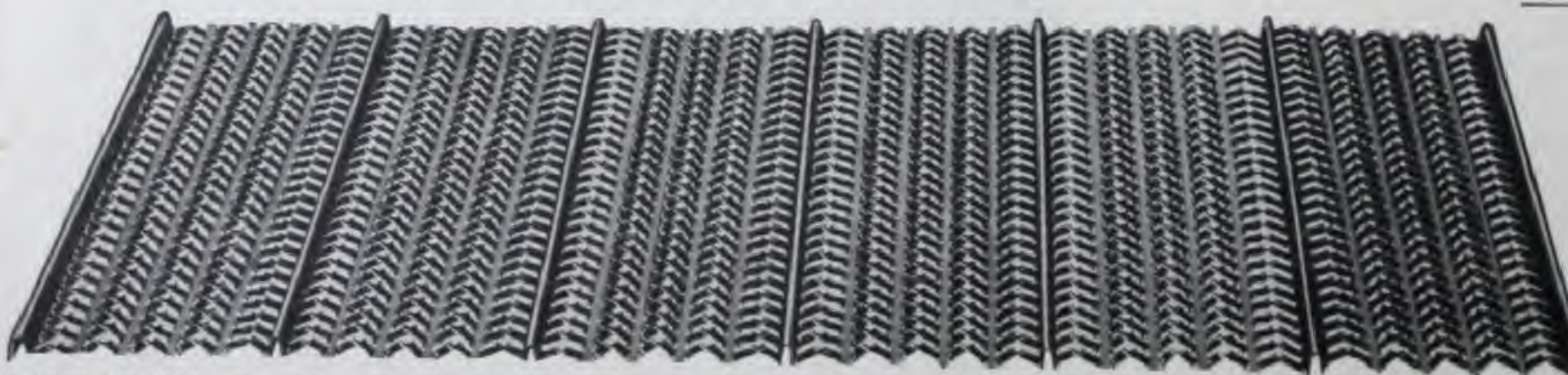
Other lengths are cut from standard lengths without charge except for waste.

All necessary side laps are provided in the Hy-Rib. Allow 2" for end laps where splice occurs over supports; otherwise, 8".

$\frac{1}{4}''$ Hy-Rib is shipped in bundles of 4 sheets; $\frac{3}{8}''$ Hy-Rib in bundles of 10 sheets.

Hy-Rib is supplied either painted or unpainted; in Open Hearth or Copper Bearing Steel.

$\frac{1}{4}''$ Hy-Rib is furnished curved to any radius greater than 13" in any segment less than one-third circle.



$\frac{1}{4}''$ IN. HY-RIB. RIBS $\frac{1}{4}''$ IN. HIGH, 4 IN. APART; SHEETS 28 IN. WIDE. GAUGE 24, 26 OR 28—STANDARD LENGTHS, 8, 10 AND 12 FEET.

See also our advertisement on Steel Sash, on page 266.



TRUSSED CONCRETE STEEL COMPANY

OF CANADA, LIMITED

WALKERVILLE, ONTARIO

MONTREAL

TORONTO

WINNIPEG

CALGARY

VANCOUVER

TORONTO

WAREHOUSES AT
WINNIPEG

CALGARY



Truscon BUILDING PRODUCTS For modern permanent construction cover Reinforced Concrete in all its phases; Steel Window Sash of every type; Metal Lath for Plaster and Stucco; Concrete Highway Reinforcement; Spot Grounds; Waterproofings, etc.

Truscon COLUMN HOOPING.



SET UP.

COLLAPSIBLE COLUMN HOOPING.

Collapsible Column Hooping, for reinforcing concrete columns, is shipped in the form of flat, circular coils of exact diameter and accurately spaced by means of special spacing bars. These coils spring automatically into a complete hooped column on cutting the small fastening wires.

Rib Bars are ordinarily used as vertical reinforcement in conjunction with Column Hooping.

SIZES OF COLLAPSIBLE COLUMN HOOPING.

Shipped complete with two or three spacing bars.

Sizes of wire for hooping: $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{7}{8}$ " and $\frac{1}{2}$ " diameter.

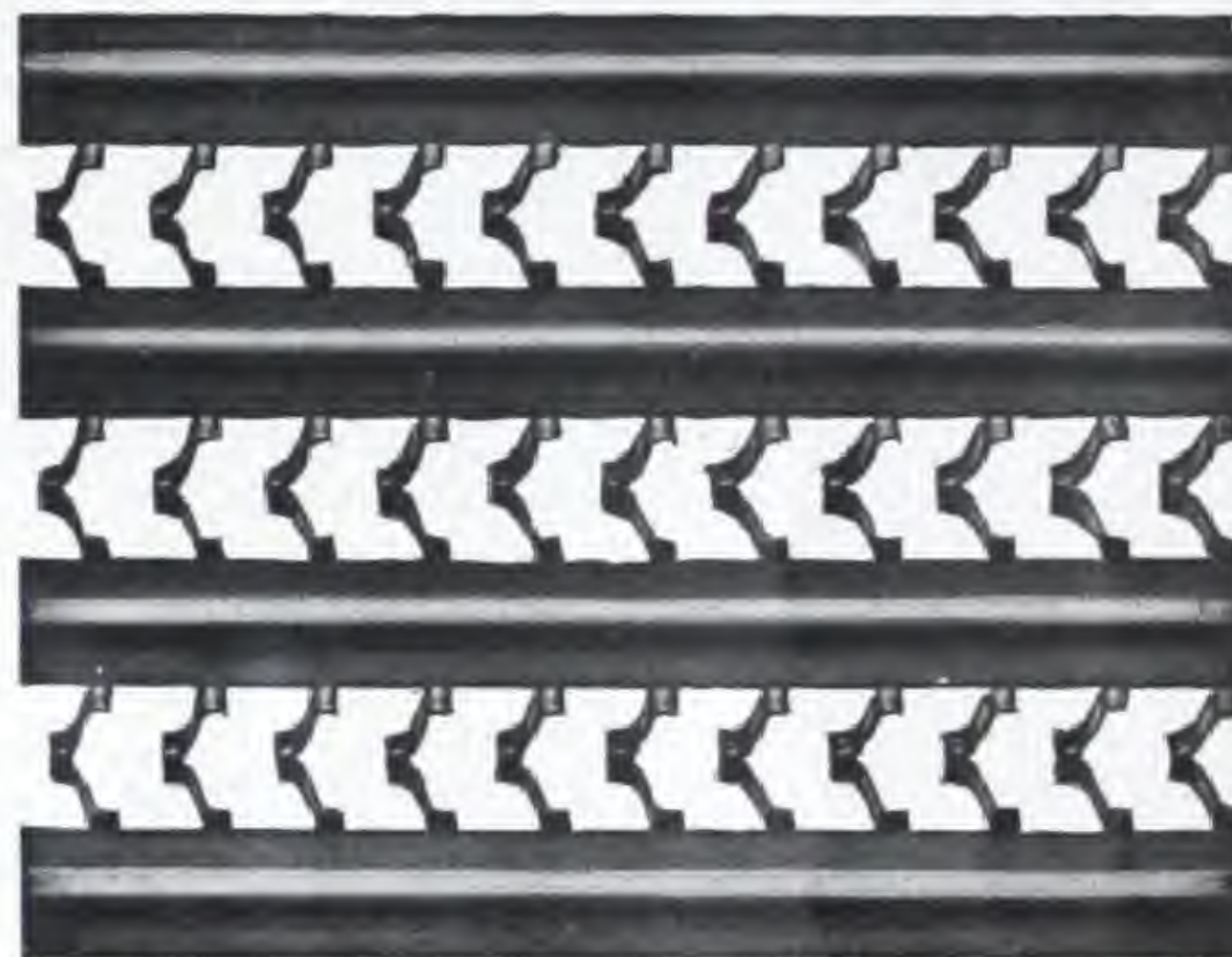
Diameter of Coils: 9" to 30"

Pitch: $1\frac{1}{2}$ " to 12".

Truscon LORIB.

Truscon Lorib is a very stiff metal lath, due to the ribs. It provides a perfect clinch and a flat, rigid surface for plaster. Requires a minimum amount of plaster. Lorib is a very economical lath, as it permits of wider spacing of studs and effects a great saving in labour and materials. Permits two coat work instead of three.

Sheets, 18" x 96". Weight, 3.2 lbs. per square yard.



TRUSCON LORIB.

Truscon DIAMOND MESH LATH.



TRUSCON DIAMOND MESH LATH.

Truscon Diamond Mesh Lath is a perfect metal lath and is furnished in sheets 24 inches wide and 8 feet 1 inch long. This extra 1 inch allows for lap of sheets.

Gauges, 24 and 26.
Painted or galvanized.

Truscon NATIONAL INSERTS.

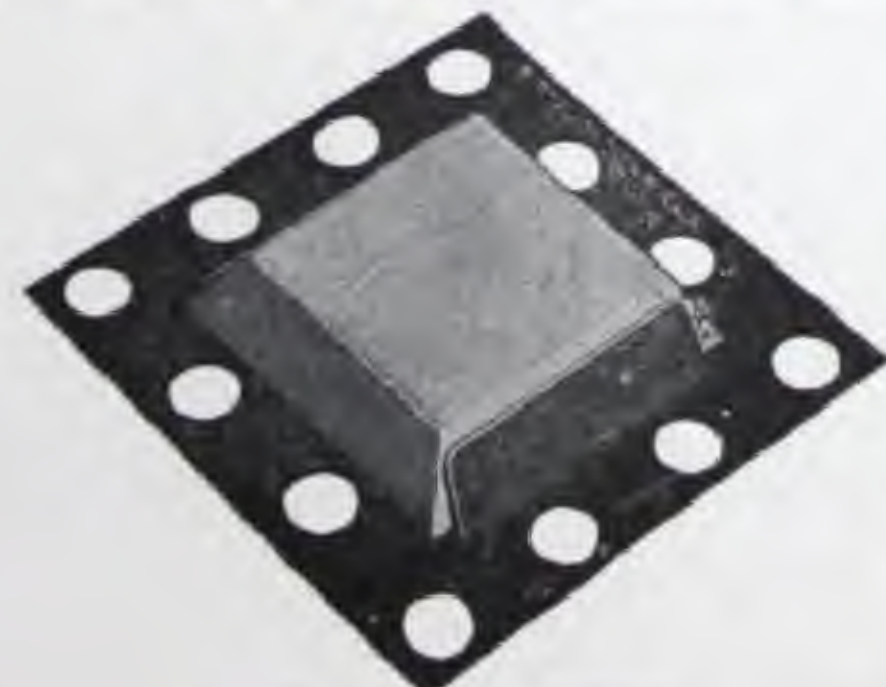
Truscon National Inserts are used in concrete slabs, beams and columns for attaching shafts, hangers, sprinkler systems, etc., and are incorporated into the concrete while under construction by securely nailing them to the wood forms, doing away with extensive drilling into the concrete after the building is complete.

They are made of iron in three sizes, properly cored and tapped to receive $\frac{1}{2}$ ", $\frac{5}{8}$ " and $\frac{3}{4}$ " bolts.



SOCKET INSERTS.

Truscon SPOT GROUNDS.



WALL SPOT GROUND.

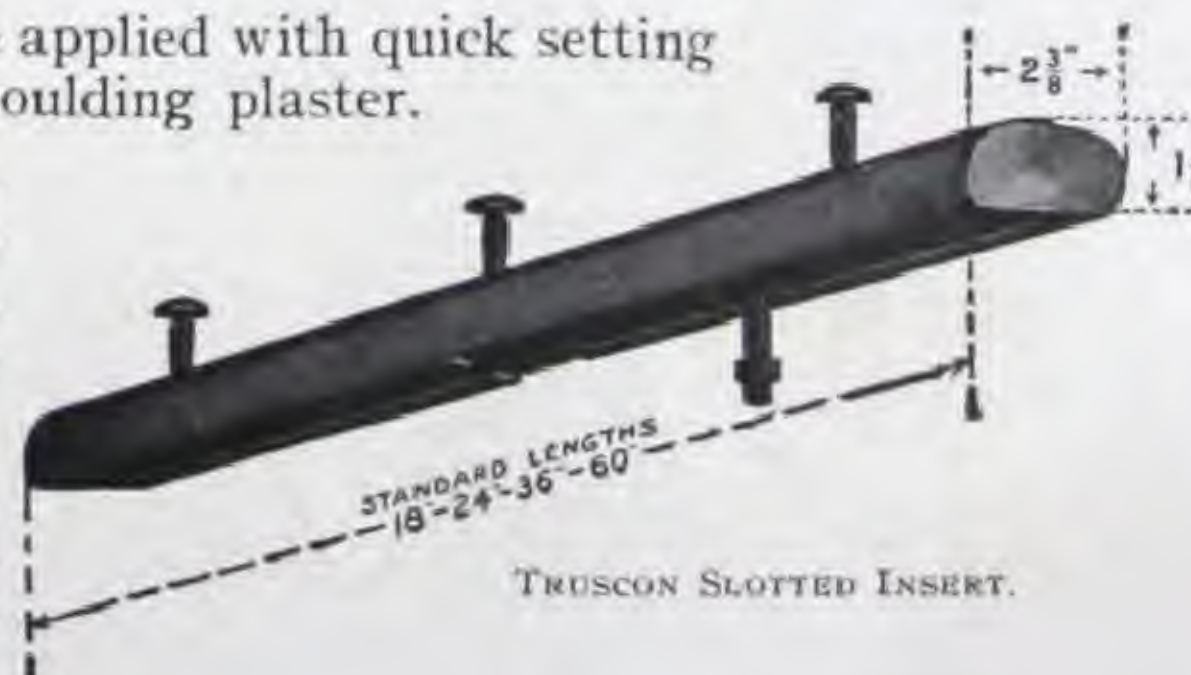
A Spot Ground is a nailing block of wood held in a metal plate and is used for attaching wood or metal trim to walls, screeds or metal slabs, securing plumbing, electrical fixtures, etc. On floors, they eliminate the necessity of using cinder fill.

Spot Grounds are applied with quick setting plaster of paris or moulding plaster.

Truscon SLOTTED INSERTS.

Truscon Slotted Inserts are used where a greater degree of adjustability is desired than can be obtained by the use of Truscon Adjustable Inserts. Only the narrow slot flush with the concrete is seen in the completed work. The bolt can be moved along this slot to any desired location, allowing a wide variation in position. Standard lengths, 18", 24", 36" and 60". A continuous Insert of any desired length can be obtained by removing the end caps and butting the Inserts end to end.

Also see our advertisements on Steel Sash, page 266.



TRUSCON SLOTTED INSERT.

THE C. A. P. TURNER CO.

M. Am. Soc. C.E.

CONSULTING AND CONTRACTING ENGINEERS.

"MUSHROOM SYSTEM" OF REINFORCED CONCRETE CONSTRUCTION.

STEEL AND REINFORCED CONCRETE BRIDGES AND BUILDINGS.

DESIGNS AND MATERIALS FOR ALL TYPES OF CONSTRUCTION.

MAIN OFFICE: SIXTH FLOOR, JEWELLERS EXCHANGE BUILDING,
MINNEAPOLIS, MINN.

BRANCH OFFICES:

WINNIPEG: 1004 Lindsay Bldg.

DANVILLE, VA.: First National Bank Bldg.

COLUMBUS, OHIO: 502 Commercial Bldg.

Main Canadian Office; Tenth Floor, Lindsay Bldg., WINNIPEG, MAN.

NEW YORK CITY: 30 Church St.

CHICAGO: 5 South Wabash.

NEW ORLEANS: 909 Union St.

PHILIP L. BAKER, District Engineer and Manager, Member Association of Professional Engineers, Prov. of Man.

PRODUCTS AND
SERVICES.

Inventor and Patentee of the "MUSHROOM SYSTEM" of Reinforced Concrete Construction, the practical Flat Slab supported directly on columns without the intervention of beams.

CONSULTING ENGINEERING WORK: BRIDGES, BUILDINGS AND DAMS.

ADVANTAGES.

"MUSHROOM"
FLAT SLAB
SYSTEM.

(1) The floor slabs are built so as to transport the load directly to the columns without the use of beams and girders and take full advantage of the extraordinary strength developed by slabs reinforced in several directions. "Mushroom System" floors are more economical for heavy loadings than any other construction.

(2) The centering is simplified, thus reducing the cost of the temporary parts of the construction.

(3) The beams and girders, which interfere with light, cost money to plaster and finish, and reduce the clear storey height, are eliminated. The arrangement of the reinforcement is designed to secure a maximum efficiency of the material and place the maximum amount of steel around and over the tops of columns where shear and negative moments are the greatest.

(4) The flat ceiling so obtained gives free and unobstructed illumination from the windows, and permits the placing of partitions anywhere without regard to the floor, which is unusually rigid and solid, due to the fact that a part of the material, which in the beam type is placed in the rib, is consolidated in the slab, making the slab of unusual thickness, with an actual decrease in the total amount of material where the loads are at all heavy.



FINISHED INTERIOR—"MUSHROOM SYSTEM."

ADAPTATION
AND
CONTRACTS
EXECUTED.

The "Mushroom System" has been used in every type of fireproof construction. The list embraces court houses, schools and State capitols, office buildings, warehouses, factories and manufacturing plants. More than 3,000 important structures completed or now contracted for.

PATENTS.

C. A. P. Turner, as the original inventor, has been granted patents covering the basic elements of *circumferential cantilever flat slab construction*. Fully protected by Canadian Patent No. 131567.TEST LOAD, 600 LBS. PER SQUARE FOOT. DEFLECTION, $\frac{1}{8}$ INCHREPRESENTA-
TIVE
CONTRACTS.

CITY.	BUILDING.	ARCHITECT.
Montreal.....	Alliance Building.....	P. J. Turner, Montreal, Que.
Montreal.....	Gillette Safety Razor Co. Building.....	Lockwood & Greene, Boston, Mass.
Toronto.....	Northern Electric Co. Building.....	W. J. Carmichael, Montreal, Que.
Toronto.....	Harris Abattoir Packing Plant.....	H. P. Henshein, Chicago, Ill.
Fort William.....	International Harvester Co.....	W. D. Price (Supt.), Chicago, Ill.
Winnipeg.....	Smart, Woods Co. Factory and Warehouse.....	Woodman & Carey, Winnipeg, Man.
Winnipeg.....	Paris Building.....	Raymond Carey, Winnipeg, Man.
Edmonton.....	Revillion Building.....	J. McDairmid Co., Winnipeg, Man.
Edmonton.....	Marshal-Wells-Alberta, Co. Bldg.....	German & Jenssen, Wpg. Man.
Calgary.....	Calgary Furniture Co. Bldg.....	Brown & Vallance, Montreal, Que.
Vancouver.....	Y.M.C.A. Building.....	H. S. Griffith, Vancouver, B.C.
Vancouver.....	Georgia Harris Viaduct.....	C. A. P. Turner, Engr.
Regina.....	Eaton Bldg.....	Woodman & Cubbidge, Wpg., Man.

THE BROWN HOISTING MACHINERY COMPANY

FOUNDED 1880.

CLEVELAND, OHIO.

BRANCH OFFICES:

NEW YORK, N.Y., 50 Church Street.

PITTSBURGH, PA., Oliver Building.

CHICAGO, ILL., 208 South LaSalle Street.

NEW ORLEANS, LA., Whitney-Central Building.

SAN FRANCISCO, CAL., Monadnock Building.

EUROPEAN REPRESENTATIVE: H. E. HAYES, 12 Rue de Phalsbourg, PARIS.



Reg. U. S. Pat. Off.

DESCRIPTION.

"Ferroinclave" is a box annealed steel sheet with dovetail corrugations, $\frac{1}{2}$ inch in depth or height, which are inversely tapered, permitting the large ends of corrugations of one sheet to fit or "shingle" over and into the small ends of corrugations of another sheet. This forms a tight joint and practically makes one continuous sheet. Sheets for ridges or valleys of roofs are made with non-tapering corrugations.

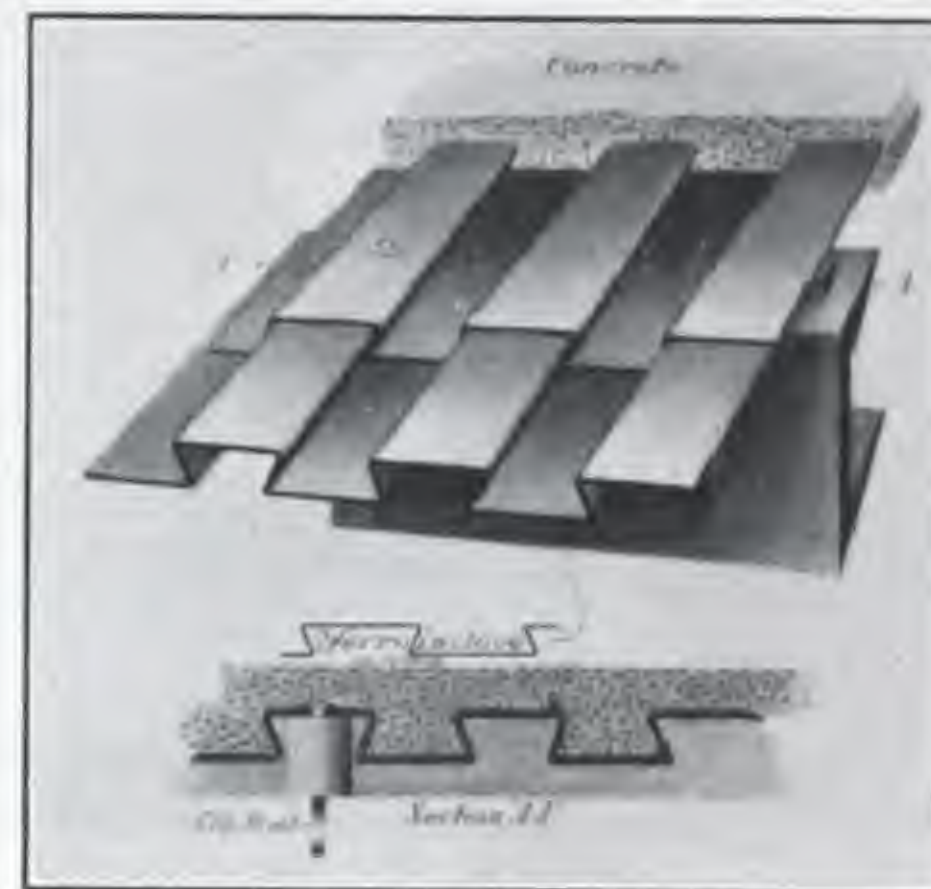
USES.

"Ferroinclave" is used as a combined reinforcement and centering for concrete roofs, partitions, floors, stairs, water tanks, bins, highway bridges, etc.

APPLICATION.

"Ferroinclave" should be laid on hardwood strips to prevent corrosion, and then secured with clips furnished for the purpose. When the sheets are in place, the upper side should be coated with a mixture of Portland cement and sand. The coating should be $\frac{1}{2}$ inch in thickness above tops of corrugations.

After cement on upper side has set, under side should be coated with cement mortar with small amount of hair. Mortar to be $\frac{3}{8}$ inch thick applied in 3 consecutive coats—second and third applied before preceding one dries or sets. Waterproof covering should be used on exposed side.



"FERROINCLAVE" ROOF, FLAT FLOOR OR SIDING, ETC.

ADVANTAGES.

(1) Lightest reinforced concrete construction. (2) Strongest for a given thickness and span. (3) Erected without forms. (4) Sheets are waterproof and building can be used before concrete is applied. (5) Sheets are laid entirely from upper side. (6) Sheets easily handled. (7) Under side is smooth and white and serves as a ceiling.

BROWNHOIST

LOCOMOTIVE CRANES AND BUCKETS.

TYPES OF CRANES.

Brownhoist Locomotive Cranes are built in the following sizes: Nos. 2, 3, 4, 5 and 6. Capacities range from 5 to 40 tons. Can be operated by steam, electricity or internal combustion engine. Nos. 2 and 3 cranes are mounted on 4-wheel railroad trucks. Nos. 4, 5 and 6 cranes are mounted on two M.C.B. Standard railroad trucks. The No. 2 crane can also be equipped with traction wheels or Brownhoist Creeper Trucks. Various lengths of booms are used on various types of cranes.

USES.

Brownhoist cranes can be used for all kinds of hoisting work and for handling materials. Some of the general uses are handling coal, ore, stone, sand, gravel, etc., by bucket; handling bars, sheets, scrap iron, etc., by lifting magnet; handling structural forms, tubs of concrete and all kinds of sling loads by bottom block; driving piles; pulling piling; and switching cars.

ADVANTAGES.

Brownhoist cranes are unusually fast in operation. Their engines develop full power quickly. This is important because crane service requires constant starting and stopping of the engines. Brownhoist cranes are designed and built to stand up under hard and continuous service, and have earned a wide reputation for their higher operating speeds, the tonnage which they handle and their low cost of upkeep.

BROWNHOIST BUCKETS.

Brownhoist buckets are built in the following types: Link-type, of which there are models for digging in coal, ore and for excavating; the Clamshell; and the Drag Line Bucket. The Link-type bucket is a 2-rope bucket with wide spread of spades and tremendous digging power. Made in cubic foot sizes of 17, 27, 40, 54, 70, 84 and up. The Clamshell Bucket is built in sizes of $\frac{1}{2}$ cu. yd. to 2 cu. yds. It is a fast operating 2-rope bucket of simple construction and few parts which is well suited to handling all kinds of material.



BROWNHOIST No. 4 STEAM LOCOMOTIVE CRANE, EQUIPPED WITH BROWNHOIST 54 CU. FT. COAL GRAB BUCKET.

UNITED STATES STEEL PRODUCTS COMPANY

EXPORTERS OF THE PRODUCTS OF

CARNEGIE STEEL CO.	AMERICAN STEEL & WIRE CO.	AMERICAN BRIDGE CO.	NATIONAL TUBE CO.
ILLINOIS STEEL CO.	AMERICAN SHEET & TIN PLATE CO.	THE LORAIN STEEL CO.	SHELBY STEEL TUBE CO.
TENNESSEE COAL, IRON & RAILROAD CO.		MINNESOTA STEEL CO.	

GENERAL OFFICES: NEW YORK.

CANADIAN SALES OFFICES:

NEW GLASGOW.	MONTREAL.	TORONTO.	WINNIPEG.	VANCOUVER.
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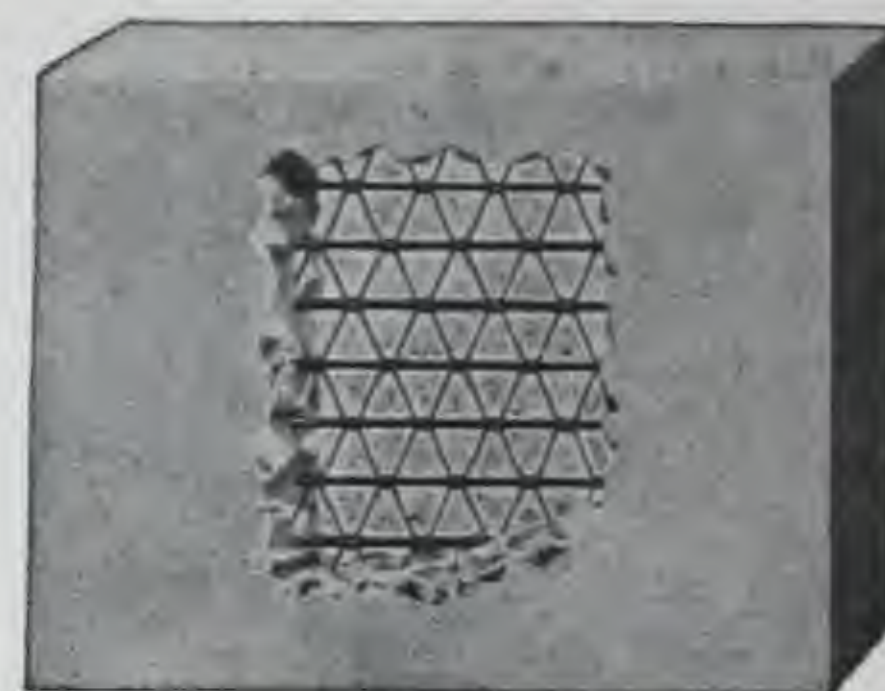
"TRIANGLE
MESH."

A woven wire fabric with single or stranded longitudinal members spaced by means of diagonal cross wires.

Made from cold drawn high tensile wire. The Ideal Reinforcement for all concrete work. Carried in stock at several Canadian points.

Special Booklet on request.

May be had in black or galvanized and of areas to suit all requirements.

"KEYSTONE"
COPPER
BEARING
STEEL
SHEETS.

Copper Bearing Steel Sheets, black or galvanized. The universally recognized product of quality, proved by time and service. "KEYSTONE" is worth more when resistance to rust is the influencing factor.

"APPOLLO" galvanized and "SPECIAL."

"ARROW" black and "U.S. ELECTRICAL."

GENERAL
PRODUCTS.

Beams, Channels, Angles, Tees, Plates, Bars, Hoops and Bands. Axles, Steel Wheels and Circular Sections. Steel Sheet Piling. Pipe of all kinds, Boiler Tubes, Poles, Cylinders, Seamless Tubes. Rails for Steam and Tram Roads. Track Accessories, Railroad and Industrial Steel Ties. Special Track Work, Frogs, Crossings, Switches and Stands. Aerial Tramways, Bleichert System. Locked Coil Track Cable. Locked Wire Cable and Smooth Coil Track Cable for Aerial Tramways. Iron and Steel Wire Rope, Bright and Galvanized. Sash Cord and Clothes Lines. Copper Wire and Cable. Copper Rail Bonds, Solid and Stranded. Weather Proof Insulated Telephone and Signal Wire. Galvanized Telegraph and Telephone Wire. Round and Flat Wire Steel Springs.

CONCRETE PIPE & PRODUCTS CO., LIMITED

HAMILTON, ONTARIO



BOOTH AT MADE-IN-HAMILTON EXHIBITION, MAY, 1921

PRODUCTS.

We manufacture PRECAST CONCRETE of every description including ORNAMENTAL BUILDING TRIM, LAWN FURNITURE, LIGHTING STANDARDS, ROOF SLABS, CULVERT PIPE, etc.

SEPTIC TANKS, ready to use.

We specialize in SILLS, LINTELS, COPINGS, etc., for factory construction.

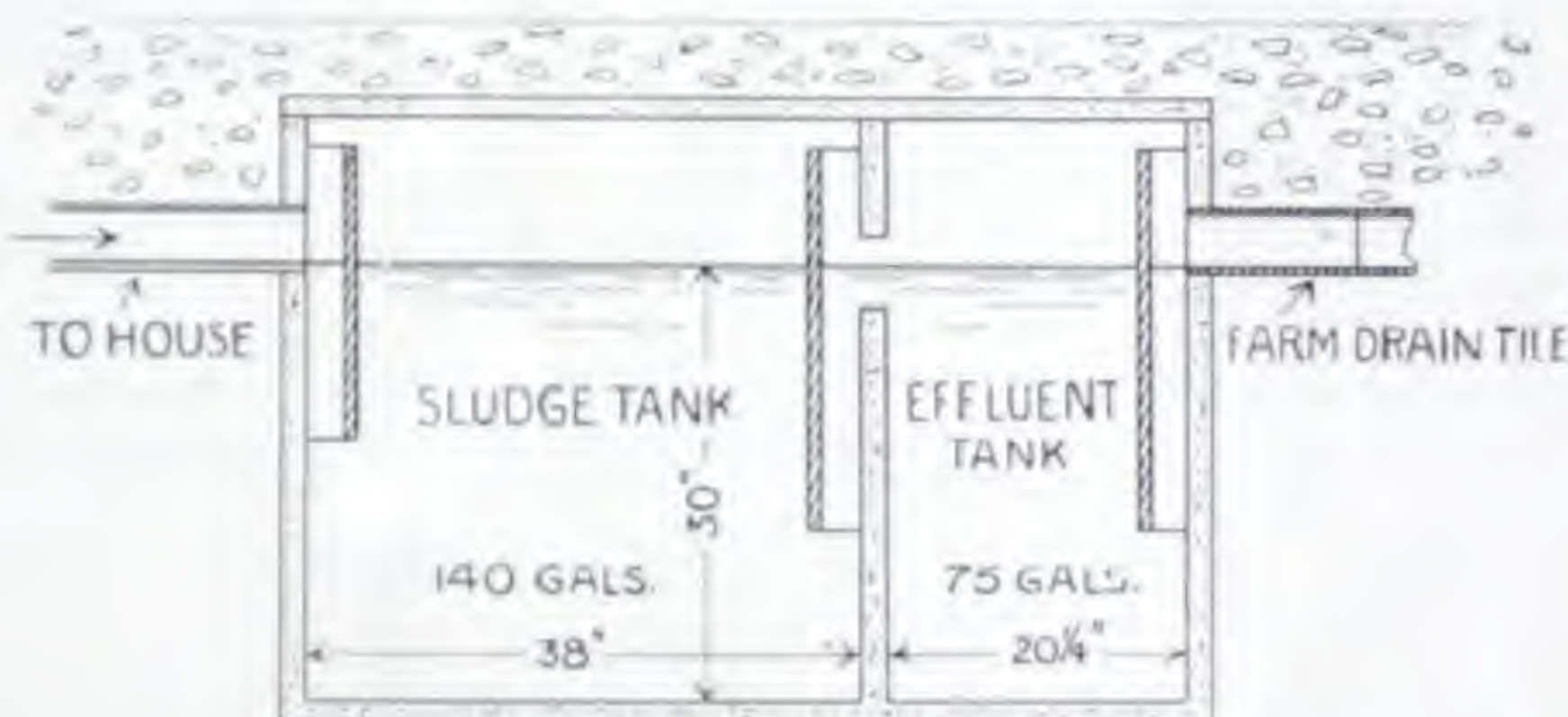
Our SPECIAL GRANITE FINISH is without equal and is specified by the most exacting Architects for ARTIFICIAL STONE.

DESCRIPTION.

All our products are made from our well known K-STONE, in which we use our own special mixture to give the desired strength, appearance, water-proofness, etc., for the positions they are to occupy.

INQUIRIES.

We solicit enquiries and can assure prompt service by rail or truck.



SEPTIC TANK



Send for pamphlet on SEPTIC TANKS.

BURLINGTON STEEL COMPANY, LIMITED

MANUFACTURERS OF

STEEL BARS, ROUNDS, SQUARES, FLATS, ANGLES, CHANNELS, AGRICULTURAL SHAPES, SPECIAL SECTIONS,
TWISTED SQUARES FOR REINFORCING CONCRETE

HAMILTON, CANADA

PRODUCTS.

RAIL-CARBON
BARS.

THE BURLINGTON STEEL COMPANY, LIMITED are the sole manufacturers in Canada of the RAIL-CARBON STEEL BAR for reinforced concrete work.

RAIL-CARBON BARS are manufactured from railroad rail by continuing the rolling process as indicated in the diagram until the required section is obtained.

In the manufacture of RAIL-CARBON BARS absolutely nothing but railroad rails are used, purchased under a rigid specification.

In the manufacture of rails only the finest of steel is used. Some thirty per cent. of the ingot is discarded, being the top third containing all the dirt, piping and segregation. The balance which goes into the rail is the purest of steel, and this again is subjected to the most critical chemical and physical tests before the rail is finally passed as fit for the severe service of the road-bed.

It follows that RAIL-CARBON BARS ARE COMPOSED OF THE PUREST OF STEEL.

RAIL-CARBON BARS have an Elastic Limit,—which is the limiting factor in design—averaging around 65,000 lbs. per square inch. The minimum set by standard specifications is 50,000 lbs.

RAIL-CARBON BARS will, therefore, do more work than any other bar, consequently one can cut down the tonnage, cut down the concrete, cut down the weight and finally the cost.

RAIL-CARBON BARS are higher in carbon than structural grade and are, therefore, harder; but numerous tests to destruction carried out by eminent engineering authorities have all failed to fracture these bars once they were embedded in the concrete. The concrete itself invariably shattered without affecting the rods.

THE BURLINGTON STEEL COMPANY LIMITED prides itself on fast and accurate service. We prefer to ship the bars cut to length, bent and tagged all ready to drop into the forms. Our plant in Hamilton is at the service of every Architect and Engineer in Canada. We are shipping today from Coast to Coast.

SPECIFICA-
TIONS.

SPECIFICATIONS.

After a most thorough investigation lasting over one half of the year 1913, the American Society for Testing Materials drafted a Standard Specification for Rail-Steel Concrete Reinforcing Bars, designated as A16-14, copy of which is summarized below.

The Association of American Steel Manufacturers in 1912 also adopted a Standard Specification, the essential requirements of which are exactly the same as the first mentioned.

The Engineer or Architect requiring RAIL-CARBON BARS, therefore, need only add to his Specification:

"The reinforcement shall conform in all respects to the requirements of the A.S.T.M. Specification, A 16-14,"
or

"The reinforcement shall conform in all respects to the requirements of the Manufacturers Standard Specification for Rail-Steel Bars."

AMERICAN SOCIETY FOR TESTING MATERIALS

PHILADELPHIA, PA., U.S.A.

Affiliated with the

INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS
STANDARD SPECIFICATIONS

for

RAIL-STEEL CONCRETE REINFORCEMENT BARS

SERIAL DESIGNATION: A 16-14.

The specifications for this material are issued under the fixed designation A 16; the final number indicates the year of original issue, or in the case of revision, the year of last revision.

Adopted, 1913; Revised, 1914.

CLASSES.

1. These specifications cover three classes of rail-steel concrete reinforcement bar, namely: plain, deformed and hot-twisted.

I. MANUFACTURE.

2. The bars shall be rolled from standard section Tee rails.

3. Hot-twisted bars shall have one complete twist in a length not over 12 times the thickness of the bar.

II. PHYSICAL PROPERTIES AND TESTS.

4. (a) The bars shall conform to the following minimum requirements as to tensile properties.

PROPERTIES CONSIDERED.	PLAIN BARS	DEFORMED AND HOT TWISTED BARS
Tensile strength, lb. per sq. in.	80,000	80,000
Yield point, lb. per sq. in.	50,000	50,000
Elongation in 8 in., per cent.	1,200,000	1,000,000
	Tens. str.	Tens. str.

CLASSES.

PROCESS.
HOT-TWISTED
BARS.
TENSION
TESTS.

BEND TESTS.

6. The test specimen shall bend cold around a pin without cracking on the outside of the bent portion as follows:

THICKNESS OR DIAMETER OF BARS	PLAIN BARS	DEFORMED AND HOT-TWISTED BARS.
Under $\frac{3}{4}$ in.	180 deg. d = 3 t	180 deg. d = 4 t
$\frac{3}{4}$ in. or over.	90 deg. d = 3 t.	90 deg. d = 4 t.

Explanatory Note: d = the diameter of pin about which the specimen is bent.
t = the thickness or diameter of specimen.

7. (a) Tension and bend test specimens for plain and deformed bars shall be taken from the finished bars, and shall be of the full thickness or diameter of bars as rolled; except that the specimens for deformed bars may be machined for a length of at least 9 in. if deemed necessary by the manufacturer to obtain uniform cross-section.

(b) Tension and bend test specimens for hot-twisted bars shall be taken from the finished bars, without further treatment.

8. (a) One tension and one bend test shall be made from each lot of ten tons or less of each size of bar rolled from rails varying not more than 10 lb. per yard, in nominal weight.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage in Section 4 (a) and any part of the fracture is outside the middle third of the gauge length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

TEST
SPECIMENS.NUMBER OF
TESTS.

BURLINGTON STEEL COMPANY, LIMITED

MANUFACTURERS OF

STEEL BARS, ROUNDS, SQUARES, FLATS, ANGLES, CHANNELS, AGRICULTURAL SHAPES, SPECIAL SECTIONS,

TWISTED SQUARES FOR REINFORCING CONCRETE

HAMILTON, CANADA.

THE PROCESS.

The ingot as it comes from the furnace.



The dirt, the excess alloys, and the gasses all gather to the top.

The Discard, representing in rail manufacture 30% of the whole, and containing all the foreign elements is cut off,



And the portion used in rail manufacture is all pure steel—no piping, no segregation.

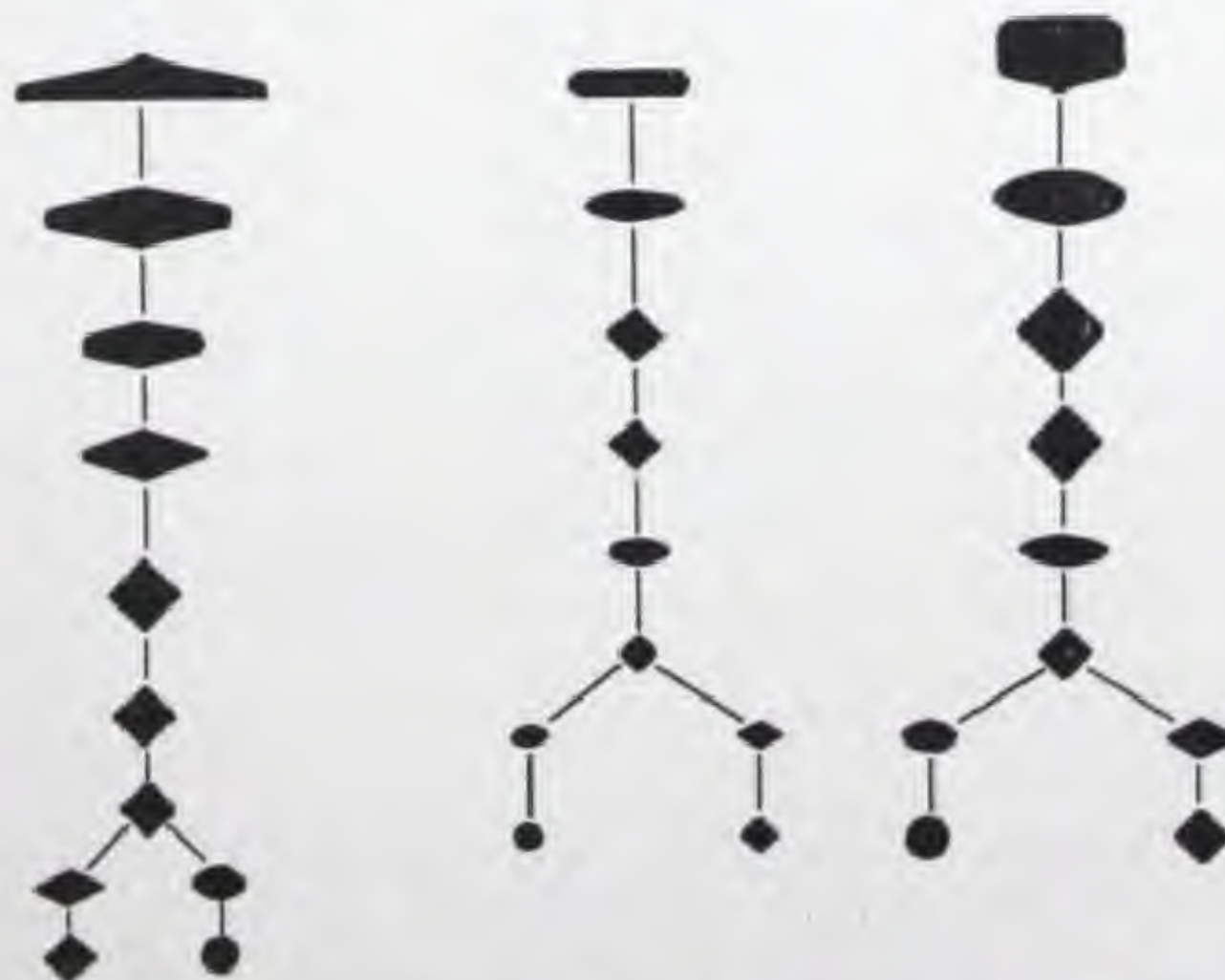
The bloom rolled from the ingot and the rail rolled from the bloom.



We purchase rails which have become worn in service, and occasionally secure new rails which are not suitable for track work on account of some surface defects. We break these rails into suitable lengths and subject them to a long slow soaking heat in a continuous furnace which entirely removes any internal stresses which might have been occasioned by their service on the road. The rails are then discharged from the furnace and passed through slitting rolls where they are split in to three separate billets, head, web and flange,—thus:—



These three different sections, or billets, are rolled separately and reduced to the required sizes of Steel Bars,—thus:—



We continue the rolling process commenced when the rail was new, and the product is the strongest bar of the purest steel on the market.

SPECIFY RAIL-CARBON BARS.



CRESCENT SALES & MFG. CO.

MANUFACTURERS OF WATERPROOFING PRODUCTS.

913 WESTMINSTER BLDG.,

CHICAGO, ILL.

PRODUCTS.

CRESCENT WATERPROOFING; CRESOLAC TRANSPARENT WATERPROOFING; INDURITE LIQUID HARDENER; CRESCENT METALLIC FLOOR HARDENER; CEM-BRIC COVERING COMPOUND; CRESCENT FOUNDATION COATING; CRESCENT PLASTER BOND; HYDROLAC ACIDPROOFING.

CRESCENT
WATERPROOF-
ING.

The integral method of waterproofing has the prestige of years of successful use. The efficiency of this method of waterproofing concrete, cement mortar and cement stucco has been demonstrated in a practical way to the satisfaction of architects, engineers and builders for so long a time, that it is now conceded to be the economical and correct method of procuring permanently waterproof results.

Crescent Waterproofing (paste or powder) can be thrown in the mixer without any preliminary preparation. This is a distinct advantage over other types of waterproofing. It is efficient beyond the factor of safety, and its use means economy and effectiveness for all classes of waterproofing work.

CRESOLAC
TRANSPARENT
WATERPROOF-
ING.

A waterproofing treatment for any class of building of brick, stucco, cement block or similar porous materials. It penetrates and seals the surface pores, leaving no film.

Since Cresolac is a transparent treatment, it is of great value for waterproofing any structure where it is not desired to change the color in any way.

Cresolac can be applied with brush or spray, two coats only being necessary.

COVERING CAPACITY.—About 200 sq. ft. per gallon for both coats.

DIRECTIONS.—Apply with wide brush in two coats, several hours apart, over dry and dirt-free surface.

INDURITE
LIQUID
HARDENER.

A colorless chemical compound, which, when applied to Portland cement surfaces, changes them to a flinty, granitelike hardness. Indurite gives concrete floors a permanent wearing surface, and insures them against dusting and the action of oils and moisture.

The Indurite method is adaptable for both new and old concrete floors. Its effectiveness combined with economy of application makes it a thoroughly practical material for protecting concrete floors against undue wear.

Indurite hardens by chemical reaction and is therefore permanent. A special folder gives detailed information as to its uses.

COVERING CAPACITY.—For 2-coat work approximately 100 sq. ft. per gal.

DIRECTIONS.—Thoroughly clean floor, removing all foreign matter such as oils, grease, etc. Workmen should wear rubbers or rubber boots. Apply material in 2 coats. Dilute first coat of Indurite with water, half and half. Flush the floor to full absorbent capacity and scrub in thoroughly with long-handled brushes with stiff bristles. Apply the second coat of Indurite without dilution, after a few hours. Scrub second coat thoroughly into the surface. Any material not absorbed can be removed with a rubber squeegee, preferably with hot water.

CRESCENT
METALLIC
FLOOR
HARDENER.

A finely ground iron compound for hardening and dust-proofing concrete floors.

DIRECTIONS.—The dust coat method in most general use is as follows: When topping is partly set, float to even surface. Dust over same a mixture of 25 lbs. each of hardener and Portland cement for each 100 sq. ft. of surface. Float in and trowel, giving a second trowelling at the proper time to make a smooth, even finish. Protect the floor with wet sand or sawdust for several days.

CEM-BRIC
COVERING
COMPOUND.

A waterproof decorative paint for exterior surfaces of brick, cement stucco and concrete. Cem-Bric penetrates and seals the surface pores and is made in the following colors: white, cream, buff, cement gray, tile green, brown and brick red.

DIRECTIONS.—Give flowing coat over dry surface until pores are thoroughly saturated. If necessary, first coat can be thinned with turpentine. Apply second coat without dilution 24 hours after first coat.

CRESCENT
FOUNDATION
COATING.

A heavy black, asphaltic paint for dampproofing outside of foundation walls, under wood floors and work of similar character.

COVERING CAPACITY.—About 65 sq. ft. per gal. on brick; 75 sq. ft. per gal. on concrete. Double coat work, 40 to 50 sq. ft. per gal.

DIRECTIONS.—Apply with large brush from outer edge of footings to 2 in. above grade level. After first coat dries, apply second coat.

CRESCENT
DAMPPROOF
PLASTER BOND.

A dampproof protecting and bonding material to be applied to the inside surfaces of outer or exposed walls before application of plaster.

COVERING CAPACITY.—60 to 75 sq. ft. per gal. on brick; about 75 sq. ft. per gal. on concrete, for single coat work.

DIRECTIONS.—Apply with large brush and coat thoroughly, leaving no pinholes. Plaster can be applied after 24 hours.

HYDROLAC
ACIDPROOFING.

A special acid and alkali resistant coating. The protective value of this material was demonstrated in a recent acid splash test where 2 coats of Hydrolac Acidproofing was not affected by either sulphuric, nitric or muriatic acids.

LITERATURE.

A book of Descriptive Specifications, size 8½ x 11 inches, also folders describing the various products.

THE TRUSCON LABORATORIES

MANUFACTURERS OF WATERPROOFINGS, DAMPPROOFINGS,
FACTORY MAINTENANCE PRODUCTS.
34 VICTORIA STREET, TORONTO.

WATERPROOFINGS AND DAMPPROOFINGS.

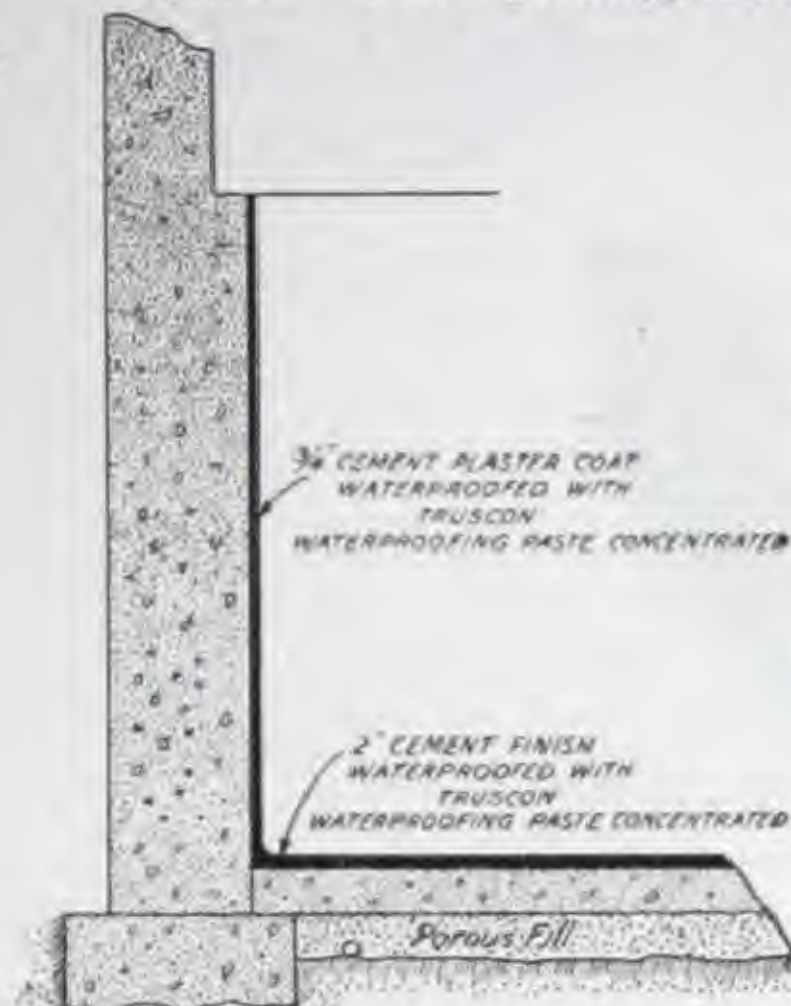
WATERPROOFINGS AND DAMPPROOFINGS.

Truscon Waterproofing Paste, Concentrated, is an integral waterproofing for concrete. While very generally used for waterproofing concrete foundations, tunnels, reservoirs, etc., it is also desirable for protecting other forms of masonry construction such as brick or stone against hydrostatic head. (See specifications below.)

Some of the largest and most prominent building operations in the world are permanently waterproofed by the Truscon method, notably the Grand Central Terminal, New York; General Motors Office Building, Detroit; Toronto Hydro-Electric System, Toronto; Canadian National Carbon Co., Limited, Toronto; Wm. Davies Co., Limited, Toronto; H. K. Wampole Co., Limited, Perth, Ont.

Truscon Waterproofing Paste has won its position in the field because it is the perfected waterproofing from both a theoretical and a practical engineering point of view. Furthermore, it is the most economical because less material is required. Consequently, it costs less per cubic yard of concrete.

SPECIFICATIONS.



WATERPROOFING CONCRETE OR MASONRY
BY WATERPROOFED PLASTER COAT.

SPECIFICATIONS. FOR WATERPROOFING MASS CONCRETE BY INTEGRAL METHOD.

APPLICABLE TO CISTERNS, RESERVOIRS, FOUNDATIONS
AND SIMILAR CONCRETE STRUCTURES.

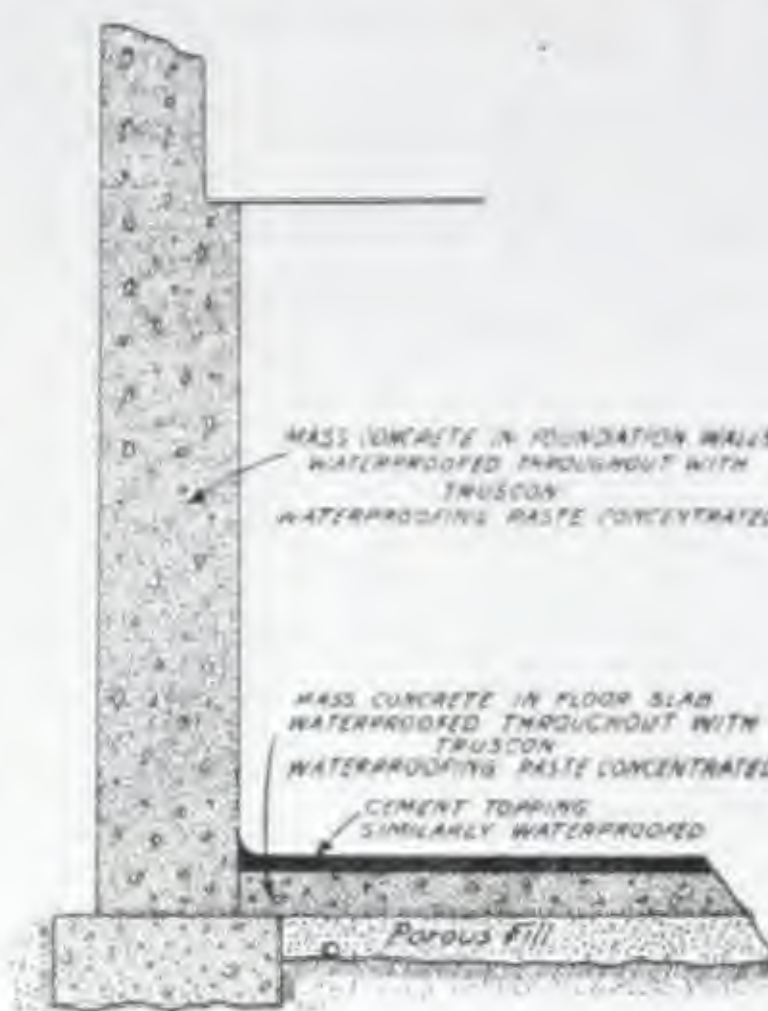
METHOD.—Watertightness shall be secured by
the addition of Truscon Waterproofing Paste, Con-
centrated, as manufactured by The Truscon Labora-
tories, to all water used to temper the dry mixture
of cement and aggregate in the proportions specified
and as supplied by the manufacturer.

SPECIFICATIONS.

FOR WATERPROOFING CONCRETE, STONE AND OTHER
MASONRY STRUCTURES BY MEANS OF WATER-
PROOFED PLASTER COAT METHOD.

APPLICABLE TO CISTERNS, RESERVOIRS, BASEMENT
WALLS, SUBWAYS AND SIMILAR STRUCTURES.

METHOD.—Watertightness shall be secured by
plastering the interior surface of the structure with
a continuous coat of Portland Cement mortar water-
proofed with Truscon Waterproofing Paste, Con-
centrated, as manufactured and recommended by The
Truscon Laboratories.



WATERPROOFING MASS CONCRETE.

TRUSCON PLASTER BOND.

A special bituminous coating for dampproofing interiors of all exposed walls. Its use provides a continuous damp-
proofing element in all such walls which perfectly insulates the interior from any evidence of dampness. On application to
the surface it is partly absorbed into the pores thoroughly sealing them and establishing a most inseparable bond.

TRUSCON FOUNDATION COAT.

A liquid bituminous cement of heavy consistency adapted for dampproofing general substructural work under
earth filling.

TRUSCON STONE BACKING.

A black dampproof coating for treating the unexposed sides of cut stone thereby preventing discoloration of the stone
from elements in the mortar.

TRUSCON MAINTENANCE ENGINEERING SERVICE

"A MAINTENANCE PRODUCT FOR EVERY MAINTENANCE PURPOSE."

Every Manufacturing Plant, every Office Building, Hotel, Hospital, Apartment Block, etc., has a definite problem
in its maintenance or up-keep. Interiors must be painted—exteriors must be protected against deterioration—and there
is much varnishing and cleaning up to be done. On account of the exceptional manufacturing facilities of The Truscon
Laboratories and our experience in handling such Maintenance Requirements, we are in a position to offer to every Architect,
Engineer, Building or Plant Superintendent a valuable Service.

Whether your problem is that of oilproofing a concrete floor, splinterproofing a wood floor, obtaining a special paint
to resist some acid or alkali condition, waterproofing a basement, or protecting exposed steel, Truscon Maintenance Engineer-
ing Service has a product for that, and every other Building Maintenance purpose.

Below we enumerate a few standard Truscon products and their particular uses. These are suggestive and we ask
that you bear in mind that Truscon Maintenance Engineering Service does not merely furnish Maintenance materials,
but is a Service which extends an intelligent, co-operative assistance that results in money saved on your Maintenance
Requirements.

"A MAINTENANCE PRODUCT FOR EVERY MAINTENANCE PURPOSE."

The natural characteristic of concrete is to dust. Dusting is followed by sanding and crumbling.
AGATEX is a chemical which hardens the concrete without changing its color or appearance. AGATEX
is swept over a floor. The surface becomes so hard that it can scarcely be scratched with a knife.

Nothing does so much towards cutting down electric lighting bills as the use of a serviceable
Mill White. Truscon INDUSTRIAL WHITE is a special light-reflecting paint. It stays white. It is
more economical and advantageous than kalsomine. It can be washed and kept clean.

Steam heat dries out wood floors—causes them to splinter and wear away. Truscon WOOD
FLOOR PRESERVATIVE gives new life and toughness to a wood floor. It penetrates—gets into the
wood—and binds the woody fibres into a hard, tough, wear-resisting surface. Also prevents decay
where floors are subjected to wetting.

BAR-Ox Inhibitive Coating is the coating that weathers and wears on Steel, because it is
designed for that special purpose. On all exposed steel, such as bridge work, cranes, outdoor tanks,
etc., BAR-Ox Inhibitive Coating should be used for both shop and field coats.

Brick, stone, stucco, concrete and other forms of exposed masonry should be protected against
the elements. They absorb moisture and moisture causes disintegration. STONETEX, the Nationally
known masonry coating, dampproofs, protects and beautifies all such surfaces.

When soot, rust and grime have obtained such a firm hold on glass that they seem to have
become a part of the glass, Truscon SKYLIGHT AND WINDOW CLEANER is the quickest remedy.
Especially useful when applied to ribbed glass. Does not injure the paint or putty.

Painting the various pipes running along the walls and ceilings of an Industrial Plant in a distinctive color is a very
common thing nowadays. Truscon PIPE IDENTIFICATION PAINT was especially designed for this purpose and is obtainable
in a standard line of colors for water, gas, steam, oil, compressed air and other pipe lines.

CHEMICAL FLOOR HARDENER.

MILL WHITE.

WOOD FLOOR PRESERVATIVE.

BAR-OX PROTECTIVE STEEL COATING.

STONETEX MASONRY COATING.

SKYLIGHT AND WINDOW CLEANER

TRUSCON PIPE IDENTIFICATION PAINT.



THE DON VALLEY BRICK WORKS

HEAD OFFICE, DOMINION BANK BUILDING,
TORONTO, ONT.

MONTREAL AGENT:
DAVID MCGILL,
320 LAGAUCHETIERE STREET.

WORKS:
DON VALLEY, TORONTO.

PRODUCTS.

We manufacture the "DON VALLEY" POROUS TERRA COTTA FIRE-PROOFING for Floors, Roofs, Ceilings, Partitions, Wall Furring, Column and Girder Coverings. Our extensive clay beds are suitable in quality and our facilities are unequalled for producing a high-grade Hollow Tile.

FLAT ARCHES.



Perspective of Typical Arch.

SIDE
CONSTRUCTION.

This, the oldest method, has the advantage of the blocks being set so as to break joints, and the flat sides of the blocks give ample surface for making good mortar joints between them.

SEGMENTAL
ARCHES.

Section Showing Style of Skewbacks and Keys.

This form of arch combines great strength with lightness and cheapness. It is suitable for Warehouse Lofts, Factories, Sidewalks, or wherever a flat ceiling is not essential.

Weight of 6" Hollow Tile Arch, 27 pounds per square foot.

TERRA COTTA
FOR
WALLS
AND
PARTITIONS.

4 x 8 x 12

4 x 12 x 12
(Split)

6 x 8 x 12

6 x 12 x 12

2 x 12 x 12

3 x 12 x 12

12 x 12 x 12

9 x 12 x 12

The above cuts represent shapes and sizes of our Porous Terra Cotta for Walls and Partitions.

WALL
FURRING.

$1\frac{1}{2}$ x 12 x 12, weight per square foot, 8 pounds.
2 x 12 x 12, weight per square foot, 9 pounds.



Type of Column Covering.

Walls are furred to prevent the admission of moisture either by lining the inside with Terra Cotta Furring Blocks, or by building the inside face of the wall with hollow bricks.

The former method is the more effective and takes less room. We carry large stocks of each.

COLUMN
COVERINGS.

Perspective of Column Fireproofing.



Type of Column Covering.

Steel and cast-iron columns must be covered with at least two inches of Porous Terra Cotta. We manufacture and carry in stock a variety of column coverings.

TOUGHER AND
WELL-BURNED.

Our Terra Cotta is tougher than other makes, thoroughly burned, and is stronger and better for the fireproofing of columns and girders and has less waste than other makes.

PROMPT
DELIVERY.

We guarantee prompt delivery, furnishing at the same time goods of the very highest quality.

See also our advertisement on pages 4 and 5.

NATIONAL FIRE PROOFING COMPANY OF CANADA, LIMITED

HEAD OFFICE: DOMINION BANK BUILDING,
TORONTO, ONTARIO.

FACTORY: HAMILTON.

PRODUCTS.

Manufacturers of DENSE, SEMI-POROUS and POROUS HOLLOW TILE for FIREPROOF FLOORS, ROOFS, CEILINGS, PARTITIONS, WALL FURRING, COLUMN and GIRDER COVERINGS and EXTERIOR WALLS. Contractors for FIREPROOF CONSTRUCTION in both HOLLOW TILE and REINFORCED CONCRETE.

ADVANTAGES.

Our factory is the largest in the Dominion of Canada devoted exclusively to the manufacture of Structural Terra Cotta. Our stock sizes embrace some 400 shapes, and we are equipped to manufacture material for special usages at short notice.

NATCO
FLAT ARCH
CONSTRUCTION.

The Flat Arch is the accepted type of Standard Fireproof Floor Construction, meeting every requirement as to strength, fire protection, architectural appearance and minimum weight.



Perspective of Typical Arch.



DETAILS OF TYPICAL
NATCO COLUMN
COVERING.

LOAD TABLE
FOR FLAT ARCH
CONSTRUCTION.

SAFE LOADS (Weight of Arch Deducted) POUNDS PER SQUARE FOOT.

The weight of the arch has been deducted from safe loads in table below, so that only the dead load of concrete fill, plastering, etc., must be deducted to obtain the net safe live load for any arch and span.

Arches	6 Inches	7 Inches	8 Inches	9 Inches	10 Inches	12 Inches	15 Inches
Spans, Feet and Inches	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
3-0	458	588	735	901	1084	1487	2210
3-3	386	496	622	763	916	1262	1877
3-6	330	424	531	653	785	1083	1612
3-9	284	365	459	565	679	938	1398
4-0	247	318	399	493	593	820	1223
4-3	216	278	350	433	521	722	1079
4-6	190	245	309	382	461	640	951
4-9	168	217	274	340	410	571	855
5-0	149	193	244	304	367	511	767
5-3	...	172	218	272	330	460	691
5-6	...	154	196	245	297	416	626
5-9	...	139	176	222	269	378	569
6-0	...	...	159	201	244	344	518
6-3	...	...	144	183	222	314	474
6-6	...	...	131	166	203	287	435
6-9	...	...	...	152	186	264	400
7-0	...	...	...	139	170	243	369
7-6	...	...	...	...	144	206	315
8-0	...	...	...	...	...	177	272
8-6	...	...	...	...	...	153	236
9-0	...	...	...	...	...	132	205
Weight of Arch, Sq. ft.	26	33	36	38	40	46	56

STOCK SIZES—2" TO 12" IN THICKNESS.

NATCO
HOLLOW TILE
PARTITIONS.

Fireproof, soundproof, easily erected, and the standard for stability, especially where called on to support plumbing fixtures, heavy picture frames, shelving, etc.

Hollow tile partitions are commonly built of dense material: 3-in. tile can be used safely to a height of 12 ft.; 4-in. to 16 ft.; 5-in. to 20 ft.; and 6-in. to 24 ft.

NATCO
CATALOGUES.

Covering various uses of Natco Tile will be furnished on request.



4-in. Partition Block. Average Weight 17 lbs. 8-in. Partition Block, 4-Cell. Average Weight 30 lbs.
6-in. Partition Block. Average Weight 22 lbs. 10-in. Partition Block, 6-Cell. Average Weight 36 lbs.

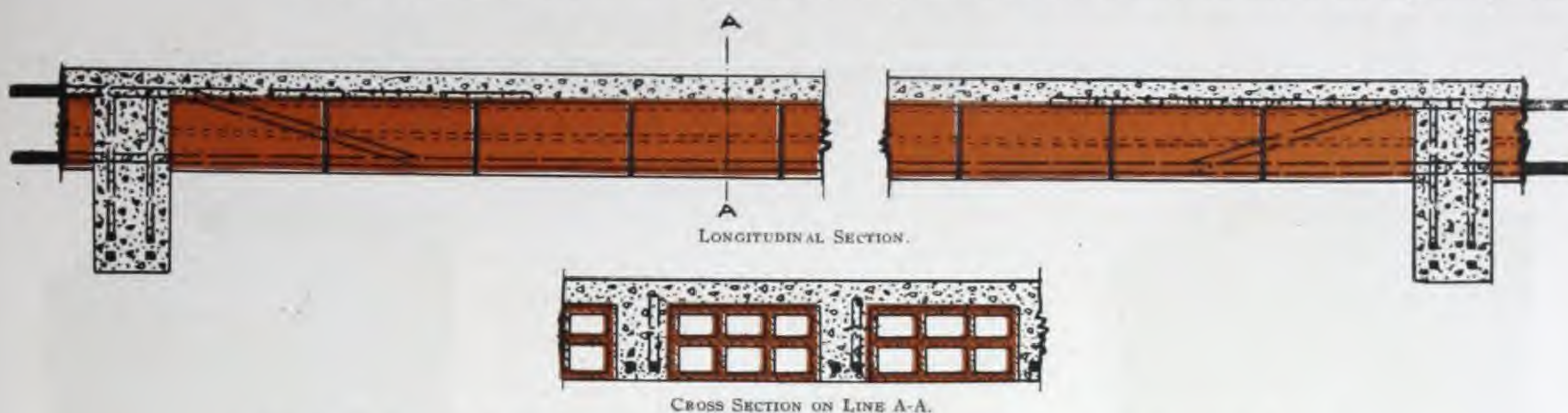
NATCO COMBINATION HOLLOW TILE AND REIN- FORCED CON- CRETE FLOOR CONSTRUCTION.

This floor has been used successfully and to economical advantage in many large modern buildings. As shown by the detailed drawing, the centering for this floor is very simple, a solid centering not being necessary. This, of course, is a great factor in reducing the cost of construction.

It will be seen that the tile is first laid on the centering, and after the courses of tile are in place the reinforced concrete joists are cast between the tile courses.

The courses of tile act in compression together with the reinforced concrete rib and also act as a side centering to hold the concrete in place until it has set.

If an additional top coating of concrete is necessary to give the floor requisite strength to carry the load for which it is designed, this top coat is then spread over the entire floor surface to the depth required.



DETAIL OF TYPICAL LONG SPAN COMBINATION HOLLOW TILE AND REINFORCED CONCRETE FLOOR
CARRIED ON REINFORCED CONCRETE BEAMS.

LOAD TABLE FOR COMBINA- TION FLOOR SLAB WITH 2" CONCRETE TOP.

THE FIGURES ON LEFT IN TABLES DENOTE THE DEPTH OF TILE IN INCHES, THE FIGURES ON RIGHT THE AREA OF REINFORCING STEEL IN EACH CONCRETE JOIST IN SQUARE INCHES.
fc. 650 lbs. per sq. in.
fs. 16,000 lbs. per sq. in.

$$\frac{E_c}{E_s} = \frac{1}{16}$$

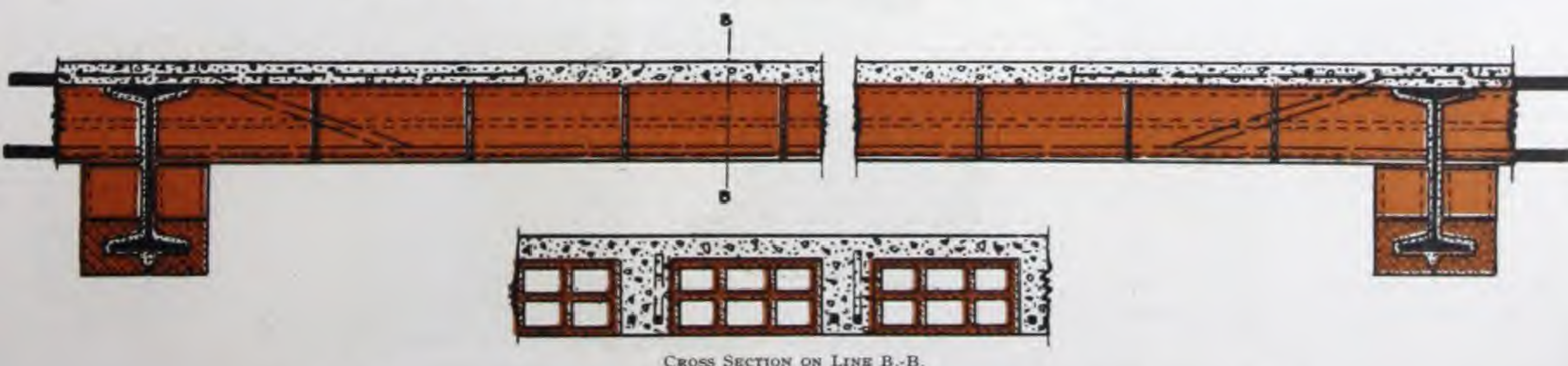
3/4-in. of concrete below reinforcement.
4-in. concrete joists 16 in. o. c.

Total Load	Span, ft.	W L	TOTAL SAFE LOADS (DEAD AND LIVE) POUNDS PER SQUARE FOOT.											
			150	165	180	195	210	225	240	260	300	335	375	450
Continuous span	12	12	125	135	150	160	175	185	200	220	250	280	310	375
	10	10	110	120	135	145	155	170	180	195	225	250	280	335
	9	9	100	110	120	130	140	150	160	175	200	225	250	300
	8	8												
Span, ft.	6	6	3/19	3/21	3/23	3/24	3/26	3/28	3/32	3/35	3/38	3/44	3/47	3/51
Span, ft.	7	7	3/23	3/25	3/27	3/30	3/32	3/34	3/37	3/40	3/46	3/51	3/55	3/59
Span, ft.	8	8	3/29	3/32	3/35	3/37	3/39	3/41	3/43	3/46	3/52	3/57	3/61	3/65
Span, ft.	9	9	3/36	3/39	3/43	3/46	3/48	3/50	3/53	3/57	3/63	3/68	3/72	3/76
Span, ft.	10	10	3/43	3/47	3/51	3/54	3/57	3/60	3/64	3/68	3/74	3/79	3/83	3/87
Span, ft.	11	11	4/1	4/5	4/9	4/12	4/15	4/18	4/21	4/25	4/31	4/36	4/40	4/44
Span, ft.	12	12	4/8	4/13	4/17	4/20	4/23	4/26	4/30	4/35	4/41	4/46	4/50	4/54
Span, ft.	13	13	4/15	4/21	4/25	4/28	4/31	4/34	4/38	4/43	4/49	4/54	4/58	4/62
Span, ft.	14	14	4/22	4/29	4/33	4/36	4/39	4/42	4/46	4/51	4/57	4/62	4/66	4/70
Span, ft.	15	15	4/29	4/37	4/41	4/44	4/47	4/50	4/54	4/59	4/65	4/70	4/74	4/78
Span, ft.	16	16	4/36	4/45	4/49	4/52	4/55	4/58	4/62	4/67	4/73	4/78	4/82	4/86
Span, ft.	17	17	4/43	4/53	4/57	4/60	4/63	4/66	4/70	4/75	4/81	4/86	4/90	4/94
Span, ft.	18	18	4/50	4/61	4/65	4/68	4/71	4/74	4/78	4/83	4/89	4/94	4/98	5/02
Span, ft.	19	19	4/57	4/69	4/73	4/76	4/79	4/82	4/86	4/91	4/97	5/02	5/06	5/10
Span, ft.	20	20	4/64	4/77	4/81	4/84	4/87	4/90	4/94	4/99	5/05	5/10	5/14	5/18
Span, ft.	21	21	4/71	4/85	4/89	4/92	4/95	4/98	5/02	5/07	5/13	5/18	5/22	5/26
Span, ft.	22	22	4/78	4/93	4/97	5/00	5/03	5/06	5/10	5/15	5/21	5/26	5/30	5/34
Span, ft.	23	23	4/85	4/101	4/105	5/08	5/11	5/14	5/18	5/23	5/29	5/34	5/38	5/42
Span, ft.	24	24	4/92	4/109	4/113	5/16	5/19	5/22	5/26	5/31	5/37	5/42	5/46	5/50
Span, ft.	25	25	4/99	4/117	4/121	5/23	5/26	5/29	5/33	5/38	5/44	5/49	5/53	5/57

WEIGHT OF COMBINATION SLABS PER SQUARE FOOT.

Tile	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
Weight	45 lbs.	50 lbs.	55 lbs.	60 lbs.	65 lbs.	70 lbs.	75 lbs.	80 lbs.	90 lbs.	105 lbs.

The load tables are for general information only, as each particular operation should be designed in accordance with actual conditions. Other 'Load Tables' and other types of floor systems shown in our literature on 'Long Span' Floors.
The engineering department is at the entire disposal of anyone desiring further information.



DETAIL OF TYPICAL LONG SPAN COMBINATION HOLLOW TILE AND REINFORCED CONCRETE FLOOR
CARRIED ON STEEL I BEAMS.

**BUILDINGS OF
NATCO HOLLOW
TILE.**

The value and economy of Natco Hollow Tile for structural as well as for fireproofing purposes is now fully recognized, and Residences, Factories, Warehouses, etc., are being built of this material in great numbers, with extremely satisfactory results to owners and architects.

It should be borne in mind that there is a vast difference in clays, as to strength, density and correct manufacturing methods, and, in order to be sure of obtaining material manufactured by us, architects should specify NATCO HOLLOW TILE, and thus secure the benefits of our long and extensive experience.

**NATCO
LOAD BEARING
WALL TILE.**

Natco Load Bearing Wall Tile realizes the **LAST** degree of structural efficiency, its design being such that, when set up in cement mortar, it virtually forms two separate walls joined with connecting webs. The continuous vertical insulation is worthy of the most careful consideration. Plaster or stucco is applied direct to the dovetailed scored surfaces of the tile, yielding an absolutely fireproof wall.

NATCO WALL TILE—MULTICELL SHAPE.

The use of Natco Wall Tile offers specially marked advantages which will effect a large saving in cost of labour and mortar over brick and all other types of hollow tile for exterior wall construction.

ADVANTAGES.

1. The large Natco units erect a wall with less labour and mortar than smaller tile, which require from 2.4 to 2.5 tile to equal the area (exclusive of mortar joints) of an 8" Natco Wall Tile.
2. Mortar applied to wide bedding surfaces, insuring tight horizontal and vertical joints. The absence of through joints ensures complete insulation.
3. The multicell walls will withstand more hard usage and less likely to break than tile with thin walls.
4. Ease of using flat tile jack arches over openings less than 5' effects marked saving over reinforced type of lintels.
5. Ease of erecting pipe chases and cutting for conduits.
6. Simplicity of construction at jambs, corners, junction of walls and on walls of multiple thickness.
7. Special tile for circle headed windows, arches, belt courses, etc.



8" X 12" X 12" WALL TILE



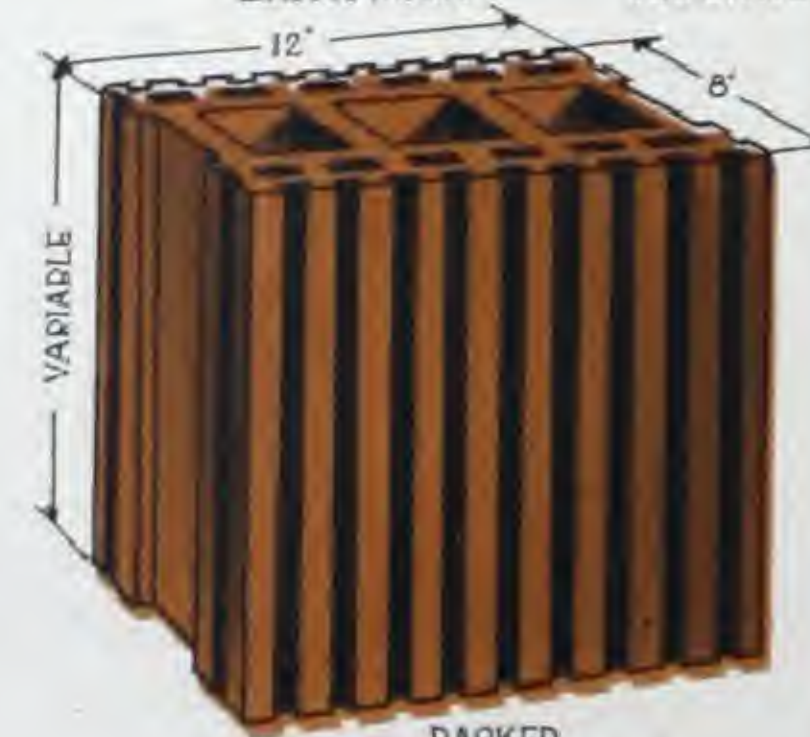
12" X 12" X 12" WALL TILE.

**NATCO
ENCLOSURE
WALL TILE.**

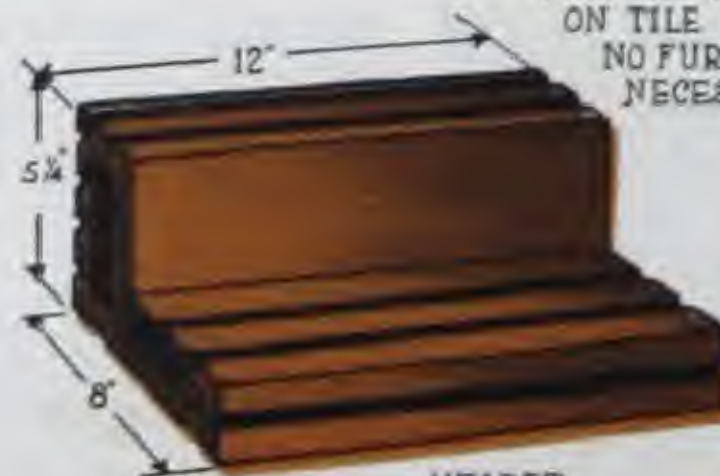
The use of the Natco Load Bearing Tile, in conjunction with the Natco Header Backer, offers special marked advantages, because of the ability to cut the "Filler" in varying lengths.

**NATCO ENCLOSURE WALL TILE
FOR WALLS OF ANY HEIGHT AND SIZE VENEERED WITH BRICK.****ADVANTAGES.**

1. Ability to work to any Bond and Storey Height without cutting or use of slabs.
2. Full 8-in. wall bearing for floor joists.
3. Confined VERTICAL air pockets prevent moisture penetration and continuous mortar joints.
4. Decreased dead loads compared to Brick Backing.
5. Mortar may be applied to flat under surface of "Header Backer."
6. Vertical cell construction offers increased strength.

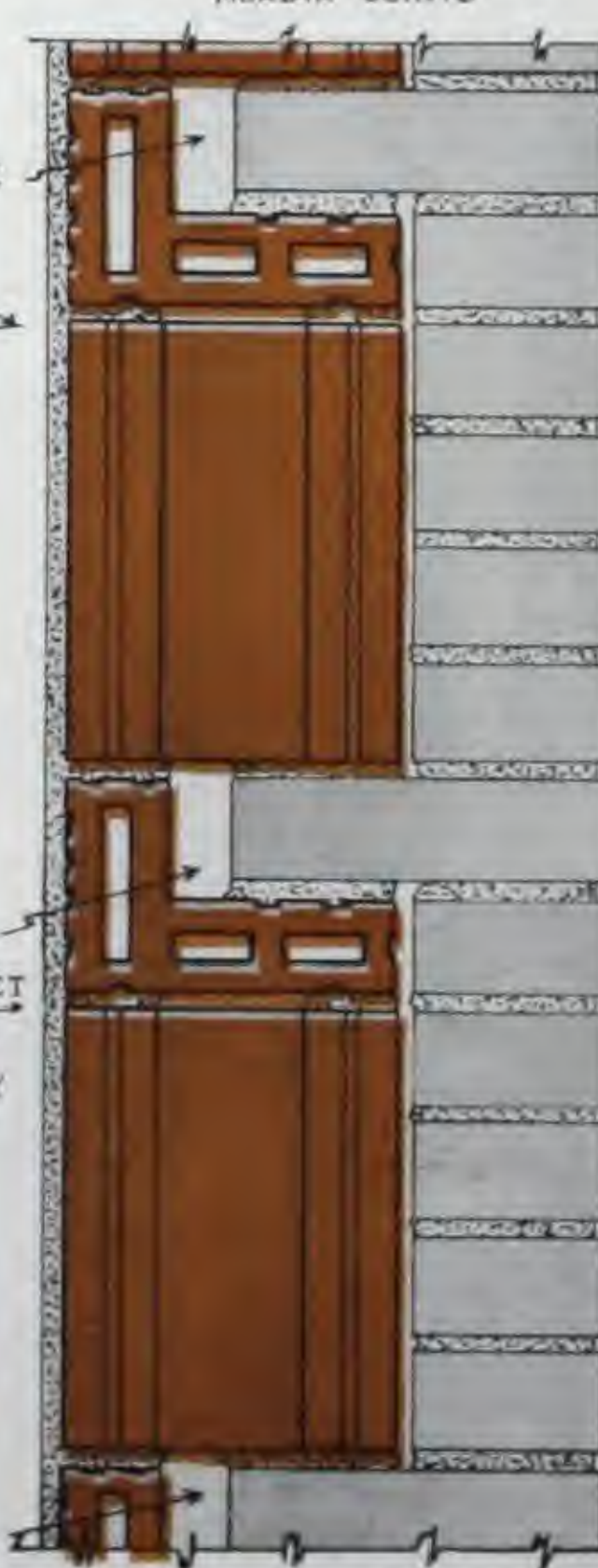
**DETAIL
NATCO
ENCLOSURE WALL TILE
FOR BACKING UP
BRICK WORK.**

BACKER



HEADER

ADAPTABLE TO
ANY THICKNESS OF WALL
FROM 12" UP

**NOTE
ABSENCE OF CONTINUOUS
MORTAR JOINTS****ADVANTAGES.**

7. Ease of using FLAT tile jack arches over openings less than 5 feet effects marked saving over reinforced type of lintel.
8. Ease of erecting pipe chases and cutting for conduits.
9. Rapidity of construction—Reduced cost of setting.
10. SIMPLICITY of CONSTRUCTION at jambs and corners and on walls of multiple thickness.

NATCO
PUBLICATIONS.

Copies of our various publications furnished upon request.

THE INTERLOCKING TILE COMPANY, LIMITED

MANUFACTURERS AND DISTRIBUTORS OF INTERLOCKING TILE.

32 TORONTO STREET, TORONTO, ONT.

(PATENT No. 137854.)

PRODUCT.

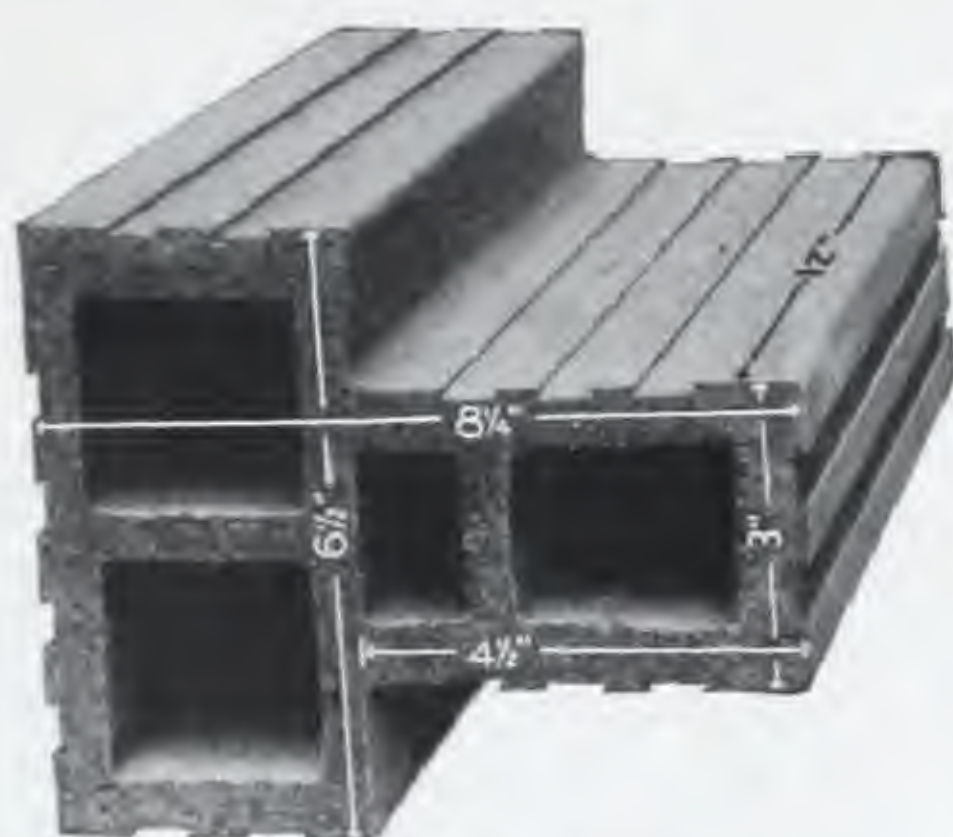
INTERLOCKING TILE is virtually a LARGE BRICK so designed as to permit of the brick mason placing it in the wall with one hand on horizontal mortar beds, as is his customary practice with brick. It is manufactured from Shale, burned to semi-vitrification, and is used for bearing walls to replace common brick. The Tile is made with deeply grooved keys to hold interior plaster or exterior stucco, or with smooth faces for exposed work. No furring is required. One shape and size builds all desirable thicknesses of walls. No matter what thickness of wall you build with Interlocking Tile every vertical web stands directly over a vertical web below. The wonderful stability of the Interlocking Tile Wall is due to the four-inch mortar beds and its PATENTED INTERLOCKING system. No mortar joints extend through the wall. This feature, together with the many insulating dead-air pockets, renders the Interlocking Tile Wall impervious to the penetration of moisture, heat, cold, sound, etc. The weight of the wall and laying-up cost is about one-half that of solid brick walls.

No other tile combines these important features.

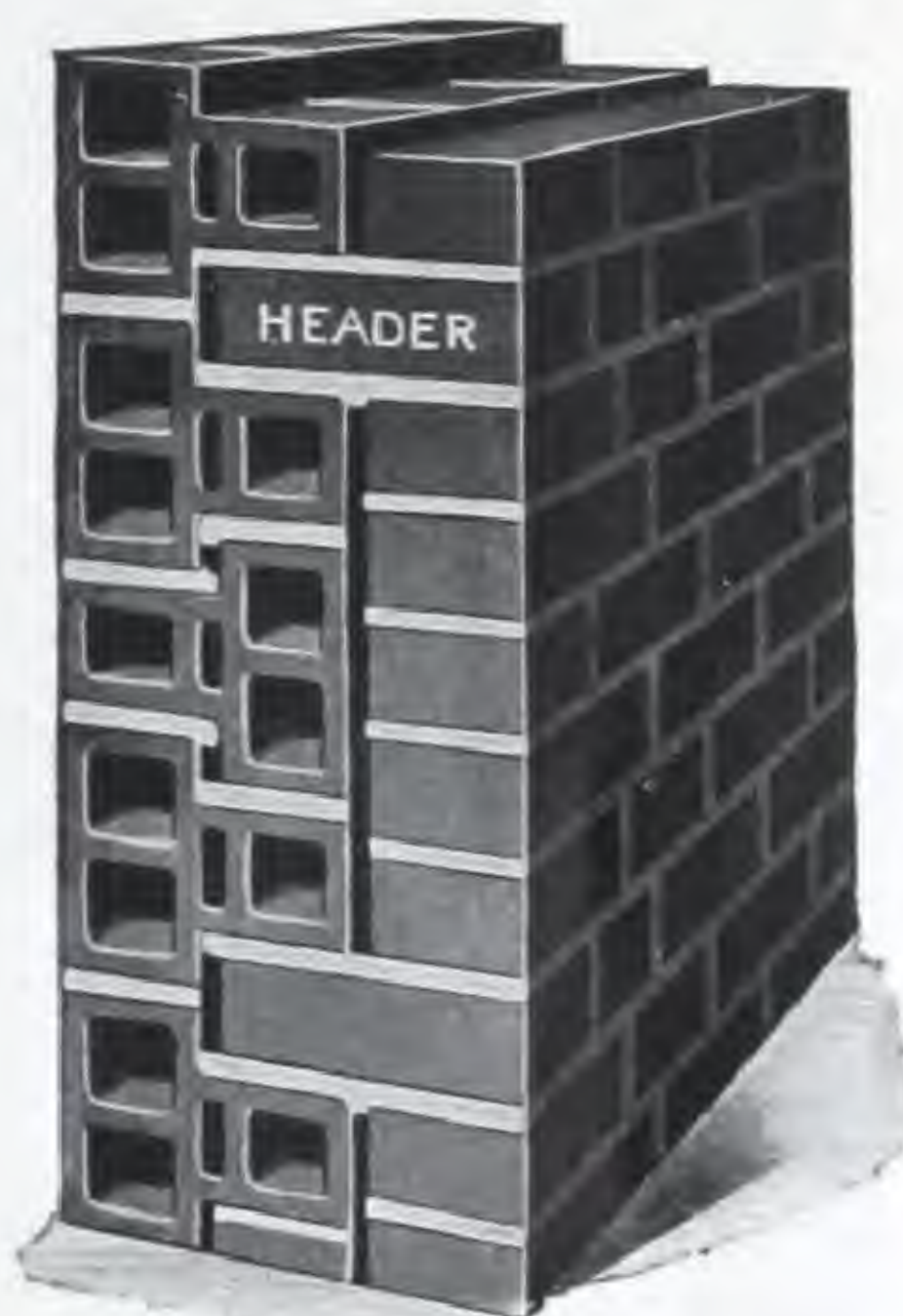
COLOR—RED.



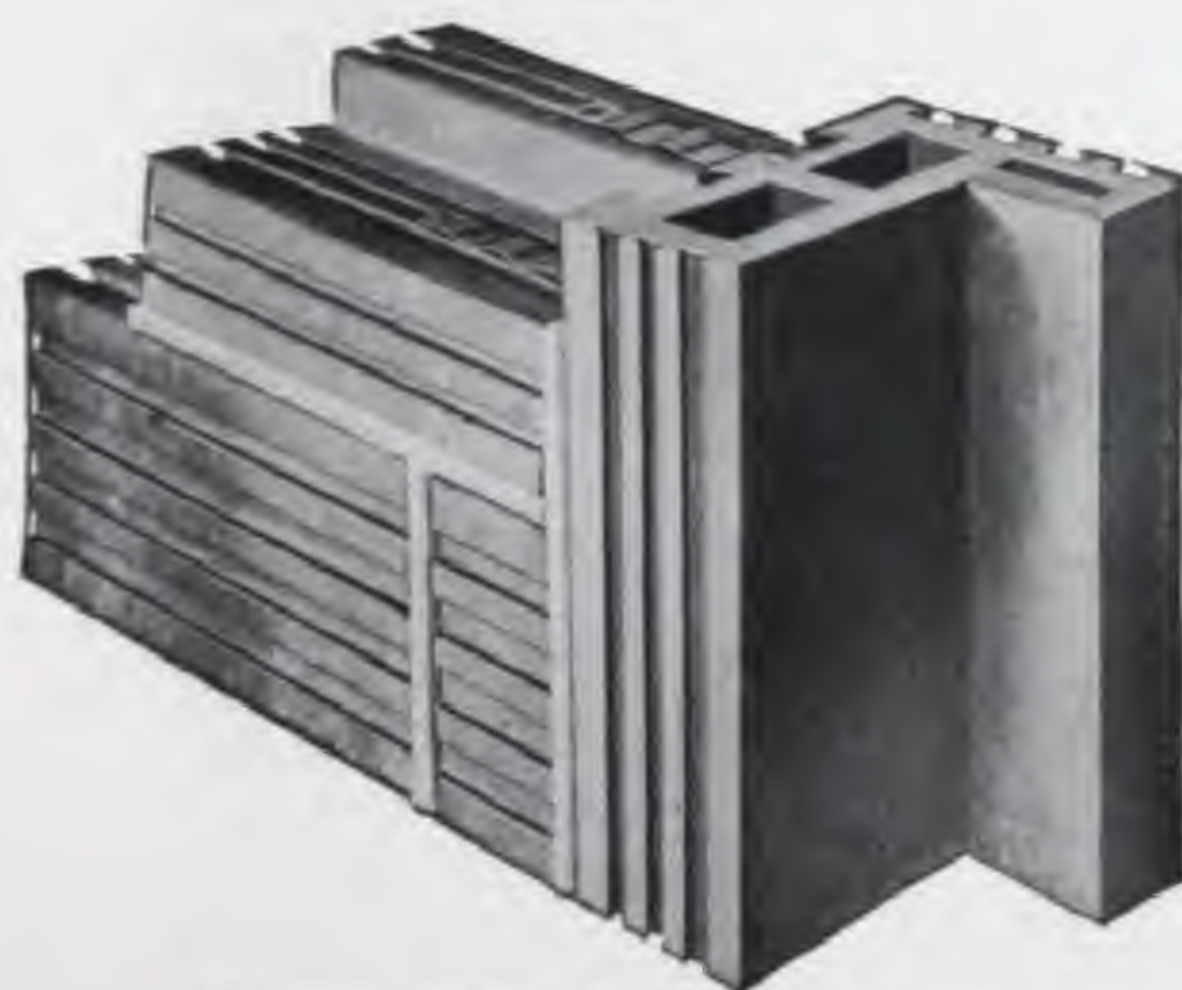
Twelve-inch Wall.



"IT INTERLOCKS."



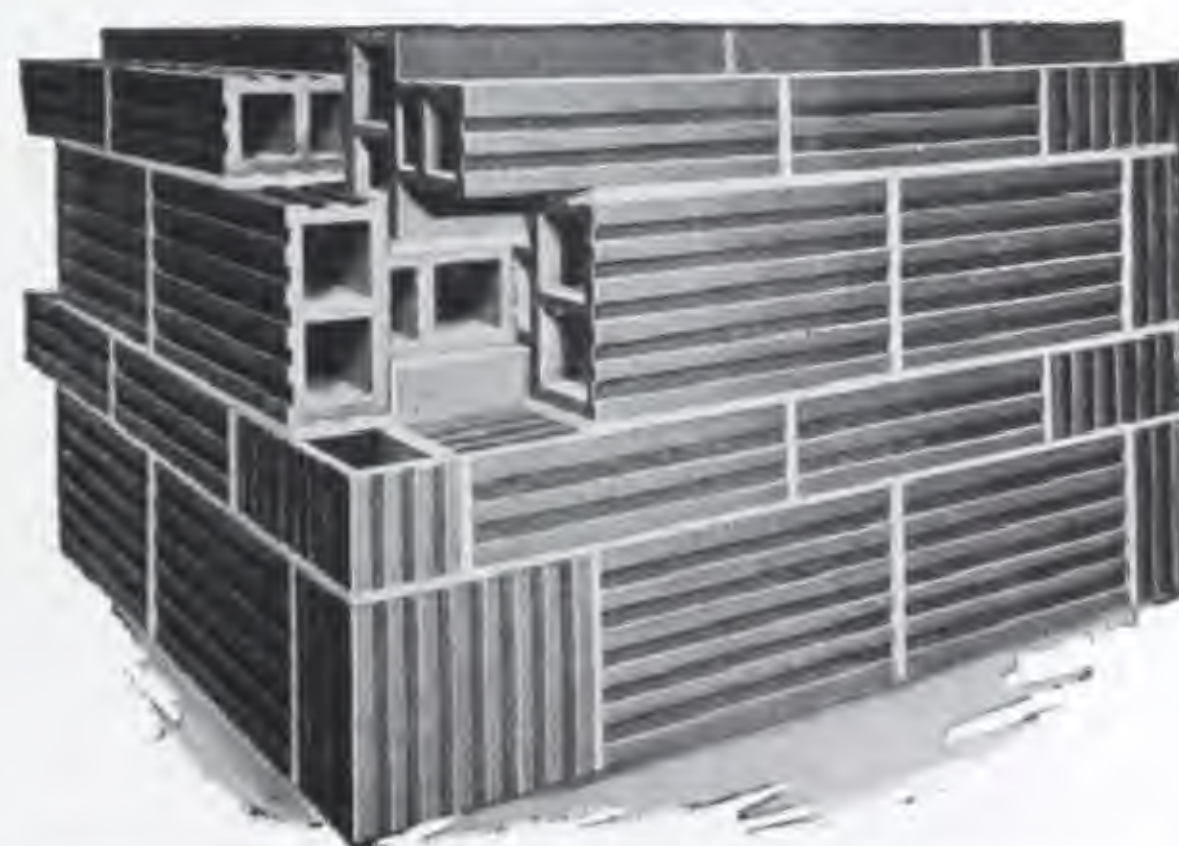
Nine-inch Wall of Denison Tile faced with four inches of Pressed or Common Brick.



Application of Jamb Tiles with Metal Ties.



Nine-inch Wall



Bonding of Wall at Corner. Corner Tile omitted in Upper Part to show manner of Bonding.

It is the Vertical Webs that must carry the Loads. To get their full strength they must stand over each other. (Notice the cuts.)

WEIGHT.

Weight of wall, inclusive of mortar, 60 pounds per cubic foot.

ORDERING.

To figure number of tile required, 2.1 tiles, lay one square foot (face of wall measure) of 9-inch wall; 3.3 tiles, lay one square foot of 12-inch wall. In ordering jamb and corner tile, give total lineal feet (vertical) of jambs and corners.

INFORMATION.

Architects and builders desiring further information concerning Interlocking Tile, prices, catalogues, etc., will confer a favour by forwarding their inquiries to us. Ask us for Detail Drawings of this construction. WE ALSO MANUFACTURE TERRA COTTA PARTITION TILES.

DOMINION BRIDGE CO., LIMITED
MONTREAL, P.Q.

ENGINEERS, MANUFACTURERS, AND ERECTORS OF
STEEL STRUCTURES.

HEAD OFFICE AND WORKS: LACHINE LOCKS, P.Q., CANADA.

CABLE ADDRESS: DOMINION.

P.O. ADDRESS: MONTREAL, P.Q.

BRANCH OFFICES AND WORKS: TORONTO, OTTAWA AND WINNIPEG.

SALES OFFICES: MONTREAL, OTTAWA, TORONTO, WINNIPEG, EDMONTON, REGINA AND VANCOUVER.



HALIFAX OCEAN TERMINALS.

PRODUCTS.

Railway and Highway Bridges—Swing and Bascule Spans; Buildings of all kinds; Plate and Tank Work of every description; Transmission Poles and Towers; Turntables; Electric and Hand Power Cranes; Hoisting Appliances; Lift Locks; Hydraulic Regulating Gates; Turbo Alternators; Turbo Blowers; Gear Cutting and General Machine Works.

ESTIMATES:

Estimates will be given upon application to our nearest offices and the same prompt attention will be given to either small or large enquiries.

LARGE STOCK OF STRUCTURAL MATERIAL AT ALL PLANTS.

THE CANADIAN BRIDGE COMPANY, LIMITED

WALKERVILLE, ONTARIO.

SALES OFFICES:

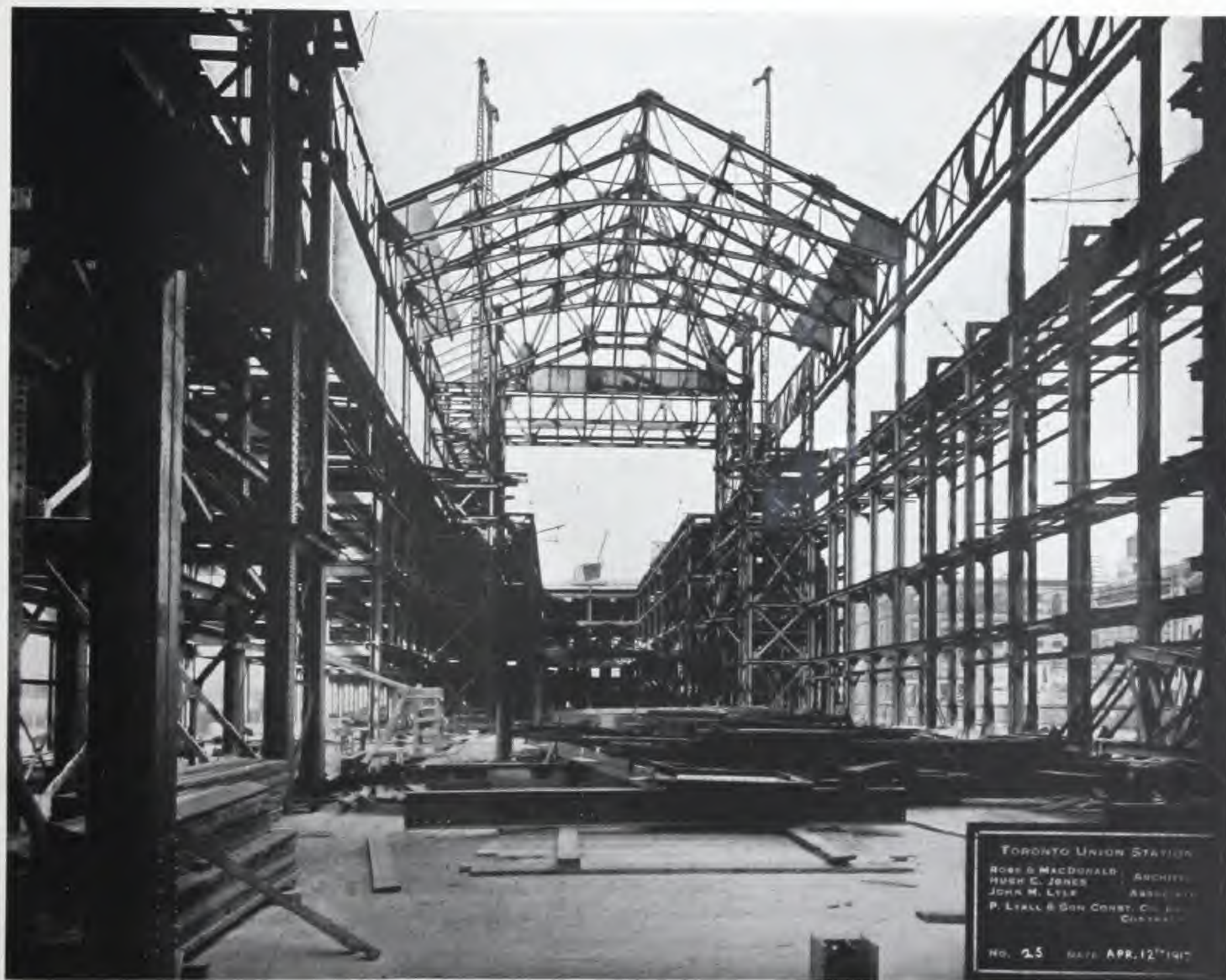
MONTREAL, QUE.

WINNIPEG, MAN.

MANUFACTURERS OF

STEEL BUILDINGS, ROOF TRUSSES, RAILWAY AND HIGHWAY BRIDGES,
LOCOMOTIVE TURNABLES AND STRUCTURAL STEEL WORK OF ALL KINDS.

ESTIMATES FURNISHED ON APPLICATION.



TORONTO TERMINAL STATION.
VIEW SHOWING ERECTION OF MAIN LOBBY ROOF TRUSSES.

6,000 TONS OF STEEL
FABRICATED AND ERECTED BY
CANADIAN BRIDGE COMPANY, LIMITED.

TORONTO TERMINAL ARCHITECTS:
ROSS & MACDONALD } ARCHITECTS.
HUGH G. JONES }
JOHN M. LYLE, ASSOCIATE.

MACKINNON STEEL COMPANY, LIMITED

HEAD OFFICE AND WORKS:

Sherbrooke, Que.

MONTREAL OFFICE:

404 New Birks Building.

TORONTO REPRESENTATIVE:

A. R. Wooldridge,
220 King Street W.

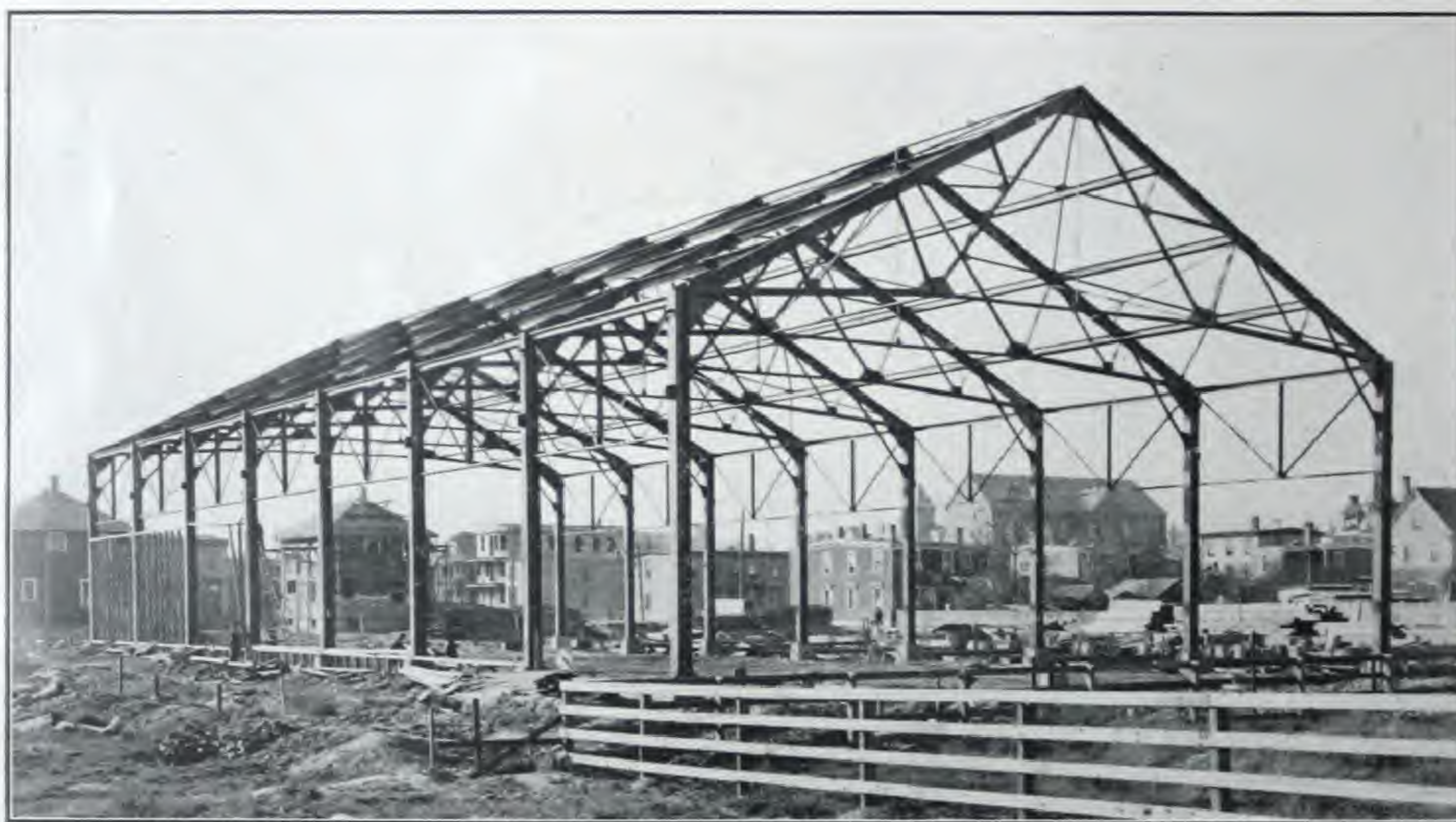
NEW BRUNSWICK REPRESENTATIVE:

Moncton Supply Co.,
Moncton, N.B.

NOVA SCOTIA REPRESENTATIVE:

R. R. Power,
Halifax, N.S.

ENGINEERS, MANUFACTURERS AND ERECTORS OF
STEEL PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.



NEW ARENA, HALIFAX, N.S.

Steelwork designed, fabricated and erected by us.

Buildings of all kinds.

Railway and Highway Bridges—Bascule spans.

Tanks of all kinds for pulp and paper plants, ships, chemical industries, sugar refineries, etc.

SMOKESTACKS

COAL BUNKERS

PENSTOCKS

SKIPS

LOG CONVEYORS

RIVETTED STEEL PIPE

We carry a large stock of plates and shapes and can make prompt deliveries.

McGREGOR & McINTYRE, LIMITED
 STRUCTURAL STEEL & ORNAMENTAL IRON WORKS,
 1139 SHAW STREET,
 TORONTO, ONT.

PRODUCTS.

STRUCTURAL STEEL for office buildings, mill buildings, grand stands, rinks, churches, etc.

STRUCTURAL STEEL BRIDGES, both highway and railway.

FIRE ESCAPES.

ELEVATOR ENCLOSURES.

SIDEWALK DOORS.

AREA GRATINGS.

AUTO CURB PLATES.

STEEL STAIRS of patented steel trough construction.

ORNAMENTAL IRON WORK of all descriptions.



GOODYEAR TIRE & RUBBER CO.'S FACTORY, NEW TORONTO, ONT.

STOCK.

Steel Beams, Channels, Column Sections, Angles, Plates, Checkered Plate, Bars always in stock.

CAPACITY.

Our annual capacity is 16,000 tons per annum. A special feature of our shop is our **SHORT ORDER DEPARTMENT**, organized to handle quickly and without the routine of a large shop, orders which are required in a very short time.

REFERENCES.

Some contracts we have executed:

Goodyear Tire and Rubber Co., New Toronto
 (7,000 tons).
 Methodist Book Room, Toronto (3,000 tons).
 Excelsior Life Building, Toronto.

St. Clair Avenue Bridge, Toronto.
 Grand Stand, London.
 Dominion Sugar Co., Chatham.
 Rolph Clark Building, Toronto.

DESIGNS AND ESTIMATES FURNISHED.

REID & BROWN STRUCTURAL STEEL AND IRON WORKS, LIMITED

63 ESPLANADE EAST,
TORONTO, ONT.

PRODUCTS.

DESIGNERS, MANUFACTURERS and ERECTORS of STRUCTURAL STEEL
Bridges, Viaducts, etc.

STRUCTURAL STEEL, PLATES, BARS, REINFORCING STEEL, GREY IRON CASTINGS

Our shops are fitted with every modern equipment for Structural Steel Work, quick service and rapid delivery. We carry a complete stock of Structural Shapes and checkered.

We also specialize in the manufacture of Automobile Turntables, Automobile Motor Truck Steel Dump Bodies.

The services of our designer are entirely at the disposal of Architects and Engineers, plans and offering suggestions.



CITY OF TORONTO—DON INCINERATOR.
250 TONS STRUCTURAL STEEL FABRICATED AND ERECTED BY US.

AUTOMOBILE TURNABLES.

We make two models, both patented, of different sizes but entirely similar in design. This is a brief description of each model.

Model No. 1 consists of a heavy cast iron drum (size of which is governed by the load) with hardened steel resistance-pin in centre, surmounted by heavy cast iron top cap revolving on, large hardened steel balls, bearing in grooves cut in two heavy steel bed casting; steel floor beams made secure by heavy cast iron clamping piece held in place by iron ring-bolt and nut at centre.

All bearings are protected from water and sand. No outer bearing track to prevent cause table to turn hard.

Model No. 1 is made in three sizes, identical in construction, the sizes of parts according to total size of turntable. Used as a wash rack.

Model No. 2. Designed for installation in upper floors of buildings, in ground level or a basement, and in places where the required depth for Model No. 1 cannot be obtained. They are identical in construction.

A special heavy turntable adapted for heavy automobile truck use is manufactured and we will be glad to furnish detail drawings and quote prices on same on application.

We manufacture Motor Truck Steel Dump Bodies. Being of steel construction they are durable and substantial, simple in mechanical operation and withstand very heavy truck loads for General Contractors and large Industrial Plants. Quick delivery can be made on order.

In spite of the general shortage of raw materials at the present time we are enabled by having in our warehouse a large stock, covering all sizes of bars, both round and square, to be thus in a position to give prompt delivery.

We invite inquiries from Engineers, Architects and General Contractors.

OUR PRICES ARE RIGHT.

MOTOR TRUCK STEEL DUMP BODIES.

REINFORCING STEEL.

STEEL



NEW ARENA, H

STEEL PRO...
CON...
MAN REPRESENTATIVES:
W. H. STE...
St. James Street,
MONTREAL, QUE.
ALLAN...
Royal Bank Bldg.,
TORONTO, ONT.
Buenos Aires; Ca...
San Francisco; Mo...
New Orleans; San...
Washington.
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CONSOLIDATED STEEL CORPORATION

REPRESENTATIVES:

GENERAL OFFICES:

25 BROADWAY,
NEW YORK, U.S.A.

CABLE ADDRESS:

"CONSTECO, NEW YORK."

CODES:

CONSOLIDATED STEEL CORPORATION, A.B.C.
5TH EDITION IMPROVED, BENTLEY'S COM-
PLETE PHRASE, WESTERN UNION, SCOTT'S
10TH EDITION, LIEBER'S.**CONSTECO**
TRADE MARK

BRANCH OFFICES AND REPRESENTATIVES IN

Aires Calcutta; Christiania; Copenhagen; Havana; Johannesburg; Lima; London;
City Montreal and Toronto; Rio de Janeiro; Rotterdam; San Francisco, Seattle,
as; Santiago and Valparaiso; Shanghai; St. John's, Newfoundland; Sydney;

SOLE IMPORTER OF THE COMMERCIAL PRODUCTS OF:

BETHLEHEM STEEL COMPANY.

HIER HILL STEEL COMPANY.

CAMBRIA STEEL COMPANY.

LACKAWANNA STEEL COMPANY.

LICKENS STEEL COMPANY.

MIDVALE STEEL & ORDNANCE COMPANY.

REPUBLIC IRON & STEEL COMPANY.

SHARON STEEL HOOP COMPANY.

TRUMBULL STEEL COMPANY.

WHITAKER-GLESSNER COMPANY.

YOUNGSTOWN SHEET AND TUBE COMPANY.

We invite and will give prompt attention to inquiries for all forms of iron and
products, including the following:Structural Steel, such as Plow
discs, Harrow Discs, Drag Teeth,
Mower Teeth, Rake Teeth, etc.
and Anchor Chains.S. I. Muck, Concrete Rein-
forcing Iron, Refined Iron.Roads, Fronts, Flue Holes,
and Holes, Man Holes, Tube
Fittings, and Braces.Rings, Welded Steel and
Nuts.Light, Passenger, Tank, etc.
Iron, Brass, and Steel.Sections, Forged and Rolled,
Gear Blanks, Pipe Flanges,
Track Wheels, and In-
termediate Wheels of all kinds.Rigid and Flexible Elec-
tric Cables for Steam and Electric
Motors.

Structural Material.

Forged Shafts for sugar
mill teamships, etc., and Miscel-
laneous Forgings.Steam and Electric Rail-
road Equipment.Gas Engines, 800 h.p. and over.
Gas Strips.Hoops.
Hot and Cold Rolled Strip Steel.Ingots.
Ingot Molds.Machinery—Bethlehem Steel Com-
pany's, Detrick and Harvey Plan-
ers, Horizontal Boring, Drilling
and Milling Machines, Hydraulic
Presses, Railway Shop Machinery,
Rolling Mill Machinery, Shipyard
Machinery.

Nails, Wire.

Ore Crushing Parts—Roll Shells,
Ring Dies, Roller Tires, Stamp
Shoes and Dies, Stamp Mill Parts,
Crusher Balls.

Pig Iron.

Piling, Lackawanna Steel Sheet.

Pipe—English Gas and Steam,
American Standard Weight, Ex-
tra and Double Extra Strong,
Black and Galvanized Line Pipe,
and Drive Pipe.Plates—Tank, Hull, Flange, Boiler,
Marine Boiler and Fire Box
Quality.

Pole Line Material.

Pumps and Pumping Engines.

Rails—Light, Heavy, Tram or Girder,
etc., and Accessories.Rivets.
Roofing.

Screws, Wood.

Shafting, Cold Rolled and Cold
Drawn.Shapes, Standard Structural and
Bethlehem.

Sheet Bars.

Sheets—Plain, Galvanized, Flat and
Corrugated, Blue Annealed.

Sidings.

Skelp.

Slabs.

Spikes.

Staybolt Iron.

Switches for Steam and Electric
Railroads.

Terne Plate.

Tin Mill Products.

Tin Plate.

Tires.

Tool Steel.

Turnbuckles.

Washers.

Wheels—Rolled Steel, Steel Tired.

Wire Products—Plain Wire, Galvan-
ized Wire of various grades, An-
nealed Wire, Bright Hard Wire,
Bright Soft Wire, Nails, Fencing,
and Barbed Wire.

Wire Rods.

We make a specialty of large size plates, one of our Member Companies having
recently completed a mill in which rectangular plates can be made up to 190 inches
in diameter, circular plates up to 196 inches diameter, and flanged boiler heads up to 183
inches diameter. Plates recently completed there are the largest that have ever been
made.As our Member Companies' annual ingot producing capacity is in excess of
1,000,000 tons, we are in a position to handle the largest requirements, as well as to
offer our customers fair prices, quick service, and dependable attention to every detail.Inquiries should include exact specifications, giving quantities desired, par-
ticularly as to size, weight, packing, country of destination, etc., and purposes for which
materials are required.

REID & BROWN STRUCTURAL STEEL AND IRON WORKS, LIMITED

63 ESPLANADE EAST,
TORONTO, ONT.

PRODUCTS.

DESIGNERS, MANUFACTURERS and ERECTORS of STRUCTURAL STEEL for Buildings, Bridges, Viaducts, etc.

STRUCTURAL STEEL, PLATES, BARS, REINFORCING STEEL, GREY IRON CASTINGS, etc.

Our shops are fitted with every modern equipment for Structural Steel Work, thus guaranteeing quick service and rapid delivery. We carry a complete stock of Structural Shapes and Plates, plain and checkered.

We also specialize in the manufacture of Automobile Turntables, Automobile Curb Plates and Motor Truck Steel Dump Bodies.

The services of our designer are entirely at the disposal of Architects and Engineers in preparing plans and offering suggestions.



CITY OF TORONTO—DON INCINERATOR.
250 TONS STRUCTURAL STEEL FABRICATED AND ERECTED BY US.

AUTOMOBILE TURNABLES.

We make two models, both patented, of different sizes but entirely similar in design. The following is a brief description of each model.

Model No. 1 consists of a heavy cast iron drum (size of which is governed by diameter of table) with hardened steel resistance-pin in centre, surmounted by heavy cast iron top supported by, and revolving on, large hardened steel balls, bearing in grooves cut in two heavy steel ball runs, set in each casting; steel floor beams made secure by heavy cast iron clamping piece held in place by large Norway iron ring-bolt and nut at centre.

All bearings are protected from water and sand. No outer bearing track to produce friction or cause table to turn hard.

Model No. 1 is made in three sizes, identical in construction, the sizes of parts simply increasing according to total size of turntable. Used as a wash rack.

Model No. 2. Designed for installation in upper floors of buildings, in ground floor where there is a basement, and in places where the required depth for Model No. 1 cannot be obtained. All styles are identical in construction.

A special heavy turntable adapted for heavy automobile truck use is manufactured by this company and we will be glad to furnish detail drawings and quote prices on same on application.

MOTOR TRUCK STEEL DUMP BODIES.

We manufacture Motor Truck Steel Dump Bodies. Being of steel construction they are naturally durable and substantial, simple in mechanical operation and withstand very heavy trucking. Most adaptable for General Contractors and large Industrial Plants. Quick delivery can be made on any special design required.

REINFORCING STEEL.

In spite of the general shortage of raw materials at the present time we are particularly fortunate in having in our warehouse a large stock, covering all sizes of bars, both round and square sections. We are thus in a position to give prompt delivery.

We invite inquiries from Engineers, Architects and General Contractors.

OUR PRICES ARE RIGHT.

CONSOLIDATED STEEL CORPORATION

CANADIAN REPRESENTATIVES:

W. H. STEWART,
263 St. James Street,
MONTREAL, QUE.

ALLAN HILLS,
Royal Bank Bldg.,
TORONTO, ONT.

GENERAL OFFICES:

25 BROADWAY,
NEW YORK, U.S.A.

CONSTECCO
TRADE MARK

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BRANCH OFFICES AND REPRESENTATIVES IN

Barcelona; Buenos Aires; Calcutta; Christiania; Copenhagen; Havana; Johannesburg; Lima; London;
Milan; Mexico City; Montreal and Toronto; Rio de Janeiro; Rotterdam; San Francisco, Seattle,
and New Orleans; Santiago and Valparaiso; Shanghai; St. John's, Newfoundland; Sydney;
Wellington.

MEMBER COMPANIES.

SOLE EXPORTER OF THE COMMERCIAL PRODUCTS OF:

BETHLEHEM STEEL COMPANY.
BRIER HILL STEEL COMPANY.
CAMBRIA STEEL COMPANY.
LACKAWANNA STEEL COMPANY.
LUKENS STEEL COMPANY.

MIDVALE STEEL & ORDNANCE COMPANY.
REPUBLIC IRON & STEEL COMPANY.
SHARON STEEL HOOP COMPANY.
TRUMBULL STEEL COMPANY.
WHITAKER-GLESSNER COMPANY.

YOUNGSTOWN SHEET AND TUBE COMPANY.

PRODUCTS.

We invite and will give prompt attention to inquiries for all forms of iron and steel products, including the following:

Agricultural Steel, such as Plow
Discs, Harrow Discs, Drag Teeth,
Cultivator Teeth, Rake Teeth, etc.
Alloy Steels.
Anchors and Anchor Chains.
Axles.
Bands.
Bars—Steel, Muck, Concrete Rein-
forcing, Iron, Refined Iron.
Billets.
Blooms.
Boiler Heads, Fronts, Flue Holes,
Hand Holes, Man Holes, Tube
Holes, Fittings, and Braces.
Boiler Tubes, Welded Steel and
Charcoal.
Bolts and Nuts.
Bridges.
Cars—Freight, Passenger, Tank, etc.
Castings—Iron, Brass, and Steel.
Circular Sections, Forged and Rolled,
such as Gear Blanks, Pipe Flanges,
Crane Track Wheels, and In-
dustrial Wheels of all kinds.
Conduit, Rigid and Flexible Elec-
trical.
Crossings for Steam and Electric
Railroads.
Fabricated Structural Material.
Forgings—Forged Shafts for sugar
mills, steamships, etc., and Miscel-
laneous Forgings.
Frogs for Steam and Electric Rail-
roads.

Gas Engines, 800 h.p. and over.
Gas Strips.

Hoops.
Hot and Cold Rolled Strip Steel.

Ingots.
Ingot Molds.

Machinery—Bethlehem Steel Com-
pany's, Detrick and Harvey Plan-
ers, Horizontal Boring, Drilling
and Milling Machines, Hydraulic
Presses, Railway Shop Machinery,
Rolling Mill Machinery, Shipyard
Machinery.

Nails, Wire.

Ore Crushing Parts—Roll Shells,
Ring Dies, Roller Tires, Stamp
Shoes and Dies, Stamp Mill Parts,
Crusher Balls.

Pig Iron.
Piling, Lackawanna Steel Sheet.
Pipe—English Gas and Steam,
American Standard Weight, Ex-
tra and Double Extra Strong,
Black and Galvanized Line Pipe,
and Drive Pipe.
Plates—Tank, Hull, Flange, Boiler,
Marine Boiler and Fire Box
Quality.
Pole Line Material.
Pumps and Pumping Engines.

Rails—Light, Heavy, Tram or Girder,
etc., and Accessories.

Rivets.

Roofing.

Screws, Wood.

Shafting, Cold Rolled and Cold
Drawn.

Shapes, Standard Structural and
Bethlehem.

Sheet Bars.

Sheets—Plain, Galvanized, Flat and
Corrugated, Blue Annealed.

Sidings.

Skelp.

Slabs.

Spikes.

Staybolt Iron.

Switches for Steam and Electric
Railroads.

Terne Plate.

Tin Mill Products.

Tin Plate.

Tires.

Tool Steel.

Turnbuckles.

Washers.

Wheels—Rolled Steel, Steel Tired.

Wire Products—Plain Wire, Galvan-
ized Wire of various grades, An-
nealed Wire, Bright Hard Wire,
Bright Soft Wire, Nails, Fencing,
and Barbed Wire.

Wire Rods.

SPECIAL SIZES.

We make a specialty of large size plates, one of our Member Companies having recently completed a mill in which rectangular plates can be made up to 190 inches wide, circular plates up to 196 inches diameter, and flanged boiler heads up to 183 inches diameter. Plates recently completed there are the largest that have ever been produced.

As our Member Companies' annual ingot producing capacity is in excess of 12,000,000 tons, we are in a position to handle the largest requirements, as well as to give our customers fair prices, quick service, and dependable attention to every detail.

INQUIRIES.

Inquiries should include exact specifications, giving quantities desired, particulars as to size, weight, packing, country of destination, etc., and purposes for which the materials are required.

THE HAMILTON BRIDGE WORKS COMPANY, LIMITED

HEAD OFFICE:
BAY AND BARTON STREETS,
HAMILTON, ONT.

ENGINEERS, CONTRACTORS,
MANUFACTURERS.

PLANT NO. 1:
HAMILTON, ONT.

PLANT NO. 2:
HAMILTON (EAST)

PRODUCTS.

Designers and Builders of RAILWAY AND HIGHWAY BRIDGES, STEEL FRAME BUILDINGS for Offices, Warehouses, Factories and other purposes. METALLIC STRUCTURES for all purposes.



STRUCTURAL STEEL MILL BUILDING, RECENTLY FABRICATED AND ERECTED BY HAMILTON BRIDGE WORKS CO., LIMITED.

FABRICATING PLANTS.

Shop A—capacity 18,000 tons; Shop B—6,000 tons; Shop C—12,000 tons per annum.

STOCK.

A large stock of structural shapes and plates, is carried and we can make quick deliveries of Fabricated Steel of any description.

ERECTION.

With a large fleet of derrick cars, erection cranes, compressor cars, boarding cars, etc., we are able to handle many large contracts simultaneously.

REFERENCES.

We are extensive Contractors to the Canadian Pacific Railway, Grand Trunk Railway System, Canadian National Railway Systems, and many others.

HEPBURN & DISHER, LIMITED

OFFICE:

71 VAN HORNE STREET

WORKS:

40-60 VAN HORNE STREET

TORONTO, ONT.

PRODUCTS.

STRUCTURAL STEEL, BEAMS, GIRDERS, COLUMNS, TRUSSES, LINTELS, WALL PLATES, BUILDERS' IRONWORK.

We are also sole agents for "DUPLEX" JOIST AND WALL HANGERS, POST CAPS, POST BASES, WALL PLATES, WALL BOXES, WALL TIES, WALL ANCHORS, STRAPS, Etc.

FACILITIES.

We carry a large stock of all sizes of beams, channels, angles, plates, etc., from which we are in a position to make prompt deliveries. We also have splendid facilities for manufacturing to the designs submitted by Architects and Engineers.

We specialize in rush contracts.



GRAND STAND AND BETTING SHED
KENILWORTH PARK RACE TRACK
WINDSOR, ONTARIO

GRAND STAND, 416 ft. Long x 56 ft. Wide.
BETTING SHED, 416 ft. Long x 100 ft. Wide x 30 ft. High.
Structural Steel Fabricated and Erected by Us in Record Time.

A. JORDAN RATTRAY, JR.,
ARCHITECT
TORONTO, ONTARIO.

"DUPLEX" JOIST AND WALL HANGERS.



"DUPLEX" JOIST HANGER.

The "Duplex" joist hanger is superior to the old methods of framing by mortise and tenon. It also has greater efficiency than wrought iron stirrups and steel hangers, in so much that it retains the full strength of the timber. The application of the "Duplex" hanger is very simple, the timber being bored at or above its neutral axis, and the malleable lug of the hanger placed in the hole, filling it completely.

The "Duplex" wall hanger is now used extensively as a great improvement over the old method of anchoring timbers to masonry walls. It absolutely renders timbers self-releasing in case of fire, increases the bearing timbers on the walls and maintains a secure anchorage.



"DUPLEX" WALL HANGER.

"DUPLEX" STEEL POST CAP.

In this cap we have the most perfect column and girder that it is possible to obtain. The cap is made of mild open hearth steel and consists of three pieces, bolted together with four heavy bolts. The weight of the girder is carried on the shoulder formed on the post. The heavy bolts underneath the bearing bracket relieve the outer edge of the bracket and transmit the load direct to the post. The outer bolt is directly under the plate of the bearing bracket, while the inner bolt is close against the post. This forms a truss of the bolts, plates and bracket. Tests have proved that it is impossible to break the

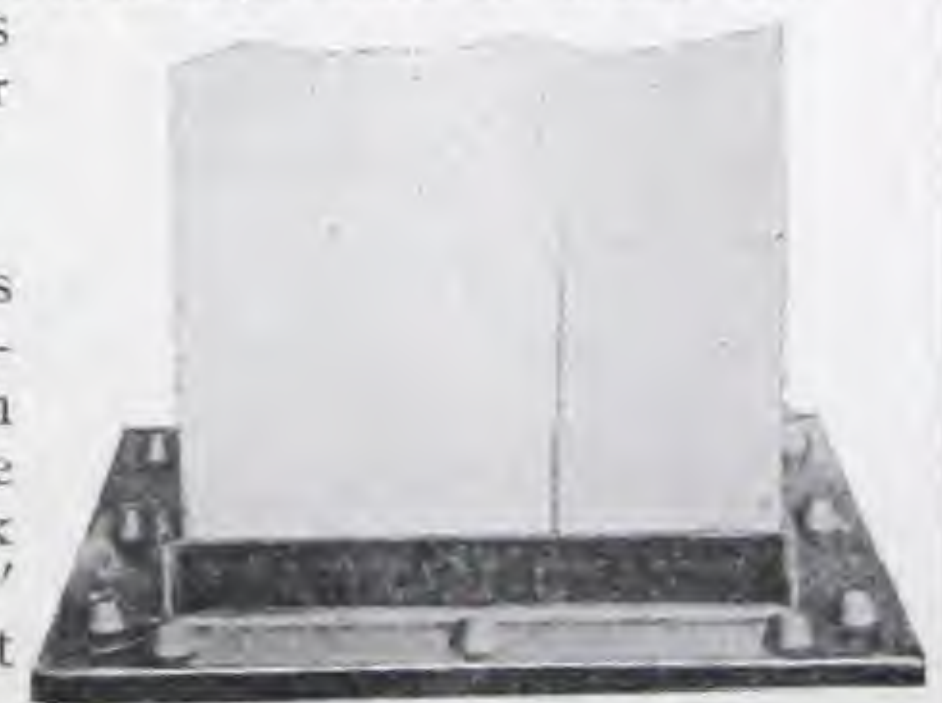
Cap when even more than six times the ultimate safe load of the timber has been applied.



"DUPLEX" POST CAP FOR FOUR WAY CONSTRUCTION.

"DUPLEX" STEEL POST BASE.

The "Duplex" steel post base is made of steel plates and angles riveted together to fit the post and is much more economical than the old style cast iron base. We carry sizes in stock to fit from a 6"x6" post to a 20"x20" post. Larger sizes made up on short notice.



"DUPLEX" STEEL POST BASE.

THE ROOFERS' SUPPLY CO., LIMITED

SHAW AND DUPONT STREETS,

TORONTO, ONT.

PRODUCTS.

We are manufacturers of and dealers in SHEET METALS, ROOFING MATERIALS, ROOFERS' SUPPLIES, WIRED GLASS, etc.

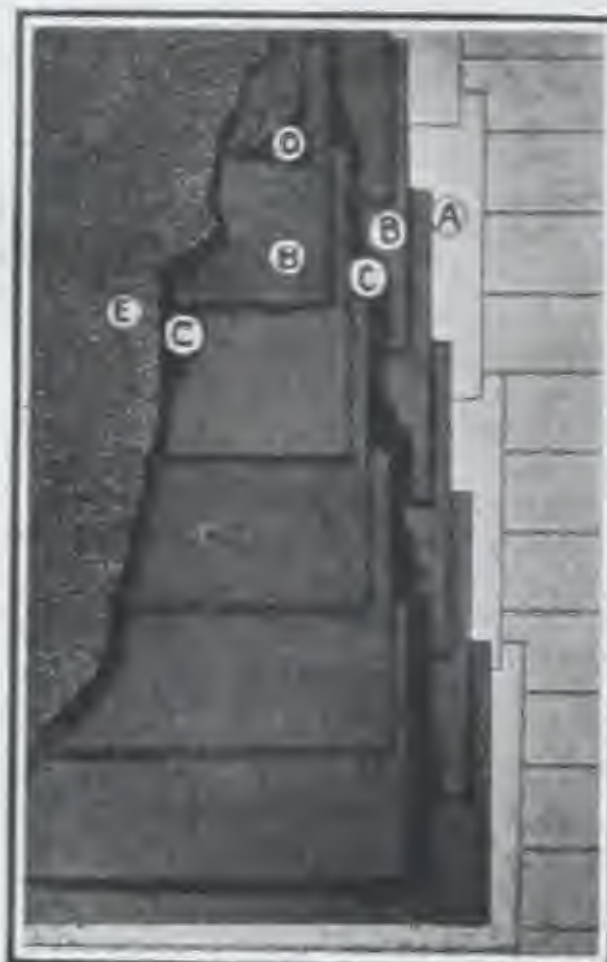
FELT AND GRAVEL ROOFS.

The flat or deck style of roof is conceded to be the most economical for warehouses, factories, office buildings, etc. The slope of roof should be $\frac{1}{4}$ inch to $\frac{1}{2}$ inch per foot. Where hanging gutters are to be used, have the cornice project at least 10 inches over wall, have the fascia board come up to roof and go below the soffit; never have roof boards project past fascia; put a 6 inch strip of galvanized iron along eave, turned down 3 inches into gutter, then start your Felt Roofing by sticking the first ply to the edge of roof and over the galvanized iron, projecting the felt over 1 inch to 2 inches to carry water into gutter. Around skylights, chimneys, brick walls, etc., turn felt up and stick with pitch, nailing a lath along top of felt, about 3 inches up from roof. If Metal Cloak Flashing is to be used, the lathing is not necessary. Never allow any nailing or flashing, etc., to come within 3 inches of roof. The most successful way to construct flat roofs is to have the water brought down inside the building, grade the roof to one or more points according to size of building, have hoppers about 16 inches across mouth, run down into 4 inch wrought or cast iron pipe, put wire guard over hopper to prevent gravel, etc., getting in. The trouble with ice along eaves and in gutters is done away with, but this style is not suitable unless the building is sufficiently heated to prevent frost reaching the down-pipes during winter. We offer for guidance two specifications, but recommend No. 1 for all first-class buildings.

These roofs resist fire three times as long as iron or tin.

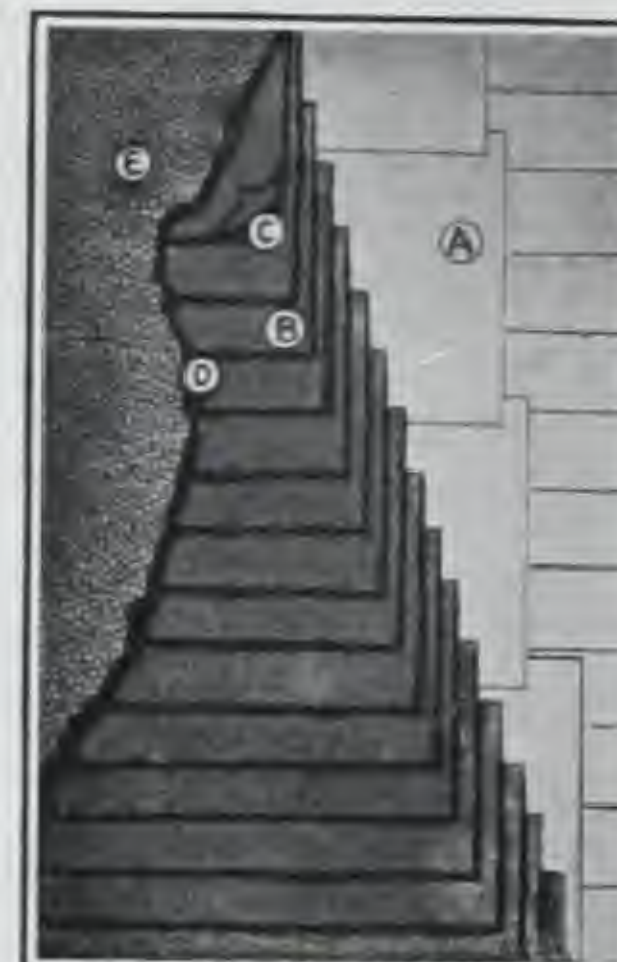
Felt to be "R. S. Brand" medium weight Tarred Felt.

Pitch to be "R. S. Brand" Roofing Pitch.



A—Dry Felt or Sheathing. BB—Tarred Felt, each ply shows 15 in. exposed. CC—Flowing Coat of Pitch. D—Pitch between Sheets. E—Gravel.

Specification No. 1.—Lay one ply of dry felt or sheathing, over this two plies of tarred felt, medium weight, swabbed between each sheet with hot pitch, then swab the whole surface with a good coat of boiling pitch; lay another two plies of tarred felt, swabbed between sheets, and a second flowing coat of hot pitch. When last coat of pitch is set, swab on a light coat of hot coal tar, and evenly spread over the whole, clean gravel to a depth of $\frac{5}{8}$ of an inch.



A—Dry Felt or Sheathing. B—Tarred Felt, each ply shows $7\frac{1}{2}$ in. exposed. C—Pitch between Sheets. D—Flowing Coat of Pitch. E—Gravel.

Specification No. 2.—Lay one ply of dry felt or sheathing, over this four plies of tarred felt, medium weight, swabbed with hot pitch between each sheet, then swab on a flowing coat of hot pitch. When set, apply light sticking coat of coal tar and cover to $\frac{5}{8}$ of an inch with clean gravel.

ADVANTAGES OF SLATE ROOF.

A roof does not require any stronger construction for slates than for shingles. This theory has long ago been disproved by practical men. A slate roof adds greatly to the appearance of any class of building; its first cost is the only cost. It is fire-proof and therefore lessens the rate of insurance. It does not collect ice or snow, and can be deluged with water and dry out in a few minutes. It cannot rot or corrode, while the rain water from a slate roof is pure and clean.

SPECIFICATION FOR SLATE ROOFING.

Put in strong valley rafters. Tongue and grooved sheathing is not necessary, only have your boards even in thickness, your roof $\frac{1}{4}$ pitch or upwards. Line your valleys 20 inches wide at bottom and 15 inches at top with galvanized iron. Chimneys should always have a saddle at back; step and cloak flash at all intersections around brick work, and cover ridges with galvanized iron. Have your eave-troughs so hung that the outside edge will be $\frac{1}{2}$ inch below the run of the roof, so that ice or snow may slide clear. Lay over boarding one ply Slaters' Felt, then cover with "Roofers Supply Company's No. 1 Roofing Slate" (in black, green, mottled or red), and you will have a good roof for ever. A square contains sufficient slate to cover 100 square feet.

PRICES.

We carry a large stock of Roofing Slate in black, green, mottled or red, and quote the following approximate prices for slate laid on roof at Toronto: Black Slate, per square, \$15.00 to \$17.00; Mottled, \$18.00 to \$20.00; Unfading Green Slate, \$18.00 to \$20.00; Red, \$26.00 to \$30.00.

RUST-RESISTING IRON.

Our rust-resisting galvanized and black sheets will last five to seven times as long as ordinary galvanized sheets. Write and get particulars.

ROOFING TILE.

Write for particulars and prices on our Red, Green or Brown Vitrified Tile; also our promenade flat roof tile. Ontario and Quebec Agents for Ludowici-Celadon Co. of Chicago.

ROOFERS' SUNDRIES.

Pipe, Trough, Ridge, Tools, Cement, etc.

READY
ROOFING.



For sloping roofs on factories, freight sheds, barns, etc., there is nothing better than our prepared wool felt asphalted roofings. Each roll contains sufficient to cover 100 square feet of roof, also the necessary nails and liquid asphalt for sticking laps. On roofs where there is a short rafter, this style of roofing is often laid from ridge to eave, but we recommend starting at the eave; let the roofing project over eave about 2 inches, and we advise rolling out along roof; stretch tight so as to avoid wrinkles, drive a few nails along top edge to hold in position, the bottom edge can then be turned up and liquid run along; stick down and nail about every 3 inches. This is the most satisfactory way to apply Ready Roofings. Write for samples and prices of Roofers Supply Company's Ready Roofing.

SHEET METALS.

Galvanized and Black Steel Sheets, Tin Plate, Terne Plate, Sheet Zinc and Copper, Bar Copper and Copper Tubing.

CORRUGATED
GALVANIZED
IRON.

The use of Corrugated Galvanized Iron is increasing steadily each year, as architects and builders recognize in it a very serviceable material for roofs and siding of warehouses, elevators, barns, etc. The iron may be applied to sheeting of wood or direct to iron or wood purlins. Any gauge can be supplied from 18 to 28, weight depending on gauge, from 75 to 240 lbs. per 100 square feet of iron. All our sheets are corrugated from the very best quality of sheets made for that purpose; they are uniform in size, and the corrugations, being pressed by very heavy machinery, fit exactly. Two sizes of corrugations can be supplied, $2\frac{1}{2}$ inch \times $\frac{5}{8}$ inch and 1 inch \times $\frac{1}{4}$ inch. The sizes of sheets kept in stock are 6, 8 and 10 feet long, the widths depending on the size of corrugation used. Sheets corrugated $2\frac{1}{2}$ inches \times $\frac{5}{8}$ inch are $27\frac{1}{2}$ inches and 33 inches wide; sheets corrugated 1 inch \times $\frac{1}{4}$ inch are $26\frac{1}{2}$ inches and 32 inches wide. Odd-sized sheets can be supplied at extra cost.

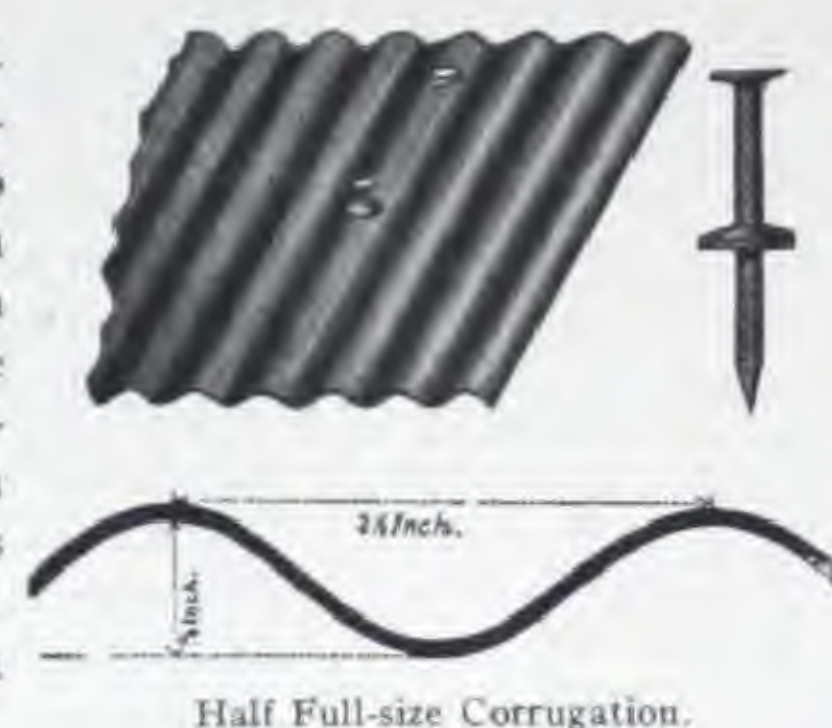
Quotations from us are based on 100 square feet of iron after corrugating, no allowance being made for laps, the pitch or angle of roof having a great deal to do with the amount of lap required. We recommend for roofs that are known as quarter pitch or 3 inches to the foot, 3 inch end lap and two corrugations side lap. This makes the covering width of a sheet 33 inches wide ($2\frac{1}{2}$ inch \times $\frac{5}{8}$ inch corrugations) $28\frac{1}{2}$ inches. For siding we give an end lap of 2 inches and side lap of one corrugation, this makes the covering width of a sheet $30\frac{1}{2}$ inches. Allowing for the different laps indicated above, 121 square feet of iron is required to cover 100 square feet of roof, and 110 square feet of iron is required to cover 100 square feet of siding.

Where sheeting is not used, space the purlins not more than 2 feet 6 inches for 26 gauge iron, from 3 feet to 4 feet for 24 gauge, from 4 feet 6 inches to 6 feet for 22 gauge, and from 6 feet to 8 feet for 20 gauge.

A special fastener is required for iron purlins.

We recommend our Lead Washers for use under nail head when applying corrugated iron to a roof. They make an absolutely water-tight joint and prevent rust from accumulating under the nail head. One pound is required for two or three squares. The additional cost per square of doing a job with these washers is trifling, while a perfect job is made. The application is shown in the foregoing cut.

Quotations for Corrugated Galvanized Iron delivered F.O.B. any point will be mailed upon application. We also supply Black Corrugated Sheet, painted, for which we will be pleased to receive your enquiries.



Half Full-size Corrugation.



Half Full-size Corrugation.

SLATE BLACK-
BOARDS.



Our Slate Blackboards are made from the Bangor, Pa., "Big Beds," best in the world for this class of work.

In ordering, be sure and give the exact length of space to be filled, and the width of board required. Our boards are smooth and flat, easily set up in position. The cut shows clearly the best method of setting up. See that joints are even on surface before nailing up the quarter-round stops. Prices furnished on application.

SLATE TREADS
AND
LANDINGS.

We supply Treads and Landings for stairways, etc. Enquiries for prices must state exact size and thickness required. The usual thickness for this class of work is $1\frac{1}{4}$ inches, and the slate in general use is that known as ribbon stock, being cheaper and just as serviceable as clear stock.

WIRED AND
ROUGH
ROLLED
GLASS.

Wired Glass has come into very general use for fireproof windows, also for skylight work. We carry a large stock of the Wired and also of the Ordinary Rough Rolled Glass, 3-16 inch and $\frac{1}{4}$ inch thick. The Wired Glass in general use is $\frac{1}{4}$ inch thick. We also supply to order Clear Wired Glass, which is used for elevator doors and also for office windows. This Clear Wired being rather expensive, is not carried in stock, but is cut to order. Contrary to the general impression that is held concerning Wired Glass, it is cut with very little more trouble than the ordinary glass; in fact, the percentage of breakage in cutting Wired Glass is actually less with us than in cutting the ordinary Rough Rolled, and for skylight work, particularly large skylights, there is nothing to compare with the Wired Glass, as it retains its place and remains water-tight when cracked in two or three places in the one light. As a preventive against fire for partition work or in metal windows it has been found invaluable, and where used reduces the premium on insurance very materially. In writing for prices give exact size and quantity.

BRANTFORD ROOFING CO., LIMITED

MANUFACTURERS OF BRANTFORD ASPHALT PRODUCTS.

HEAD OFFICE AND FACTORY: BRANTFORD, ONTARIO.

BRANCHES AT: TORONTO, MONTREAL, HALIFAX, WINNIPEG.

Specify Brantford Roofing for Durability and Economy.

PRODUCTS.

ROLL ROOFING.

BRANTFORD ASPHALT ROOFING.
BRANTFORD RUBBER ROOFING.
BRANTFORD LEATHEROID ROOFING.
STANDARD MOHAWK ROOFING.
BRANTFORD CRYSTAL ROOFING

SLATE ROOFING.

BRANTFORD ASPHALT SLATES.
BRANTFORD SLAB SLATES.

ROOFING ACCESSORIES.

BRANROCO ASPHALT SATURATED FELT.

CLIMAX SHEATHING PAPER.

BRANROCO LAP CEMENT.

SUPERIOR ROOF COATING.

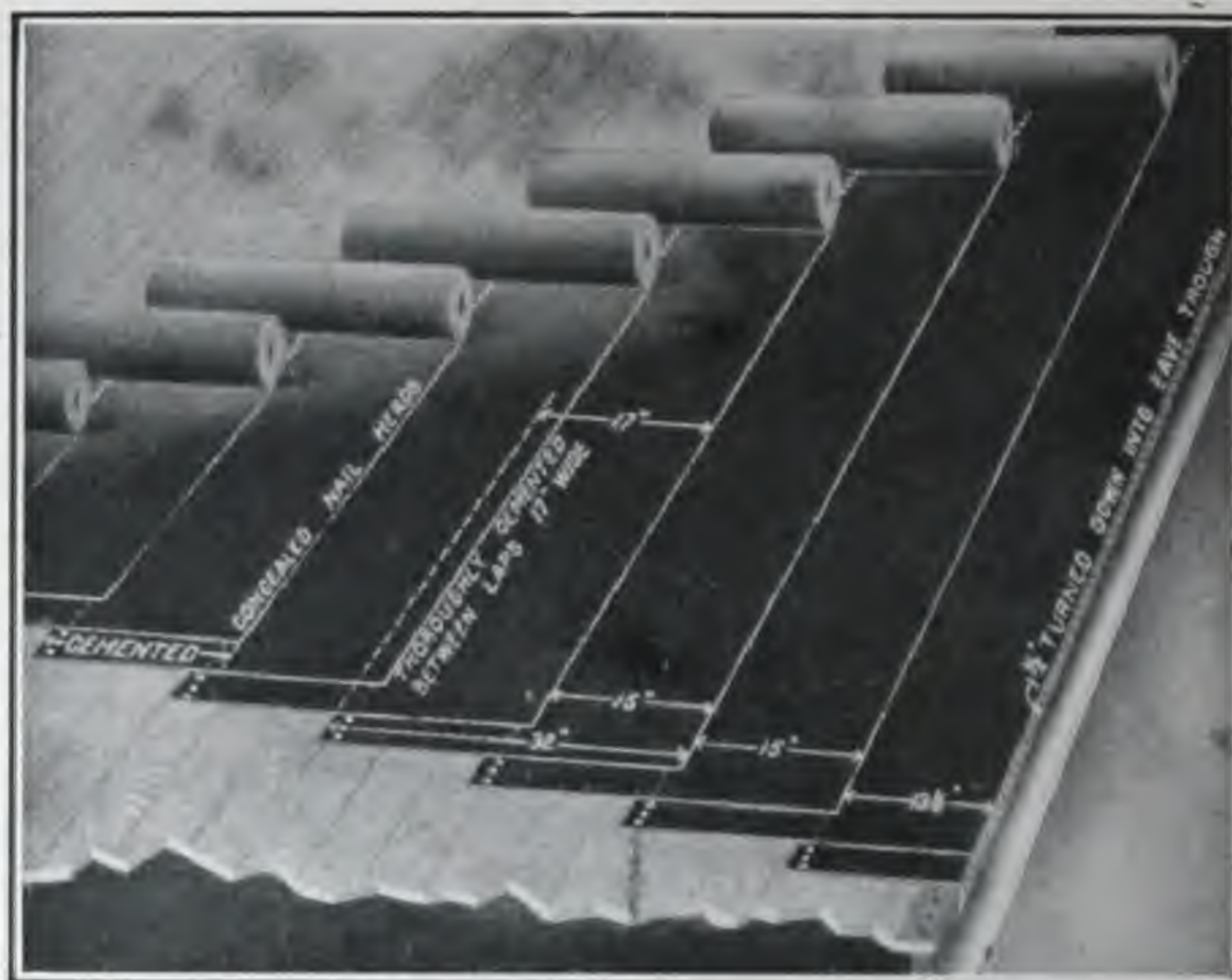
RED AND GREEN ROOF LEAK.

BRANTFORD PREPARED ROOFING is regarded as standard in building materials by engineers and architects. It is sold in rolls 32 inches wide and is laid with a two or three inch lap, or according to Brantford specification. Each roll contains sufficient nails and cement for laying. The weights are as follows:

No. 1 Brantford Asphalt
60 pounds per square.
No. 2 70 pounds.
No. 3 80 pounds.

No. 1 Brantford Rubber
40 pounds per square.
No. 2 50 pounds.
No. 3 60 pounds.

No. 1 Brantford Leatheroid
35 pounds per square.
No. 2 45 pounds.
No. 3 55 pounds.
No. 1 Standard Mohawk
40 pounds per square.



"BRANTFORD SPECIFICATION."

BRANTFORD SPECIFICATION (10 YEAR).

ON WOODEN CONSTRUCTION:

Brantford Asphalt No. 1, 60 pounds—32 inches wide is laid 15 inches to the weather, lapped 17 inches, thoroughly cemented between laps with Branroco Lap Cement; all nail heads are covered; roof when laid to receive one coat of Superior Roof Coating. For each square, (roof measurement) is required:

2 Rolls No. 1 Brantford Asphalt
1½ Gallons Branroco Lap Cement
¾ Gallon of Superior Roof Coating
1 pound (1 inch by 10) Roofing Nails.

BRANTFORD SPECIFICATION ON CONCRETE CONSTRUCTION.

Concrete roof must be properly graded with all depressions filled, all sharp projections removed, and finally swept off clean. Then the entire surface of concrete is covered with a bond coat of Branroco Lap Cement and Naphtha mixed thoroughly half and half. This coat fills all the pores in the concrete, waterproofing the surface, and provides firm adhesion for the coating of Branroco Lap Cement, which is next applied, and onto which is laid Brantford Asphalt No. 1—60 pounds—32 inches wide, 15 inches to the weather, lapped 17 inches, thoroughly cemented between laps with Branroco Lap Cement.

N.B. The second coat, Branroco Lap Cement, on the concrete surface can be applied as the work progresses, so that the Brantford Asphalt Roofing will be laid before the Cement is dry.

Roof when laid to receive one coat of Superior Roof Coating. For each square is required:

2 Rolls No. 1 Brantford Asphalt,
2½ Gallons Branroco Lap Cement,
¾ Gallon of Superior Roof Coating,
¼ Gallon of Naphtha.

(NOTE). Bond coat requires ¼ Gallon of Branroco Lap Cement and ¼ Gallon of Naphtha mixed thoroughly, and is included in the above quantities.

N.B. Roll roofing on Specification roofs lays better when reverse side of roll is laid up to weather, especially in cool weather.



BRANTFORD SPECIFICATION (15 YEAR).

ON WOODEN CONSTRUCTION:

Over this Brantford Asphalt 50 pounds, 32 inches wide is laid 10 inches to the weather, lap 22 inches, thoroughly cemented between laps with Branroco Lap Cement; all nail heads are covered. Roof when laid to receive one coat Superior Roof Coating.

For each square (roof measurement) is required:

- 3 Rolls 50 pound Brantford Asphalt,
- $2\frac{1}{4}$ Gallons Branroco Lap Cement,
- $\frac{3}{4}$ Gallons Superior Roof Coating,
- 3 pounds (1 inch by 10) Roofing nails.

BRANTFORD SPECIFICATION (15 YEAR)

ON CONCRETE CONSTRUCTION:

Concrete roof must be properly graded with all depressions filled, all sharp projections removed and finally swept off clean. Then the entire surface of concrete is covered with a bond coat of Branroco Lap Cement and Naphtha mixed thoroughly half and half. This coat fills all the pores in the concrete, waterproofing the surface, and provides firm adhesion for the coating of Branroco Lap Cement which is next applied and onto which is laid Brantford Asphalt 50 pounds, 32 inches wide, 10 inches to the weather, lapped 22 inches, thoroughly cemented between laps with Branroco Lap Cement.

N.B. The second coat of Branroco Lap Cement can be applied as the work progresses, so that the Brantford Asphalt Roofing will be laid while the cement is tacky.

Roof when laid to receive one coat of Superior Roof Coating.

For each square is required:

- 3 Rolls 50 pound Brantford Asphalt,
- $3\frac{1}{4}$ Gallons Branroco Lap Cement,
- $\frac{3}{4}$ Gallons Superior Roof Coating,
- $\frac{1}{4}$ Gallon Naphtha.

NOTE: Bond coat requires $\frac{1}{4}$ gallon of Branroco Lap Cement and $\frac{1}{4}$ Gallon of Naphtha mixed thoroughly, and is included in above quantities.

BRANTFORD ASPHALT SLATES.

Specify Brantford Asphalt Slates and Brantford Asphalt Slab Slates for beauty, economy and long endurance. Brantford Asphalt Slates and Brantford Asphalt Slab Slates are manufactured from tough, long-fibred felt, thoroughly saturated with hot asphalt. Next a coating of high-grade asphalt is put on one side of the roofing, and on this asphalt while it is hot, a coating of finely crushed slate is imbedded, giving the roofing additional fire-resisting qualities and a soft permanent tint of green or reddish brown, depending on the color used.

Brantford Asphalt Slates are cut 8 inches wide and $12\frac{3}{4}$ inches long. They are laid 4 or 5 inches to the weather. They come in two colors, brownish red and dark green. One square laid five inches to the weather contains 342 slates, packed in bundles of 114 slates. One square 4 inches to the weather contains 424 slates, packed in 4 bundles, 106 slates each.

Brantford Asphalt Slab Slates are cut 32 inches long, 12 inches wide, the size of four Asphalt slate shingles joined together. Notches are cut five inches deep, to be laid five inches to the weather. Slab slates come in the same colors as shingles. One square consists of 90 strips, packed in two bundles and is enough to cover 100 square feet of roof.

BRANTFORD CRYSTAL ROOFING.

The same roofing as Brantford Asphalt Slates and Brantford Asphalt Slab Slates put up in rolls 32 inches wide, weighing 80 pounds. Laid in the same manner as other styles of the Brantford Roofing with a three inch lap and may be used for siding a building.

Write for samples of Brantford Asphalt Roofing products, and for prices and catalogues. The company will furnish estimates on Brantford Specification Work.



LUDOWICI-CELADON COMPANY

MANUFACTURERS OF
TERRA COTTA ROOFING TILES.

GENERAL SALES OFFICE: MONROE BUILDING,
CHICAGO, ILL.

BRANCHES:

CLEVELAND, O.	. . .	UNION BLDG.	WASHINGTON, D.C.	. . .	UNION TRUST BLDG.
PITTSBURG, PA.	. . .	PARK BUILDING.	NEW YORK CITY, N.Y.	. . .	225 LEXINGTON AVE.

REPRESENTATIVES:

MANITOBA AND NORTHWEST:	EASTERN CANADA:	BRITISH COLUMBIA:
SUPPLY AND FUEL CO., LIMITED, WINNIPEG, MAN.	THE ROOFERS SUPPLY CO., LTD., TORONTO, ONT.	EVANS, COLEMAN & EVANS, LTD., VANCOUVER, B.C.

In addition to the Roofers Supply Co., Limited, Toronto, representing us in Eastern Canada (from Quebec to Windsor, Ont.), our own travelling representative calls in person on all architects, and will call on builders and owners upon request.

PRODUCTS.

We manufacture TERRA COTTA ROOFING TILES in all standard shapes, including the Spanish, Shingle and French patterns. With these tiles we furnish all necessary fittings.

CHARACTER.

All these Tiles are made of shales, and subjected to high degrees of heat after painstaking preparation for the kilns. They are devised to interlock in the only practical and effective manner, so that water is carried to the surface of the next lower tile. Their durability is established by the only unassailable verdict—the test of time. The first product of this Company was put on the American market thirty-three years ago at the rate of possibly three hundred squares per *month*; at present, the output of our factories is approximately six hundred and fifty squares per *day*, an unmistakable evidence that builders recognize the merits of our ware.

COLOURS.

The standard colour of Roofing Tiles is terra cotta red. The greater development of colour study in building has opened a field for glazed roofing tiles, of which we make a very complete line. Aside from the high glazes, we furnish full glazes in satin finish and dull or matt greens.

ESTIMATES
AND SPECI-
FICATIONS.

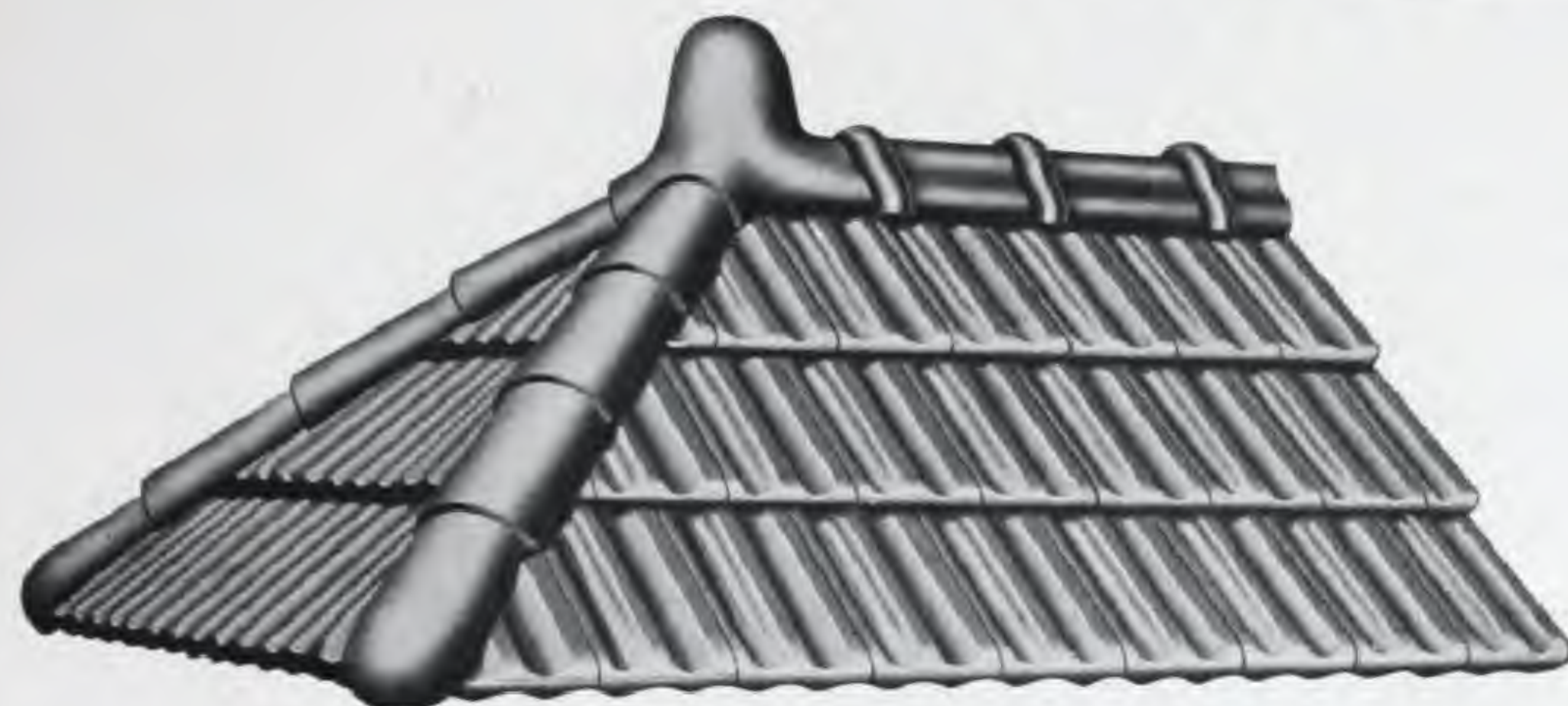
We shall be pleased to furnish catalogue and estimates on application, but inquiries for complete estimates should be accompanied with roof plan and the four elevations. We shall be very glad also to supply suggestions as to specifications for our different patterns, and have these in printed form, so that immediately upon receiving such request we can mail specifications to those desiring to use Roofing Tiles.

INFORMA-
TION.

All inquiries for information should be addressed to the Main Office in Chicago. If the services of a salesman or estimator are required, please advise by mail, or by wire if the case is urgent.

IMPERIAL SPANISH TILE

with mission eave closures
and top fixtures
152 hip starter
102 hip roll
215 ridge and
405 two-way terminal.



IMPERIAL FRENCH TILE

with 152 hip starter
102 hip roll
206 ridge and
405 two-way terminal.

IMPERIAL CLOSED SHINGLE TILE

with 161 hip starter
111 hip roll
203 ridge and
250 two-way terminal.



SPECIFICATIONS.

All pitched roofs shall be covered with [Insert Name of Pattern] Tiles made by the Ludowici-Celadon Company with stock fittings suitable for each pattern. The tiles as specified above must be hard burned, of colour, and in accordance with samples deposited in the office of the architects.

PREPARATION OF ROOF.

Before the roofer is sent for, the owner or general contractor should construct roofs in strict accordance to plans, sheath the roofs TIGHT, have all chimneys and walls above roof line completed, have all vent pipes put through roofs, furnish all strips of required width used under hip rolls, furnish any strips that may be used under tile at eaves, and have all scaffolding ready for roofer's use. The metal contractor should have all gutters in place on the roof (gutters, whether box, hanging or secret, to extend over the roof sheathing, and run under the felt and tile at least eight (8) inches), and should also have in place all valley metal, the width of which must be not less than 24 inches, with both edges turned up 1/4 inch the entire length of the valley, the valley metal to be fastened with clips and never nailed or punctured in any manner. The valley metal must be laid over one layer of felt running lengthwise the entire distance of the valley. The metal contractor must have in readiness all flashing metal used along side and in front of dormers, gables, skylights, towers, perpendicular walls, also around vent pipes and chimneys, and place same after the arrival of the tile roofer and in accordance with the requirements of the tile.

LAYING OF FELT.

After the roofs have thus been prepared to receive the felt and tile, the tile roofer shall cover the sheathing of the roofs with one thickness of asphalt roofing felt weighing not less than 30 pounds to the square, laying same with a 2 1/2-inch lap and securing in place by capped nails. The felt should be laid parallel with the eaves and lapped over all valley metal about 4 inches and laid under all flashing metal about 6 inches.

LAYING OF TILE.

The roof having thus been prepared, the tile layer is to fasten tile with copper nails. The roofer shall see that the tiles are well locked together and lay smoothly, and no attempt shall be made to stretch the courses. The tiles must be laid so that the vertical lines are parallel with each other and at right angles to the eaves. The tiles that verge along the hips should be cut close against the hip board, and a water-tight joint made by cementing cut hip tile to hip board with elastic cement. Each piece of hip roll shall then be nailed to the hip board, and the hip rolls cemented where they lap each other. The interior spaces of hip and ridge rolls must not be filled with the pointing material.



THE RUBEROID CO., LIMITED

FORMERLY
THE STANDARD PAINT CO. OF CANADA, LIMITED.

52 VICTORIA SQUARE,
MONTREAL.

SALES OFFICES AND WAREHOUSES:

TORONTO.

WINNIPEG.

VANCOUVER.

FACTORY: HIGHLANDS, LACHINE CANAL, MONTREAL.



ALL TRADE MARKS MENTIONED IN THESE PAGES ARE REGISTERED IN CANADA.

PRODUCTS.

"RU-BER-OID" (our standard high-grade roofing); "RU-BER-OID" COLORED ROOFING (the Ru-ber-oid in handsome permanent shades of red and green); "S.P.C." SLATEX STRIP SHINGLES; "PLUS," "SLATEX," and "EUREKA" ASPHALT ROOFINGS; also "RU-BER-OID" WATERPROOF CLOTH; "RU-BER-OID" WALL BOARD; "RU-BER-OID" FLOOR CLOTH; "STANCO" CARPET FELT; "SNUG" FELT; BURLAP FELT; "SOVEREIGN" SHEATHING FELT; DAMP-PROOFING PAINT; "IMP" BRAND CEMENT FLOOR FINISH AND MASONRY FINISH; "GIANT," "P. & B." AND "HERCULES" INSULATING PAPERS; "P. & B." PRESERVATIVE PAINTS; "P. & B." ELECTRICAL COMPOUNDS; "P. & B." ELECTRICAL WEATHERPROOF TAPE; "P. & B." ELECTRICAL INSULATING VARNISHES; "P. & B." GARDEN HOSE MENDER; "S.P.C." STOP LEAK CEMENT; "P. & B." ASPHALT SATURATED AND WATERPROOFING FELTS, Etc., Etc.

See also our advertisement of Paints and Waterproofing Products on page 92 and of Insulation on page 278.



STATION OF CANADIAN PACIFIC RAILWAY CO., VANCOUVER, B.C.
ROOFING TYPE A RU-BER-OID BUILT-UP.
ENGINEERS AND CONSTRUCTORS—WESTINGHOUSE, CHURCH, KERR & CO.
ARCHITECTS—BAROTT, BLACKADER & WEBSTER.

EFFICIENCY.

RU-BER-OID has now been marketed for 30 years in most parts of the world, and in that long period has absolutely demonstrated its claim to permanency and dependability. It is manufactured at our works near Montreal for the Canadian trade, and is also made at three factories in the United States, and at London, England; Paris, France; and Petrograd, Russia. We are making no exaggerated statement, therefore, in saying that it is the *Universal Roofing*. The fact that it is in general use in all parts of the civilized world is absolute proof of the service it will give under *all climatic conditions*.

RU-BER-OID can be laid in *single layer* or by the *built-up* or *reinforced* method on steep or on flat roofs.

We submit the following as features worthy the careful consideration of architects and engineers in comparing the Ru-ber-oid method of built-up roofing (Specifications following) with tarred felt and gravel roofs and other types of roof covering:

1. RU-BER-OID ASPHALTIC COMPOUND will not crack in winter nor will it melt in summer heat, as pitch does.
2. RU-BER-OID ASPHALTIC COMPOUND is much more plastic than pitch, insuring a roof covering that will readily answer to all changes of temperature.
3. By actual laboratory test, it has been demonstrated that the pitch ordinarily used in tar roofing is twice as susceptible to changes of temperature as RU-BER-OID ASPHALTIC COMPOUND.
4. The Standard Paint Company's Asphalt Saturated Felt, used in specifications following, is a *wool felt* of much higher quality than ordinarily employed in the making of tarred felt.
5. The RU-BER-OID type of Built-up Roofing, when laid, is homogeneous—fabric through and through. It requires no sand, gravel or slag to weight it down. Therefore, the work cannot be slurred, intentionally or otherwise, by incompetent workmen or by the use of inferior material; also the roofing can be more readily and inexpensively repaired and leaks be more quickly located.
6. RU-BER-OID can be laid with equal success on steep or flat roofs, and, on account of its lesser weight, permits of lighter and much cheaper roof construction.

SPECIFICATIONS
TYPE "A"
RU-BER-OID
ON CONCRETE,
RU-BER-OID
BUILT-UP
OR
REINFORCED
ROOFING.
COPYRIGHT,
OTTAWA,
1914 AND 1918.

(TO FOLLOW DESCRIPTION OF ROOF CONSTRUCTION)

Over the foregoing there shall be laid a RU-BER-OID Built-up Roof as follows:—

1. PREPARATION:—

The concrete should be finished with a hard clean surface, not trowelled but properly graded and free from saucers or depressions.

Suitable raglets shall be provided in all parapet walls or projections above the roof level to permit the installation of counter-flashings.

It is desirable that a concrete fillet be formed in all angles between the roof surface and parapet walls, etc., to afford an easy turn for the flashings.

Plumbers' pipes or other projections are to be in place before the roofing is laid and provided with suitable metal collars wherever necessary.

2. MATERIALS:—

Quantities following per 100 square feet of completed roof surface:—

Two layers P. & B. Saturated Felt.....	216 square feet	—30 lbs.
One layer 2-ply RU-BER-OID ROOFING.....	108 square feet	—42 lbs.
RU-BER-OID HARD COMPOUND.....		—90 lbs.
P. & B. Asphaltum Paint.....	1/2 Imperial gallon.....	—5 lbs.

Material per 100 square feet..... 167 lbs.

3. APPLICATION:—

(a) The concrete surface shall be thoroughly dry and swept clean of all dust and loose particles of concrete.

(b) In cases where the finishing layer of RU-BER-OID is laid parallel with eaves and ridge, commence with a 9" strip, applying over it lapped 2" the second and following sheets of RU-BER-OID the full 36" width, thus giving to the finished roofing an exposed sheet first 7" and succeeding sheets 34". This procedure is recommended to obviate any possibility of damage from high winds.

(c) Paint the entire concrete surface with one coat P. & B. Asphaltum Paint, using not less than 1/2 Imperial gallon per 100 square feet.

(d) Mop the painted surface with hot RU-BER-OID HARD COMPOUND, using not less than 30 pounds per 100 square feet and, while hot, imbed the two thicknesses of P. & B. Saturated Felt, lapping each sheet 19 inches over the preceding one and mopping with the hot RU-BER-OID HARD COMPOUND the full width of the lap so that in no case shall felt touch felt.

(e) Install all outlets and collars, nailing same securely in place. Cement a reinforcement of P. & B. Asphalt Saturated Felt into all angles and around all outlets and over all collars with RU-BER-OID HARD COMPOUND.

(f) Mop the surface of the two thicknesses of P. & B. Saturated Felt with RU-BER-OID HARD COMPOUND and imbed into this, while hot, the finishing sheet of 2-ply RU-BER-OID ROOFING. Lap each sheet of RU-BER-OID ROOFING two (2) inches on the preceding one, applying the RU-BER-OID HARD COMPOUND well between the laps.

After first finishing layer of RU-BER-OID is in place, sweep the edge free of soapstone to width of lap, continuing this procedure as each sheet of RU-BER-OID is applied.

(g) Finally, brush the hot RU-BER-OID HARD COMPOUND carefully and evenly along the top of the lap to a width of from four to six inches.

(h) Counter-flashings shall be firmly fixed into raglets with wedges and pointed with cement.

NOTE 1:—The above specifications apply to roofs having a pitch not greater than 4" per foot. In cases where the pitch is greater than 4" we supply a Special RU-BER-OID HARD COMPOUND of a higher melting point.

NOTE 2:—The Material in above specifications should be applied from ridge to eaves on roofs of pitch greater than 1" to the foot.

Type B—Substitute 1-ply RU-BER-OID Roofing for 2-ply in paragraph 2.

Type C—Substitute 1/2-ply RU-BER-OID Roofing for 2-ply in paragraph 2.

Type D—Substitute 1/2-ply RU-BER-OID Roofing for 2-ply and 22 lbs. S.P.C. Saturated Felt for 30 lbs. in paragraph 2.

BEWARE IMITATIONS

NONE GENUINE UNLESS THE
RUBEROID MAN



APPEARS ON WRAPPER

GUARANTEES.

We are prepared to bid for material alone or for Roofing laid complete. We guarantee:—

Type "A"—10 years without coating or 15 years with 3 coats RU-BER-INE at intervals of 3, 7 and 11 years from date of laying.

Type "B"—10 years without coating.

Type "C"—7 years without coating or 10 years with 1 coat RU-BER-INE 5 years from date of laying.

Type "D"—5 years without coating or 10 years with 2 coats RU-BER-INE at intervals of 2 years and 7 years from date of laying.

BUILT-UP
COLOURED
RU-BER-OID
ROOFING.

SPECIFICATIONS
TYPE "A," "B,"
"C" OR "D"
RU-BER-OID OR
KA-LOR-OID
ON WOOD.

Specifications follow exactly the wording of Type "A," the only change being the substitution of "Heavy Weight KA-LOR-OID" (Red or Green, as desired) for "2-ply RU-BER-OID" in par. 2.

Substantially the same as foregoing specifications for CONCRETE ROOFS. Full and complete data furnished on request. Guarantees given for same periods on each type, as detailed foregoing.

RU-BER-OLD SINGLE LAYER.

Our standard quality. Made in three weights, designated plies:—

1 ply, for barns, outbuildings, etc. Guaranteed 5 years. Average weight, 35 lbs. per square, with fixtures.

2 ply, for dwellings, warehouses, stores, etc. Guaranteed 10 years. Average weight, 45 lbs. per square, with fixtures.

3 ply, for factories and severest usage. Guaranteed 15 years. Average weight, 55 lbs. per square, with fixtures.

RU-BER-OLD is the *pioneer* smooth-surfaced ready roofing. The 2-ply and 3-ply grades are rated by the Canadian Fire Underwriters' Association as "first class"—the lowest or base rate.

For testimonials and fuller details, write for our booklets, "*All About Roofing*" and "*Around the World with RU-BER-OLD*."



GRAND TRUNK PACIFIC HOTEL
EDMONTON, ALTA.
ROOF SHEATHED WITH RU-BER-OLD ROOFING.
ARCHITECTS:—ROSS & McDONALD.



FORT GARRY HOTEL, WINNIPEG.
ROOF SHEATHED WITH RU-BER-OLD
ROOFING, BASEMENT WATERPROOFED
WITH IMPERVITE.
ARCHITECTS:—ROSS & McFARLANE.



CHATEAU LAURIER HOTEL,
OTTAWA, ONT.
ROOF SHEATHED WITH RU-BER-OLD ROOFING.
ARCHITECTS:—ROSS & McFARLANE.

COLOURED RU-BER-OLD SINGLE LAYER.

The RU-BER-OLD in handsome permanent shades of Red and Green. This is a patented product, the only permanently coloured ready-to-lay roofing marketed in Canada. The colours are made an integral part of the exposed surface in the process of manufacture—not painted on. Made in the following weights:

Red—Medium weight, 40 lbs. per square, packed for shipment. (Guaranteed 5 years.)

Red—Heavy weight, 50 lbs. per square, packed for shipment. (Guaranteed 10 years.)

Green—Heavy weight, 50 lbs. per square, packed for shipment. (Guaranteed 10 years.)

COLOURED RU-BER-OLD is adapted for churches, dwellings, theatres, bungalows or any structures where artistic effect is desired.

"SLATEX" SLATE- SURFACED ASPHALT ROOFING, SINGLE LAYER.

Colours: Red and Green. Applied in same manner as Ready Roofing. Marketed in one weight only, 75 lbs. per square, complete with fixtures.

S-P-C "SLATEX" STRIP SHINGLES IN COLOURS (PATENTED).

Colours: Slate, Red and Green. Size $32\frac{1}{8}$ in. x 10 in., composed of 4 shingles, $7\frac{1}{2}$ in. butts, 4 in. x $\frac{1}{2}$ in. cut-out. Laid 4 in. exposed to weather. Marketed under License Canadian Patent No. 165873.



RESIDENCE OF FATHER SAVAGE, MONCTON.
ROOFED WITH SLATEX SHINGLES.

EUREKA,
STANDARD
WEIGHT.

A moderate-priced roofing of substantial quality. Corrugated surface with fine talc dusting finish.

EUREKA,
HEAVY WEIGHT.

An Asphalt Roofing, corrugated on both sides. Special weights—1 ply, 40 lbs.; 2 ply, 50 lbs.; 3 ply, 60 lbs.

S.P.C. PLUS.

An Asphalt Roofing, smooth-coated on both sides.—1 ply, 40 lbs.; 2 ply, 50 lbs.; 3 ply, 60 lbs.

"S.P.C." SINGLE
COATED WATER-
PROOF CLOTH.

Made of heavy duck, coated underside. Weight, 20 lbs. per square; width, 60 in. Suitable for covering decks, porches, passenger cars or any exposed surface subject to hard wear.

"P. & B."
PLASTIC
CAR ROOFING.

A Ready-to-lay Roofing, specially designed for box cars. It consists of two outer layers Asphalt Saturated Felt and an inner layer of Burlap, the whole made adhesive with refined Asphaltum. Put up in rolls 60 in. wide and in any desired length. Weight, 50 lbs. per 100 sq. feet.

RU-BER-OLD
WALL BOARD.

A dense board, quite smooth, the layers bonded with silicate. Absolutely moisture and damp proof. May be nailed directly on studding and ceiling joists or applied over old plaster. Will not deteriorate, crack or peel. Wall paper, burlap, paint, fresco or any other decoration desired may be applied. Put up in sheets, 32 in. and 48 in. wide; stock lengths, 6, 7, 8, 9, 10, 11 and 12 ft.

RU-BER-OLD
FLOOR CLOTH.

An improved floor covering, adapted for use in residences, hospitals, sanitariums, churches, lodge rooms, billiard rooms, factories, stores, theatres, etc., or for any interior where linoleum, oilcloth or cork carpet has hitherto been used. Its distinctive features are:—Greater durability, giving longer service than old-time flooring. Absolutely waterproof and non-absorbent, no porous canvas back being used as in linoleum. More sanitary, as its composition is so dense that it affords no lodgment for germs, and it will not absorb grease, kitchen drippings or like refuse. May be unrolled and laid at almost any indoor temperature. Highly fire-resistant and may be used with safety around stoves and heaters. Burning embers will not ignite it. Made in Black and Red. Put up in rolls 36 in. or 4/4 and in 72 in. or 8/4 wide. Rolls about 30 lineal yards.

RU-BER-OLD
ASPHALT
SATURATED
FELT.

Substitute for Tarred Felt. More durable, lasts longer, less susceptible to changes of temperature. Will not melt, run or drip. Less messy to handle. Free from the disagreeable odour of tar. Furnished in all standard weights.

"STANCO"
CARPET FELT.

Marketed in one weight only, 16 oz. per lineal yard. Rolls 36 in. wide, each containing 50 lineal yards.

"SNUG" FELT.

Marketed in one weight only, 24 oz. per lineal yard, rolls containing 50 lineal yards. A high-grade material for high-grade interiors.

"DURO"
DOUBLE-COATED
SHEATHING
FELT.

Put up in rolls of 500 square feet. Average weight, 75 lbs. An excellent sheathing for walls and a sound deadener for floors. On account of its peculiar properties, it is frequently called *frost-proof blanket*.

SOVEREIGN
SHEATHING
FELT.

Put up in rolls 36 in. wide, containing 200 square feet. Saturated and single-coated with RU-BER-OLD Gum. This material was first marketed in Canada some ten years ago, to meet an insistent demand for a sheathing free from the objectionable odour of tar paper and of superior quality, to insure permanency in construction, freedom from draughts and dampness—in a word, a sheathing of lasting character, flexible, waterproof, and wind-proof, of high tensile strength, that will not harbour vermin. It possesses great insulating qualities, thus contributing to the comfort of the occupier, and insures a cool interior in summer and a warm one in winter, saving coal bills.

SHINGLE MANUFACTURERS' ASSOCIATION OF BRITISH COLUMBIA

910 METROPOLITAN BUILDING,
VANCOUVER, B.C.



BRITISH COLUMBIA RED CEDAR SHINGLES.

THE IDEAL
MATERIAL
FOR ROOFING
OR SIDING.

For use where exposed to the weather, no building material combines the advantages of Durability, Adaptability, Economy and Artistic effects or gives more general satisfaction than British Columbia Red Cedar Shingles.

A "NATURE"
PRODUCT.

British Columbia Red Cedar Shingles are made from the great forest giants of the Pacific Coast of British Columbia—the finest stand of Red Cedar in the world. They represent in texture, grain and thorough permeation of decay resisting natural oils the forest growth of generations.

DURABILITY.

A primary requirement of material exposed to the weather is its ability to resist decay and rot and to withstand the extremes of weather and climatic conditions without deterioration.

British Columbia Red Cedar Shingles meet these requirements to the highest degree. The essential oil with which the Shingle is permeated is a natural preservative which defies all manufactured treatments and enables it to successfully defy decay and rot. This fact is proven by the actual use of these Shingles in all parts of Canada, under the greatest variations of climate and the most extreme weather conditions.

The satisfaction given by British Columbia Red Cedar Shingles—for both roof and siding—is so great that the demand for the product is increasing by leaps and bounds. To-day it is with difficulty that the mills associated with the Association are able to keep up with their orders.

ARTISTIC
EFFECTS.

Whether used for roof or siding, British Columbia Red Cedar Shingles lend themselves admirably to the wish of the architect to attain pleasing artistic results. They may be made to fit in any type of architecture. The charm of the Bungalow and Colonial type of architecture reaches its maximum by the use of British Columbia Red Cedar Shingles for both roof and siding.

Herewith are given views of shingled roofs and siding showing the artistic possibilities. To the mind of every architect will occur distinctive variations of style to all of which the product may be adapted.



SHINGLE ROOF.

Taken after giving 67 years' service. Surface not exposed to weather still perfectly sound. Weathered portions affected only by mechanical action of elements.



A "THATCHED" SHINGLE ROOF.

One of the many artistic designs possible with shingles.



A "TIER" SHINGLE ROOF.

A pleasing variation from the ordinary roof, obtained simply by doubling the courses of shingles at regular intervals.

SPECIFICATIONS FOR LAYING B.C. RED CEDAR SHINGLES.

Use No. One 16 in. or 18 in. Shingles.

For roofs use sized 2 x 4's or 2 x 6's for rafters, spaced not over 2 ft. centres and properly spiked and braced. For Roof Boards or Sheathing use SIS strips 1 x 4 or random widths to not more than 8 in. spaced not more than 2 in. apart and nailed solid. Use shiplap solid instead of 1 x 4 strips where building paper insulation is used.

If shingles are not to be stained, thoroughly wet them before laying; if to be stained, lay dry, but not closer than $\frac{3}{8}$ in. Break all joints at least $1\frac{1}{4}$ in. sidelap and provide for no break coming directly over another on any three consecutive courses. Nail shingles 6 in. from butt and $\frac{3}{4}$ in. to $\frac{5}{8}$ in. from sides.

For $\frac{1}{4}$ pitch lay 16 in. shingles 5 in. and 18 in. shingles $5\frac{1}{2}$ in. to weather. For $\frac{1}{3}$ or greater pitch lay 16 in. shingles 5 in. and 18 in. shingles 6 in. to weather. For siding an extra inch may be added for weather exposure.

For siding use Shiplap solid for Sheathing and, if extra warmth is desired, cover with a good grade of building paper.

Novelty effects may be obtained as desired on Siding by using 16 in., 18 in. and 24 in. shingles with variation as to exposure.



THE PROPERLY LAID SHINGLE ROOF
—GOOD FOR A GENERATION OF
SATISFACTORY SERVICE.

STAINING.

The grain and texture of the British Columbia Red Cedar Shingle provides for it readily taking Stains which afford a pleasing contrast. These stains come in a wide range of shades and tones affording unsurpassed color effects.

NON-CONDUCTING PROPERTIES.

Buildings covered with British Columbia Red Cedar Shingles are comfortable. The non-conducting properties of the material assure the greatest possible warmth in Winter and the highest degree of coolness in Summer.



ARTISTIC RESULT GAINED BY USING
SHINGLES FOR SIDING.

ECONOMY.

The first cost of a surface of British Columbia Red Cedar Shingles is no greater, if as much, as any surfacing material of equal grade. Its long life and practical freedom from upkeep cost makes it by long odds the most economical material for its intended purpose of any offered on the market.

(Owing to variation of costs in different localities it is impossible to submit a statement covering the above facts which would be everywhere acceptable. The facts stated can, however, be proven for practically every location.)

MANUFACTURE.

British Columbia Red Cedar Shingles are manufactured under strict grading rules which provide for their being "Strictly Clear," "Vertical Grain" and "Free from Sap," thereby assuring the highest grade Shingles known to the trade.

USE A PROPER SHINGLE NAIL.

British Columbia Red Cedar Shingles will give a lifetime of service if properly laid. In the laying, we would emphasize the importance of using a proper nail. The common "Blued" nail so often used for the purpose is not a proper nail for Shingles. They rust quickly and shorten the life of the surface covering by years. We recommend the use of nails of a rust resisting type such as Galvanized, Cut Iron or Zinc Coated Nails. Use these and you have a perfect combination for "Longest Life at Lowest Cost."



DIAGRAM ILLUSTRATING PARAGRAPH
ON SPECIFICATIONS FOR LAYING
SHINGLES.

The Service Department of the Association is at the service of any reader for any detailed information concerning British Columbia Red Cedar Shingles or their application in any form. Address Service Dept., Shingle Manufacturers' Association of British Columbia, 910 Metropolitan Building, Vancouver, B.C.

CANADIAN ROOFING MANUFACTURING COMPANY, LIMITED

WINDSOR, ONT.



PRODUCT.

WINTHROP TAPERED ASPHALT SHINGLES.

SPECIFICATIONS.

Size 8 inches x $12\frac{3}{4}$ inches, and tapered in thickness, heavy at the butt or exposed end. 340 shingles to the square.

Composed of extra heavy felt, asphalt coated on both sides. Surface heavily impregnated with crushed slate.

Made in two colors, natural red and green slate.

SPECIFICATIONS FOR LAYING.

Can be laid as easily as any asphalt shingle and we suggest the following: Lay 5 inches to the weather, space $\frac{1}{2}$ inch.

Lay the sheathing close, have boards of uniform thickness and not more than 8 inches in width.

Nails should be not less than 1 inch in length, and not less than $1\frac{1}{4}$ inches in length when laying over an old roof. Nail each shingle with two galvanized roofing nails. Drive nails 1 inch from the edge and $5\frac{1}{2}$ inches from the butt.

Start the first course with full shingle and lay full shingle across the roof. Start the second course with two-thirds shingle and lay full shingle across the roof. Start the third course with one-third shingle and lay full shingle across the roof.

By following this method and being sure to lay the shingles 5" exposed to the weather and spaced $\frac{1}{2}$ " apart, the full beauty of the seductive shadow line will be achieved.

ADVANTAGES.

The Winthrop Tapered Asphalt Shingle is the only tapered asphalt shingle. Because of the taper they snuggle to the roof.

They are durable. The first Winthrop Tapered Asphalt Shingles laid are still in excellent condition. We don't know how long they will last. Fire resisting—coated with slate. A red hot coal will burn itself out without damaging the roof.

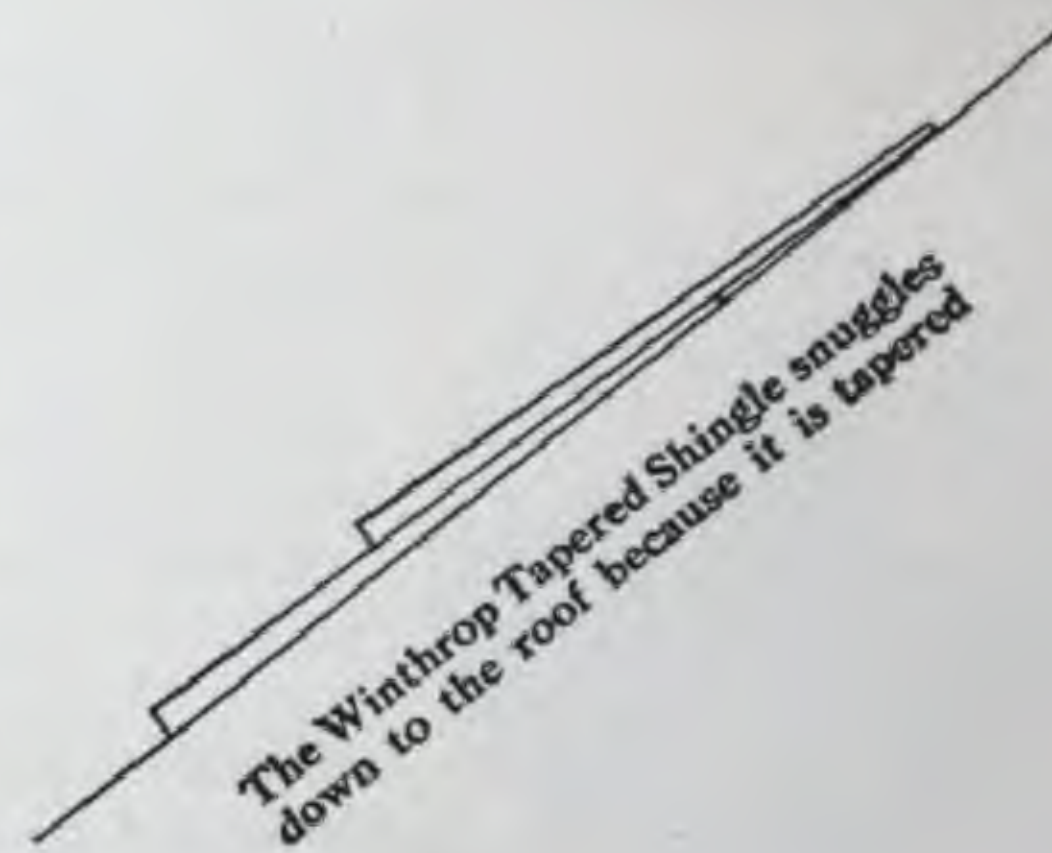
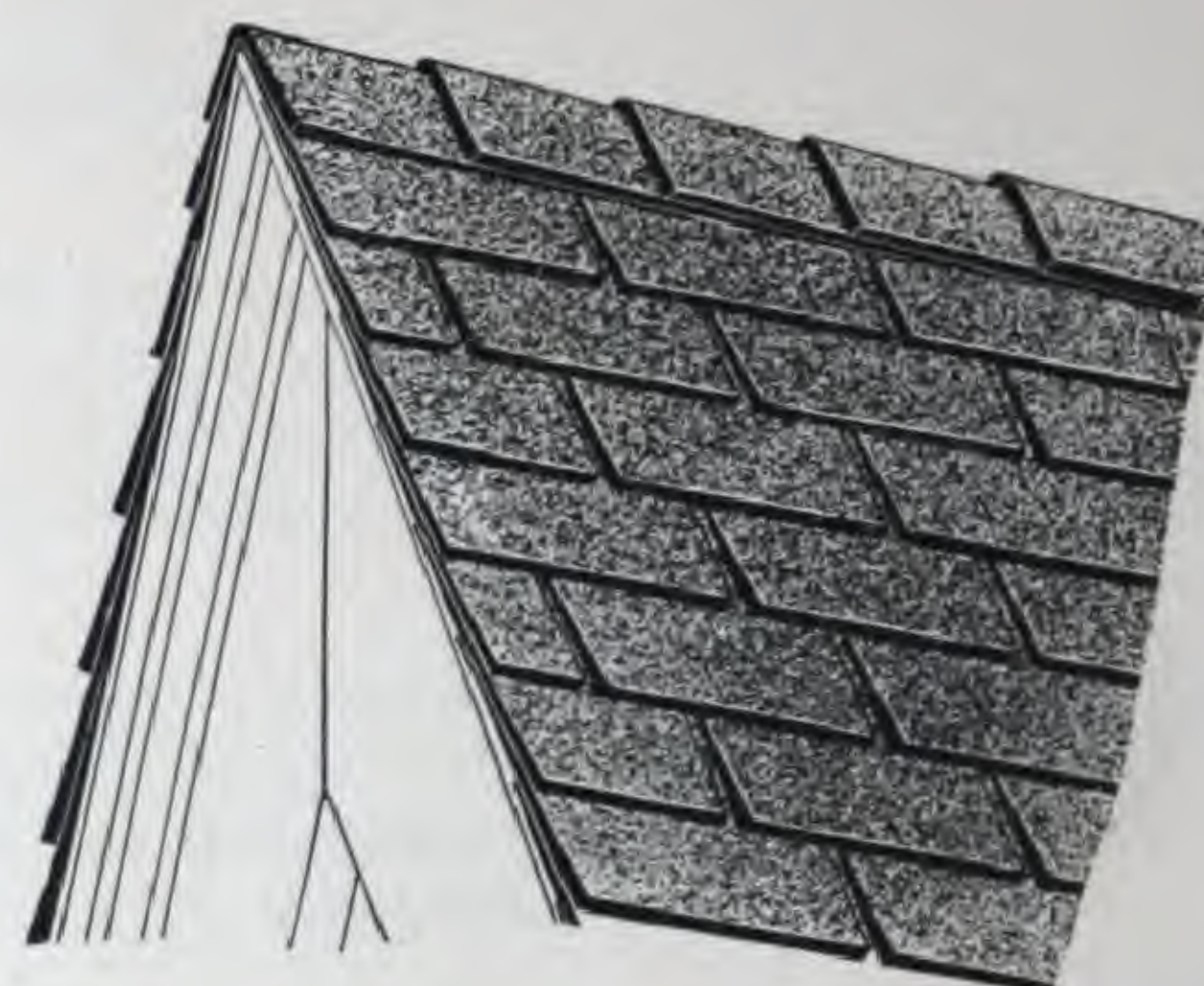
Appearance.—Pleasing tones of red and green, they blend with any surrounding. The big butt affords the distinctive shadow line, adding beauty to the building.

Flexibility.—They can be curved to suit architectural designs. Easily laid—saves time on the roof.

Uniform Size.—Like brick, they all come the same size.

Adhesive.—Processed on their under side they cannot curl.

Economy.—They cost less over a period of years.



THE BARRETT COMPANY, LIMITED

MONTREAL TORONTO WINNIPEG VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.

MANUFACTURERS OF COAL-TAR PRODUCTS FOR ROOFING, WATERPROOFING, DAMPPROOFING AND PAVING; ALSO SLATE SURFACED SHINGLES; SHEATHING AND INSULATING PAPERS.

PRODUCTS.

ROOFING.



A Barrett Specification Roof consists of alternating layers of Specification Felt and Specification Pitch, with a top surface of either gravel, slag or tile. Built-up roofs of tarred felt and coal-tar pitch laid along the lines of the Barrett Specification cover many of the first-class buildings of the Dominion, and back of these roofs stands the Barrett Company, Ltd., with its seventy-five years of experience in the roofing field. Back of these roofs also stands the confidence and knowledge—gained through experience—that this type of roof is the most satisfactory, the most durable and the most economical that it is possible to construct on flat or nearly flat surfaces.

Any Barrett Specification Roof of 50 squares or larger, in towns of 25,000 or more, and in such other places as our inspection service is available, will be guaranteed against repair expense by a Surety Company's Bond. This Bond, issued by the United States Fidelity & Guaranty Co. with headquarters at Montreal, runs for twenty or ten years, depending upon the type of roof, and it is issued without cost to the owner.

Our only conditions are that the Barrett Specification, revised April 15, 1920, shall be strictly followed and that the roofing contractor shall be approved by us and his work subject to our inspection.

A great many of the Dominion's new buildings are covered with Barrett Specification Roofs, for the property-owners and architects of Canada are strong believers in these famous roofs backed with a Surety Bond.

The Barrett Company, Limited, is the only Company that has enough confidence in its roof to put back of it a Surety Bond. In fact, no other concern will guarantee a roof for so long a period, much less furnish a Surety Bond.



DIAGRAM SHOWING BARRETT SPECIFICATION TYPE "AA" ROOF OVER BOARDS. BONDED FOR 20 YEARS.

GUARANTY.



EVERLASTIC MULTI-SHINGLES.

(4 Shingles in one.)

The Barrett Specification Type "AA" 20-Year Bonded Roof represents the most permanent roof covering it is possible to construct on flat or nearly flat surfaces, and while we bond it for 20 years only, we can name many roofs of this type that have been in service over forty years and are still in good condition.

Where the character of the building does not justify a roof of such extreme durability, we recommend the Barrett Specification Type "A" Roof, bonded for 10 years. Both roofs are built of the same high-grade materials, the only difference being in the quantity used.

Full details regarding these Bonded Roofs and copies of the Barrett Specification sent free on request.

Barrett Everlastic Multi-Shingles (4 Shingles in one) are surfaced with crushed slate in soft, natural-slate shades of red or green. They furnish color and texture to the roof and at the same time give it great durability, exceptional fire-resistance and freedom from painting. No artificial coloring is used.

Each strip of Everlastic Multi-Shingles is $32\frac{1}{4}$ inches long by 10 inches high. The self-spacing cut-outs are 8 inches apart and 4 inches deep by $\frac{1}{2}$ inch wide.

EVERLASTIC SINGLE SHINGLES.

Everlastic Single Shingles. Same material and art-finish (red or green) as the Multi-Shingles, but made in single shingles; size 8 x $12\frac{3}{4}$ inches. A finished roof of Everlastic Single Shingles is far more beautiful than an ordinary shingle roof and costs less per year of service. Need no painting.

WATER-PROOFING.

Foundation, reservoir, swimming-pool, subway, tunnel, etc.—Special specifications for waterproofing will be furnished upon request. There is always one sure way of making foundations, reservoirs, swimming-pools, subways, tunnels, etc., permanently watertight, and that is by the membrane method—the use of Barrett Specification Felt and Pitch. When writing for specifications, outline your problem.

CARBOSOTA CREOSOTE OIL.

A standardized, pure coal-tar distillate, from which all the objectionable properties of crude creosote oil have been completely eliminated. Barrett Carbosota Liquid Creosote Oil is superior to the patented or proprietary wood-preservatives, because it is purely a refined coal-tar creosote.

It is extensively used by railroads, contractors, telegraph and telephone companies.



VELVEX SHINGLE STAINS.



Velvex Creosote Shingle Stains are the ideal colorings and preservative for shingles and all rough, unplanned timber. Cheaper than paint and easier to use. The creosote penetrates and preserves the wood. All colors in soft velvety tones. Color samples on request.



CANADIAN JOHNS-MANVILLE CO., LIMITED

MINERS OF ASBESTOS,

MANUFACTURERS OF ASBESTOS AND ALLIED PRODUCTS.



HAMILTON,

MONTREAL,

OTTAWA,

TORONTO,

VANCOUVER,

WINNIPEG,

WINDSOR.

PRODUCTS.

ASBESTOS SHINGLES; ASBESTOS ROOFINGS, READY-TO-LAY, BUILT-UP AND CORRUGATED; KEYSTONE HAIR INSULATOR; ACOUSTICAL CORRECTION; PIPE AND BOILER INSULATION; UNDERGROUND SYSTEM OF PIPE INSULATION; RADIATOR AND STEAM TRAPS; INDUSTRIAL FLOORING; PACKINGS; REFRACTORY CEMENTS; ELECTRICAL MATERIALS; TRANSITE ASBESTOS WOOD. Also RAG FELT READY-TO-LAY ROOFING AND WATERPROOFING MATERIALS.

SERVICE.

Johns-Manville products are backed by the responsibility of Johns-Manville Incorporated. This assures the best of service, value and satisfaction.

Full details, specifications and drawings will be gladly furnished by the engineering service department of the nearest branch office.

JOHNS-MANVILLE
STANDARD AND
COLORBLENDE
ASBESTOS
SHINGLES.

Made of asbestos fibre and Portland cement, united under hydraulic pressure. Strong, tough, resilient, fire-proof, waterproof, light, easy to lay. Will not rot, curl or split. Furnished in various sizes and shapes, in four colors and two thicknesses— $\frac{1}{4}$ " and $\frac{1}{8}$ ".

Approved by the Underwriters' Laboratories, Inc., and take base rates of insurance.

JOHNS-MANVILLE
FLEXTONE
ASBESTOS SHINGLES

Made of asphalt impregnated asbestos felt with surfacing of crushed red or green slate in two forms; individual, self-spacing shingles, 8" x 10" and strip shingles, four shingles to the strip, 32" x 10".

JOHNS-MANVILLE
ASBESTOS
ROOFINGS.

Ready-to-lay Roofings for sloping roofs. Made of sheets of asbestos felt, waterproofed and cemented together with asphalt. Furnished in 5 different styles: Red top, with surfacing of crushed red slate on one side; Green top, with surfacing of crushed green slate on one side; Medium, plain black, smooth surface both sides, made of two layers of asbestos; Heavy, plain, black, smooth surface both sides, made of three layers of asbestos; furnished in sheets and rolls, ready to lay; Extra Heavy, plain black, smooth surface, both sides, made of four layers of asbestos; furnished in sheets only.

Built-up Roofing for flat roofs. Layers of asbestos felt, impregnated with asphalt, built up on the roof deck, to the required thickness, by Johns-Manville workmen.

Corrugated Asbestos Roofing and Siding for skeleton frame buildings. Made of asbestos felts, impregnated with asphalt, with a reinforcing center sheet of metal.

Johns-Manville roofings are approved by the Underwriters' Laboratories, Inc., and take base rates of insurance.

JOHNS-MANVILLE
KEYSTONE HAIR
INSULATOR.

Made of cleansed and sterilized cattle hair, secured between sheets of asbestos or building paper. Produces an effective insulating or sound deadening barrier in walls, floors, ceilings, partitions, etc.; is proof against rot, moisture and vermin; slow burning; and will not settle, dry out or split.

JOHNS-MANVILLE
ACOUSTICAL
CORRECTION
SERVICE.

Correction of reverberation or echoes in buildings requires the technical skill of an expert. The services of competent Johns-Manville acoustical engineers are available to architects and others who have difficulties to overcome either in designing new buildings or in correcting existing ones.

JOHNS-MANVILLE
PIPE AND BOILER
INSULATION.

Twenty-six years' specialization, directed by the highest engineering talent, has enabled Johns-Manville to develop and produce insulations of exceptional efficiency and durability under every service condition.

Asbestos-Sponge Felted, for example—a remarkable material which combines the insulating value of sponge with the endurance of asbestos—ranks first in efficiency among commercial steam pipe insulations. In addition, there are 85% Magnesia, Asbestocel, Zero, Anti-Sweat, and Brine and Ammonia Insulations.

JOHNS-MANVILLE
UNDERGROUND
SYSTEM OF PIPE
INSULATION.

Provides a permanent, efficient and economical means of insulating underground pipes conveying steam or hot water. Its efficiency is guaranteed.

JOHNS-MANVILLE
RADIATOR AND
STEAM TRAPS.

These devices permit the free discharge of water and air from any radiator or other steam apparatus without loss of steam. There is just one moving part—a ball, which rises when water flows into the trap and uncovers the outlet, but when there is no water to discharge, the ball is held against the outlet by unbalanced pressure.

The operation of these traps is continuous, for the water is discharged as soon as it is received. There are sizes for every type of apparatus.

JOHNS-MANVILLE
INDUSTRIAL
FLOORING.

An asphaltic concrete that can be laid in any consistency between extreme hardness and softness. Damp-proof, easy to walk on and very durable under hard usage in factories, warehouses, machine-shops, creameries, etc. It is made to fit each individual installation under separate specification.

JOHNS-MANVILLE
PACKINGS.

Provide for economy by preventing leakage and reducing friction. Engineers have found that instead of having to repack several times a season, a set of Johns-Manville Sea Rings often lasts several seasons, because heavy wear on packings, wear of the rod, and loss of power through friction have been reduced to a minimum.

Other Johns-Manville Packings are: Universal Piston Packing, Service Sheet, Seigleite Sheet, Kearsarge Gaskets, Vulcabeston Pump Valves, Mogul Coil Packing, etc.

JOHNS-MANVILLE
REFRACTORY
CEMENTS.

Composed of highly refractory minerals, specially adapted for use as a bond between, or a coating for fire bricks. Withstand the action of flame and severe temperatures.

Used in place of fire-clay and other mixtures to increase the life of boiler and other fire-brick settings.

JOHNS-MANVILLE
ELECTRICAL
MATERIALS.

The "Noark" line of Electrical Protective Devices comprises Cartridge Enclosed Fuses—Renewable and Non-Renewable, Cutout Bases—Main Line and Branch, Fuse and Switch Boxes, Primary Distribution Fuse Boxes, Underground Junction and Distribution Boxes, Service Meter Protective Devices, Exteriorly Operated Switch Boxes, Allsafe Switches, Friction Tape and a complete line of accessories.

JOHNS-MANVILLE
TRANSITE
ASBESTOS WOOD.

A fire-proof building material made of asbestos fibre and Portland cement. For use as a fire barrier in factories, foundries, warehouses, machine shops or wherever a fire-proof building material is required. It is strong, light and very durable. On electrical work it is used for transformer room doors, bus enclosures, oil switch barriers and many other places where fire-proof qualities and physical strength are necessary.

The impregnated form, Ebony Asbestos Wood, is the strongest insulating base that can be used for switchboards. It resembles the best oiled slate, but is much stronger physically and dielectrically.

ASBESTOS MANUFACTURING COMPANY, LIMITED

MONTREAL.
TORONTO.HALIFAX.
QUEBEC.GENERAL OFFICE AND FACTORY:
LACHINE,
Near MONTREAL.ASBESTOS CEMENT PRODUCTS.
ASBESTOS PIPE AND BOILER COVERINGS.
ASBESTOS TEXTILES, CLOTHS, TAPES, YARNSASBESTOS PAPER AND MILLBOARDS.
ASBESTOS SHEET PACKINGS.
ASBESTOS THEATRE CURTAINS.

EVERYTHING IN ASBESTOS.

"ASBESTOSLATE."

FOR THE ROOF.

"LINABESTOS."

FOR THE INTERIOR.

ASBESTOS BUILDING LUMBER.

FOR THE EXTERIOR.

ASBESTOSLATE.
(ASBESTOS CEMENT
SHINGLES.)

Composed of Portland Cement, reinforced with Asbestos Fibres, manufactured under enormous hydraulic pressure, providing a roofing tile that is *Fireproof* and *Permanent*, weighing only $2\frac{1}{2}$ lbs. to the square foot, including lap.

Colours.—Newport Gray, Indian Red, Blue-black and Brown.

Size ($\frac{5}{32}$ " thick).—Practically any size or shape up to 16"x16", though the following are generally used:

"American" or Slate Method—16"x16", 8"x16", 6"x12". Applied with two galvanised nails in the same manner as slate or shingles. See illustration above.

"French" or Diagonal Method and Honeycomb Method—16"x16", 12"x12". Applied with one copper and two galvanised nails. See illustration below. See our catalogue for complete specifications.

ASBESTOS
CORRUGATED
SHEATHING.
FROM 30" TO 36"

Same composition as "Asbestoslate." Solid concrete. No metal used. $\frac{3}{16}$ " thick, in lengths up to 10 ft. For roofing and siding in a manner similar to Corrugated Iron. It has been found especially adaptable for gas houses and chemical plants, where other materials fail on account of fumes and gases. May be laid over steel or wood framework, purlin spacing to be from 30" to 36". See our Asbestos Corrugated Sheathing Catalogue for detailed specifications.

LINABESTOS
FIREPROOF
WALLBOARD.

Manufactured of Asbestos Fibre and Portland Cement. In sheets $\frac{3}{16}$ " thick—48"x48" and 48"x96", also 42"x48" and 42"x96". Linabestos may be applied with ordinary nails as are other wallboards. We can supply battens of Linabestos any width or wooden battens may be used. Linabestos Filler may be used to fill joints where panelled effect is undesirable. Linabestos has all the good points—lightness, convenience in installation, attractive appearance, economy of ordinary wallboards, and, in addition, gives the greatest possible protection from fire. Linabestos has a colour all its own, a soft salmon pink, particularly suitable for panelling, which harmonizes with most natural woods, so that in many instances no further decoration such as paint or paper is needed, the natural colour, surface and finish being very pleasing. We have supplied enormous quantities for hospitals, churches, schools, residences, factories, etc., etc.

ASBESTOS
BUILDING
LUMBER.

Portland Cement and Asbestos Fibre. In flat sheets from $\frac{5}{32}$ " to 2" thick—42"x48", 42"x96", 48"x48" and 48"x96". For sheathing exteriors of buildings, more especially residences, in place of stucco, to obtain the English half-timber effect. Will not crack and fall away as will stucco. Also used extensively in the electrical industry.



NOTE.

Our Asbestos-Cement products provide Permanent, Fireproof Roofs and Walls, both interior and exterior, that do not require paint or treatment to keep them in condition. This should appeal to clients who are interested in upkeep costs. We suggest that plans be sent us so that estimates can be given for comparisons with other materials.

N.B.—We use actual photographs for our illustrations.

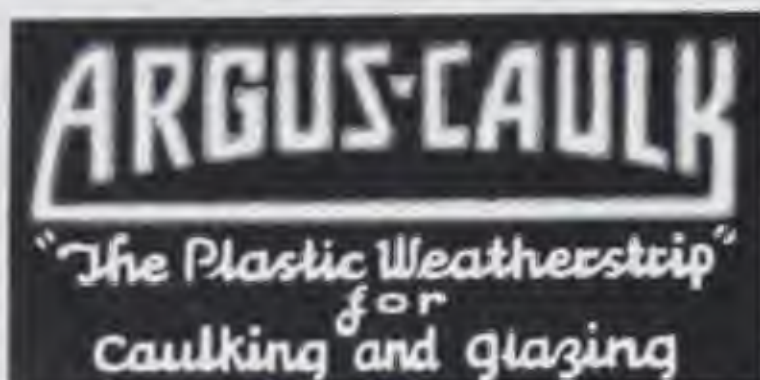
STOCKS.

Carried by agencies throughout Canada.

THE ARGUS MANUFACTURING COMPANY

PLASTIC ROOFING AND LIQUID PROOF COATING.

TECHNICAL PAINTS, ASPHALT SPECIALTIES, DAMPPROOFING PRESERVATIVES.



GENERAL OFFICES AND FACTORY:

CLEVELAND, OHIO.

WAREHOUSES:

TORONTO, WINNIPEG, VANCOUVER.

USES.

Window and door frames (of brick buildings especially) rarely fit snug and *never* airtight. Buildings vibrate and settle. Frames no longer set flush with the masonry. Unsightly openings appear, admitting draughts, dust and soot, dampness and water, causing ruination of the finish around the inside of window and door frames, to say nothing of the heat wasted.

Here is a statement from an expert who knows: "With a building uncaulked, a wind blowing thirty miles an hour forces through *one average size window frame*, 109.98 cubic feet of air *per minute*, on the windy side, no matter how tightly the window is closed."

Count your windows and doors and figure it out for yourself. How much heat do you waste in winter when cold air is coming in around every window and door frame at that rate, and your heat going out on the other side? Are you wasting 20%, 30% or 50% of your fuel? Ventilators and windows should be your control of temperature. *Cracks around door and window frames rob you of this control.* These cracks are admitting cold air into your building twenty-four hours every day. ARGUS-CAULK *will kill this waste for you.*



CAULKING AROUND WINDOW FRAMES.

UNIQUE QUALITIES.

Argus-Caulk has several unique qualities. First, it never dries brittle hard. The sun can beat on it for weeks—it never dries. Below zero temperature cannot crack it. This we guarantee. When Argus-Caulk sets, a film or skin forms on its surface. This prevents the material beneath it from *ever* drying. As a matter of fact, years after application this skin has been broken only to find the material beneath to be in a plastic, spongy and "fresh" condition. Argus-Caulk *never dies*—its life is permanent—it lives to serve you year after year.

PRODUCTS.

ARGUS-CAULK, ARGUS ROOFCOAT, ARGUS ROOF CEMENT, ARGUS FLEX, ARGUS BOILER COAT, TECHNICAL PAINTS, ASPHALT SPECIALTIES, DAMPPROOFINGS, FUEL SAVERS, PRESERVATIVES.

AT YOUR SERVICE.

We maintain a Service Department for you and we hope you will use it. We are proud to say that some of the largest corporations both in Canada and the United States together with scores of smaller ones are taking our advice in regard to the preservation of their exterior surfaces. We manufacture plastic and liquid asbestos roof coatings, caulking and glazing compounds, technical paints for special purposes, also dampproofings and boiler setting covering. When you are interested, write us, as we are always ready and willing to furnish all information desired.

A FEW CANADIAN USERS OF ARGUS-CAULK.

Armstrong, Smyth & Dowswell Ltd.	Regina, Sask.	Montreal Harbor Commissioners	Montreal, Que.
Bingham & Bingham	Winnipeg, Man.	Montreal Locomotive Works	Montreal, Que.
Cameron & Heap Ltd.	Regina, Sask.	Penmans Ltd.	Paris, Ont.
Canadian Consolidated Rubber Co.	Montreal, Que.	James Robertson Co. Ltd.	Montreal, Que.
Canadian Locomotive Co. Ltd.	Kingston, Ont.	Robertson Bros. Ltd.	Toronto, Ont.
Canadian National Railways	Joliette, Que.	J. Robinson & Co. Ltd.	Winnipeg, Man.
Canadian Pacific Railways	Montreal, Que.	City of Saskatoon	Saskatoon, Sask.
Wm. Davies Co. Ltd.	Montreal, Que.	Standard Chemical Co. Ltd.	Fassett, Que.
Wm. Davies Co. Ltd.	Toronto, Ont.	City of Toronto	Toronto, Ont.
T. Eaton Co.	Winnipeg, Man.	City of Winnipeg	Winnipeg, Man.
Grand Trunk Railway System	Montreal, Que.	Winnipeg Electric Railway	Winnipeg, Man.

THE BEAVER COMPANY, LTD.

MANUFACTURERS OF

VULCANITE ASPHALT SHINGLES AND ROLL ROOFINGS, BEAVER BOARD AND BEAVER BLACKBOARD.

(See also page 78.)

ADMINISTRATION OFFICES:

THOROLD, ONT., CANADA.

BUFFALO, N.Y., U.S.A.

LONDON, ENGLAND.

TIMBER OPERATIONS AT FREDERICKHOUSE AND CHARLTON, ONT.

MILLS AND PLANTS AT THOROLD AND OTTAWA, ONT.

EASTERN SALES OFFICE:

THOROLD, ONT.

WESTERN SALES OFFICE:

WINNIPEG, MAN.

Distributors and Dealers Everywhere.



YOU CAN'T EXPECT BEAVER QUALITY RESULTS UNLESS THIS TRADE-MARK IS ON THE ROOFING YOU BUY.

THE COMPANY.

Vulcanite Roofing was first manufactured in Great Britain about fifty years ago. The first Vulcanite plant in North America was opened at Chicago in 1902, since which time Vulcanite has built up the largest roof manufacturing facilities on the continent. The Canadian plant at Ottawa, Ontario, is thoroughly equipped to manufacture the highest quality roofings.

Vulcanite roofings are built up with a tough, fibrous felt base saturated and coated with Vulcanite specification asphalt. The Beaver laboratories, by systematic inspections and tests, constantly guard each step in its production and thus insure uniformly high quality in the finished product.

VULCANITE QUALITIES.

Vulcanite roofing gives complete weather protection. It is absolutely weather proof, it can't rot, it can't rust, alternate freezing and thawing can't make it disintegrate.

Vulcanite is fire-resisting. Sparks or burning brands falling on Vulcanite Roofs simply die out. Intense heat will not cause the roof to crack or buckle. And fires started beneath Vulcanite Roofs are more easily quenched because flames find it hard to break through this protective covering.

Vulcanite is durable. Roofs laid nearly twenty years ago are still in perfect condition, and the Vulcanite Roofing manufactured to-day is a greatly superior product.

A COMPLETE LINE.

Besides the shingles illustrated and described at the right the complete Vulcanite line includes roll roofings for every purpose. Vulcanite roll roofings are 32" wide and each roll contains sufficient material with accessories to cover 100 square feet of roof surface, allowing for all necessary laps and seams.

Vulcanite Slate-surfaced roll roofing is illustrated at the right. The other Vulcanite roll roofings are as follows:

VULCANITE ASPHALT. Built up on a strong felt base thoroughly saturated and coated with Vulcanite Specification Asphalt. A surfacing of fine silica sand is firmly imbedded in both surfaces, increasing the weather and fire-resisting qualities of the roofing. Made in three weights: Medium, 65 lbs. per square; Heavy, 75 lbs. per square; and Extra Heavy, 90 lbs. per square.

VULCANITE HIGRADE. Surfaced on both sides with non-absorbent, non-conducting flaked mica, which adds to its fire and weather-resisting qualities and at the same time gives HIGRADE a distinctive, pleasing appearance on the roof. Three weights: Light, 35 lbs. per square; Medium, 45 lbs. per square; and Heavy, 55 lbs. per square.

ALLIGATOR. The ideal inexpensive roofing. Talc finish. Derives its name from the pleasing leathery texture of the asphalt coating. Made in three weights: Light, 35 lbs. per square; Medium, 45 lbs. per square; and Heavy, 55 lbs. per square.

SAMPLES.

Samples of Vulcanite Roofing and detailed information will be forwarded free of charge. Address your request to the Thorold or Winnipeg sales office.

SELF-SPACING SHINGLES.

An exclusive improvement over ordinary straight-edge shingles — automatic spacing saves time. Builds a perfectly sealed roof with double thickness throughout. Size 8" x 12 3/4". Packed 4 bundles to the square. Standard weight, 240 lbs. per square. Surfaced with natural colored crushed slate, red and green.



HEXAGON SLAB SHINGLE.

A distinctive Vulcanite design having unusual decorative possibilities. Patented design insures correct spacing and quick application. Gives double thickness over entire roof area. Surfaced with crushed slate in cool sage green or deep indian red. Double butt gives heavy tile effect. Size over all 32" x 12 1/2". Weight 200 lbs. per square.



4-IN-1 SLAB SHINGLE.

A slab-type shingle which produces an attractive individual shingle effect. Quick and easy to lay with four shingles spaced automatically in each slab. Size over all 32" x 10". Weight 190 lbs. per square.



SLATE SURFACED ROLL ROOFING.

The highest type of "Beaver Quality" roll roofing. Manufactured from the best grade of fabric felt, saturated and coated with Vulcanite specification asphalt and surfaced with natural colored crushed slate, red or green. Standard weight, 80 to 85 lbs. per square; Jumbo weight, 105 lbs. per square.



THE PEDLAR PEOPLE LIMITED

OSHAWA, ONTARIO, CANADA.



GENERAL DISTRIBUTERS



FOR DOMINION OF CANADA.

ADDRESS NEAREST BRANCH.

QUEBEC,
263 St. Paul St.

MONTREAL,
26 Nazareth St. Banque Nationale Bldg.

OTTAWA,

TORONTO,
473 College St.

HAMILTON,
Clyde Block,
King & Hughson Sts.

WINNIPEG,
80 Lombard St.

THE STARK ROLLING MILL CO., CANTON, OHIO, SOLE PRODUCERS.

GALVANIZED IN CANADA BY DOMINION SHEET METAL CORPORATION, LIMITED, HAMILTON.

DESCRIPTION.

Toncan Metal is a rust and corrosion-resisting sheet metal, made from an iron ore base and procurable in galvanized, blue annealed, black and painted finishes. Our Toncan Metal Book gives complete details and evidence.

ADVANTAGES.

In Toncan Metal lies the most satisfactory solution of the Sheet Metal problem. It enables you to specify a moderate priced sheet metal of unquestioned durability—a durability proven by many years of use in thousands of structures and in every form of severe sheet metal service.

USES.

Toncan Metal Roofing, Siding, Ventilators, Skylights, Window Frames, Cornice, Conductor Pipe, Eaves Trough, Blower Systems, Tanks, Refrigerators, Reinforcing and Metal Lath are some of the uses for Toncan Metal in building construction.

ROOFING.

There is Toncan Metal Corrugated, V-Crimped, Pressed Standing Seam and Roll Roofing. Also Toncan Metal Shingles and Imitation Spanish Tile.

SIDING.

Toncan Metal Siding is made in the following styles: Imitation Weatherboard, Imitation Pressed Brick, Imitation Rock Faced Brick, Imitation Rock Faced Stone and Corrugated.

EAVES TROUGH, CONDUCTOR PIPE, Etc.

Toncan Metal is made up into the usual standard forms of eaves trough and conductor pipe, i.e.: Plain Round, Corrugated Round and Square Conductor Pipe; Single or Double Bead Eaves Trough, lap or slip joint.

METAL LATH.

For the more trying forms of metal lath service—near the sea or in walls subject to continuous dampness—Toncan Metal should always be specified for the lath, and many builders prefer to have the extra assurance of durability that comes from the use of Toncan for all Metal Lath work.

SPECIFICATIONS.

Toncan Metal meets all the requirements of modern sheet metal practice. To secure it simply specify "Genuine Toncan Metal" for the sheet metal work or products.

IDENTIFICATION. All genuine Toncan Metal Sheets bear the following trade mark in red:—**INSTALLATIONS.**

Following are a few of the many structures in which Toncan Metal has been or is being used: New King Edward Hotel, Toronto; Chateau Frontenac, Quebec; Customs Building, Royal Mint and East Block of Parliament Building, Ottawa; Plant of J. R. Eaton & Sons, Ltd., Orillia, Ont.; Warehouse of Wood, Alexander & James, Hamilton, Ont.; Royal Observatory, Victoria, B.C.

See also our advertisement on pages 15—17 and 77.



CORRUGATED ROOFING AND SIDING.
(This is only one of many styles.)



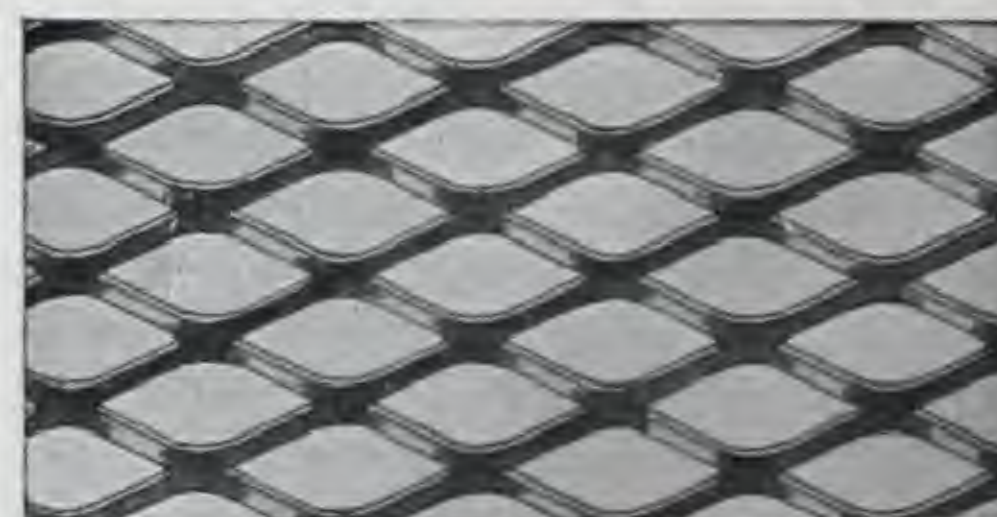
TONCAN METAL ROLL ROOFING.
(Another form of Toncan Metal Roofing.)



CONDUCTOR PIPE.



EAVES TROUGH.



TONCAN METAL LATH.



Y.M.C.A. BLDG., TORONTO. BURKE, HORWOOD & WHITE, Architects.
Toncan Metal Lath Used.

JOHN LYSAGHT, LIMITED

MANUFACTURERS,
BRISTOL, ENGLAND.

A. C. LESLIE & CO., LIMITED

MONTREAL, QUE.
MANAGERS, CANADIAN BRANCH.

PRODUCTS.

"QUEEN'S HEAD" and other well-known brands of
GALVANIZED SHEET IRON.

"QUEEN'S
HEAD."

This brand is the standard the world over for high-class work. Made of the best grade of soft Open Hearth Steel, absolutely flat, it will stand the most severe working tests. It differs from all other makes in the system of galvanizing, which gives a smooth, bright surface, free from thinly coated or defective spots, ensuring the greatest durability. While extravagant claims are made for so-called "Rust-Resisting" sheets, the fact is that in actual climatic exposure no black sheet will stand long. The life of a galvanized sheet depends almost entirely on the coating, and the proved superiority of "QUEEN'S HEAD" galvanizing makes it the cheapest sheet for all outside work.

HOW TO
SPECIFY.

All Galvanized Iron Work to be of "QUEEN'S HEAD." No other brand will be accepted as "equal." Brand to appear on every sheet.

{ CORNICES—To be made of 28G "Queen's Head" Galvanized Iron.
{ CONDUCTORS—All Conductors to be either Corrugated or made with expansion joints.
{ FLASHINGS—To be of "Queen's Head" Galvanized Iron.

GUTTERS—To be made of 26G "Queen's Head" Galvanized Iron.
All Gutters to be set with an even continuous fall to rain conductors.

{ SKYLIGHTS—To be made of 24G "Queen's Head" Galvanized Iron.
{ VENTILATORS—Skylights to have condensaiton gutters with discharge at eaves.

No other brand can fairly be substituted for "Queen's Head," for none is equally durable.

WEIGHTS
PER SQUARE.

GAUGE.....	28	26	24	22	20	18	16
WEIGHT.....	67.1 lbs.	75.0 lbs.	105.5 lbs.	124.0 lbs.	161.0 lbs.	195.0 lbs.	262.0 lbs.

Lysaght's Sheets are rolled as true to gauge as possible, not varying more than 5% from these average figures. This is important, as light weight sheets are often supplied.

"FLEUR-DE-
LIS."

Is made of the same quality of Steel as "Queen's Head," and is fully guaranteed for working purposes. It differs chiefly in the galvanizing, which is somewhat lighter than that on "Queen's Head," but is at least equal to any other brand. Splendid value, especially for inside work.

CORRUGATED
SHEETS.

"Redcliffe" is the standard brand for this purpose, made of soft Steel, uniform in weight, and of exactly the same finish as "Fleur-de-Lis." For special work requiring the most durable galvanizing, "ORB" Brand should be specified.

THE WM. RUTHERFORD & SONS CO., LIMITED

425 ATWATER AVENUE,
MONTREAL, QUE.

PRODUCTS.

We make a specialty of STOCK MILLWORK. All kinds of HIGH-GRADE INTERIOR FINISH, DOORS, COLUMNS, FLOORING—HARDWOOD and PINE, PANELLING, STAIRWORK, SASH, NEWEL POSTS, etc.

A full line of KORELOCK doors carried in stock.

FACILITIES.

We have a very large, compact and modern plant, and our equipment in this regard is equal to any on the continent. Our facilities for handling high-grade work are up to date in every respect and backed by years of experience. Our special expert workmen will lay out work from Architects' details or from plans and specifications, all work being framed and fitted ready to set in place.

Send for our illustrated Catalogue on Stock Millwork Specialties, sent free on request.

See also page 229.



DESIGN No. 361
Size 5-0 Wide X 9-0 High.
In the kneck down with Shelves, Ends and Moulding Complete. No Back. Doors Hinged and Fitted.



DESIGN No. 464
Sizes carried in Stock:
From 2-0 X 6-10 X 1 3/4
To 2-10 X 6-10 X 1 3/4



DESIGN B-3
Size carried in Stock:
2-10 X 6-10 X 1 3/4



KLIMAX 2 PANELS
Sizes carried in Stock:
From 2-0 X 6-8 X 1 3/4
To 2-10 X 6-10 X 1 3/4



"THE MONTREAL"
Sizes carried in Stock:
From 2-0 X 6-10 X 1 3/4
To 2-10 X 6-10 X 1 3/4

MIDLAND WOOD PRODUCTS, LIMITED

MIDLAND, ONT.

PRODUCTS.

Manufacturers of HIGH GRADE INTERIOR TRIM in PINE AND HARDWOOD, STAIR WORK, HARDWOOD FLOORING, DOORS—SOLID AND VENEERED, INTERIOR AND EXTERIOR COLUMNS, SASH, MATCHED AND DRESSED LUMBER.

We also make a specialty of ROLLING WOOD PARTITIONS for SUNDAY SCHOOLS and PUBLIC SCHOOL CLASSROOMS, etc. We would solicit enquiries for ROLLING PARTITIONS from architects and contractors and will gladly assist in laying out rooms in the most economical and practical manner.

SPECIAL TRIM.

We particularly specialize in making TRIM to Architects' Details and invite opportunity of figuring on such requirements. Our work in this line is unexcelled; it is executed with the finest grade of material obtainable. We aim at quality.

PLANT AND EQUIPMENT.

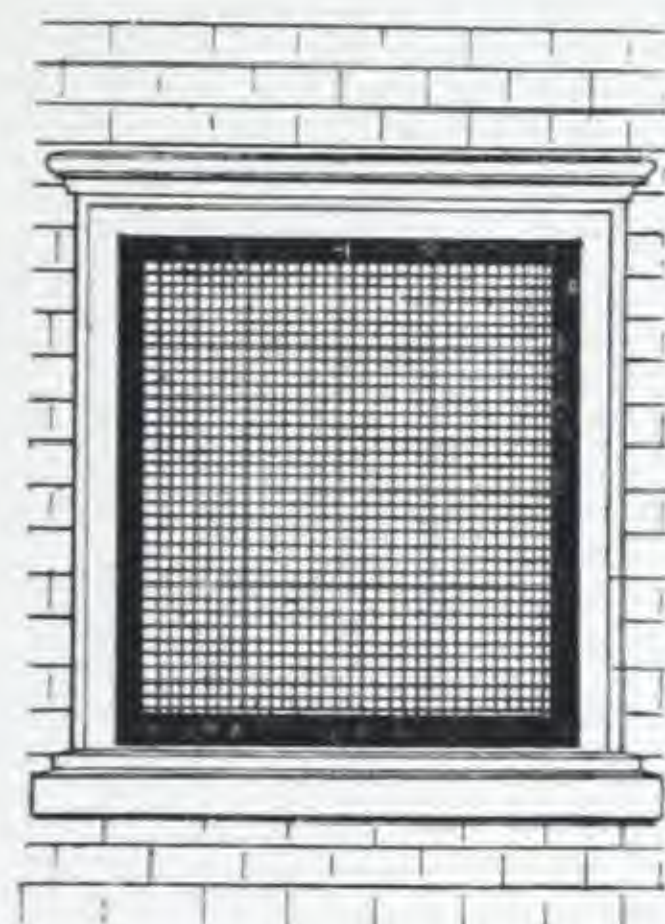
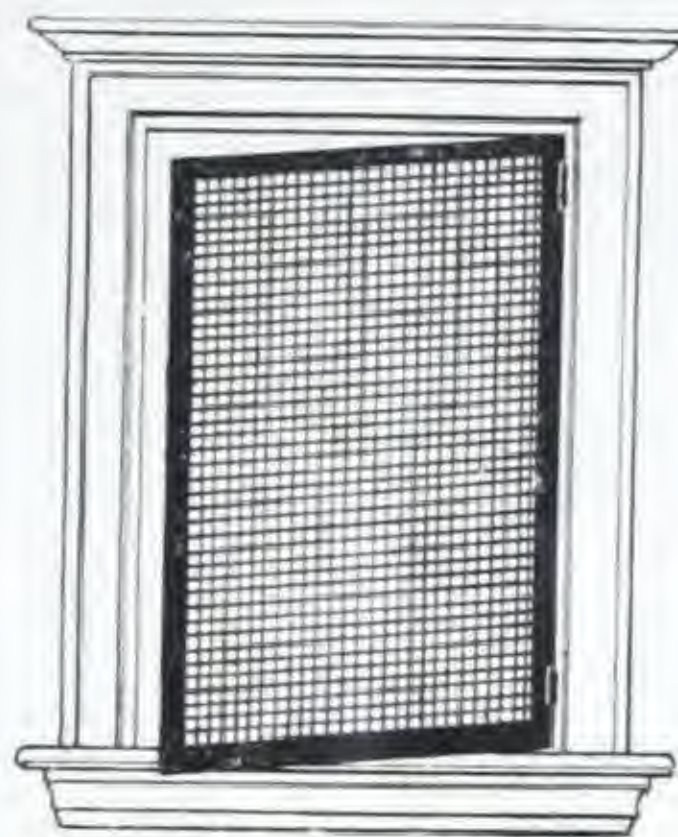
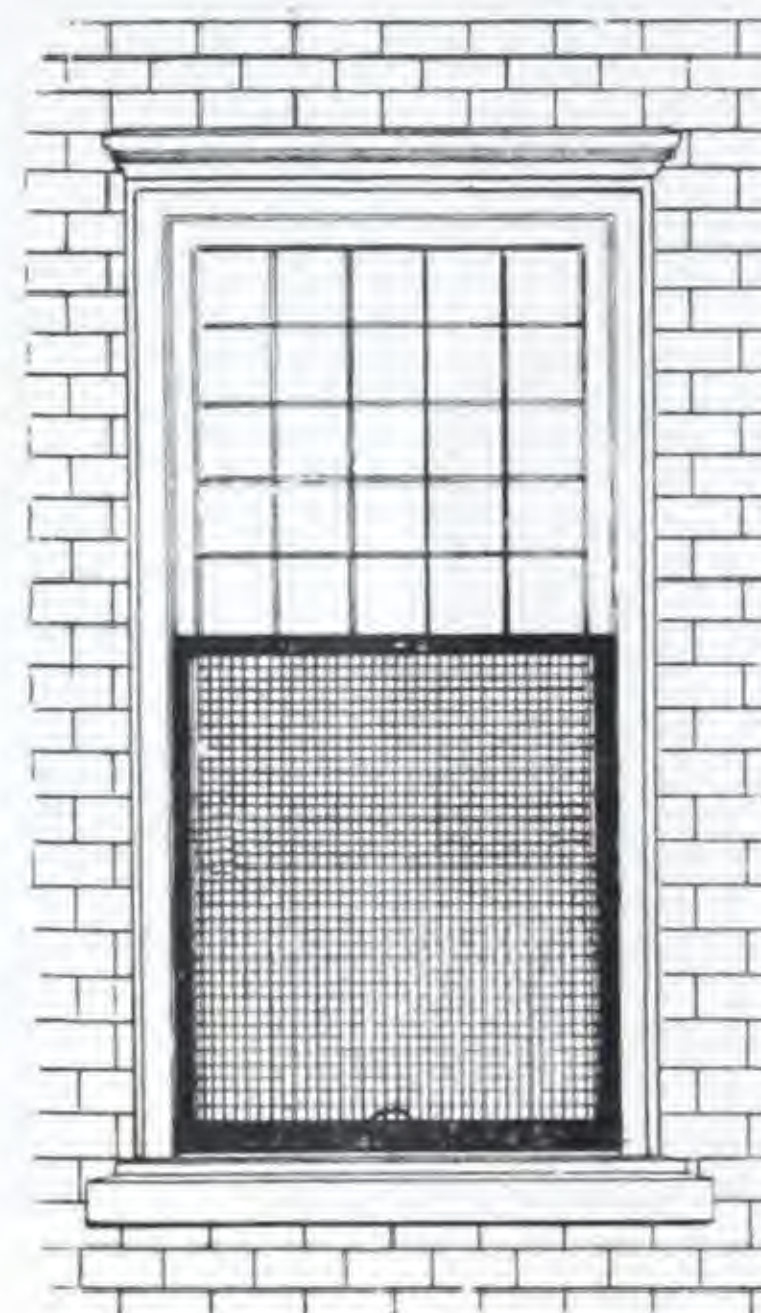
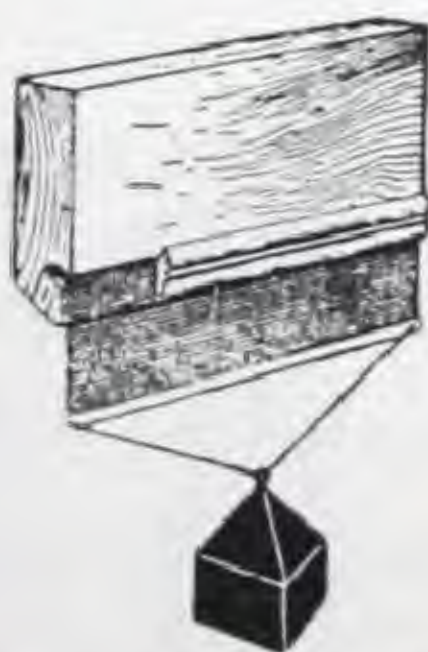
We have extensive floor space in our factory, with all modern and many special machines. Experienced and competent help is employed; we are, therefore, in a position to give entire satisfaction and prompt deliveries.

WOOD SCREENS.

We manufacture the well-known NEVER RUST SCREENS of Wood, either Sliding or Stationary, for Windows or Doors.



ROLLING PARTITIONS.

CLASS D.
STATIONARY SCREEN, TO HOOK ON.CLASS E.
CASEMENT WINDOW STYLE.
CAN BE OPENED THE SAME AS THE
GLASS WINDOW.CLASS A.
SLIDES UP AND DOWN LIKE THE WINDOW.SHOWING METHOD OF
HOLDING SCREEN
CLOTH.TEST FOR STRENGTH OF WIRE
CLOTH FASTENING—
WOOD FRAME.

Material, pine; width of wire
cloth, 12 inches.

A weight of 400 lbs., applied
as shown, failed to pull the
wire cloth out of the fastening
and there was no injury to
the frame.

SECTION OF SLIDING SCREEN, SHOWING
SPRING GUIDES.

SECTION OF DOOR.

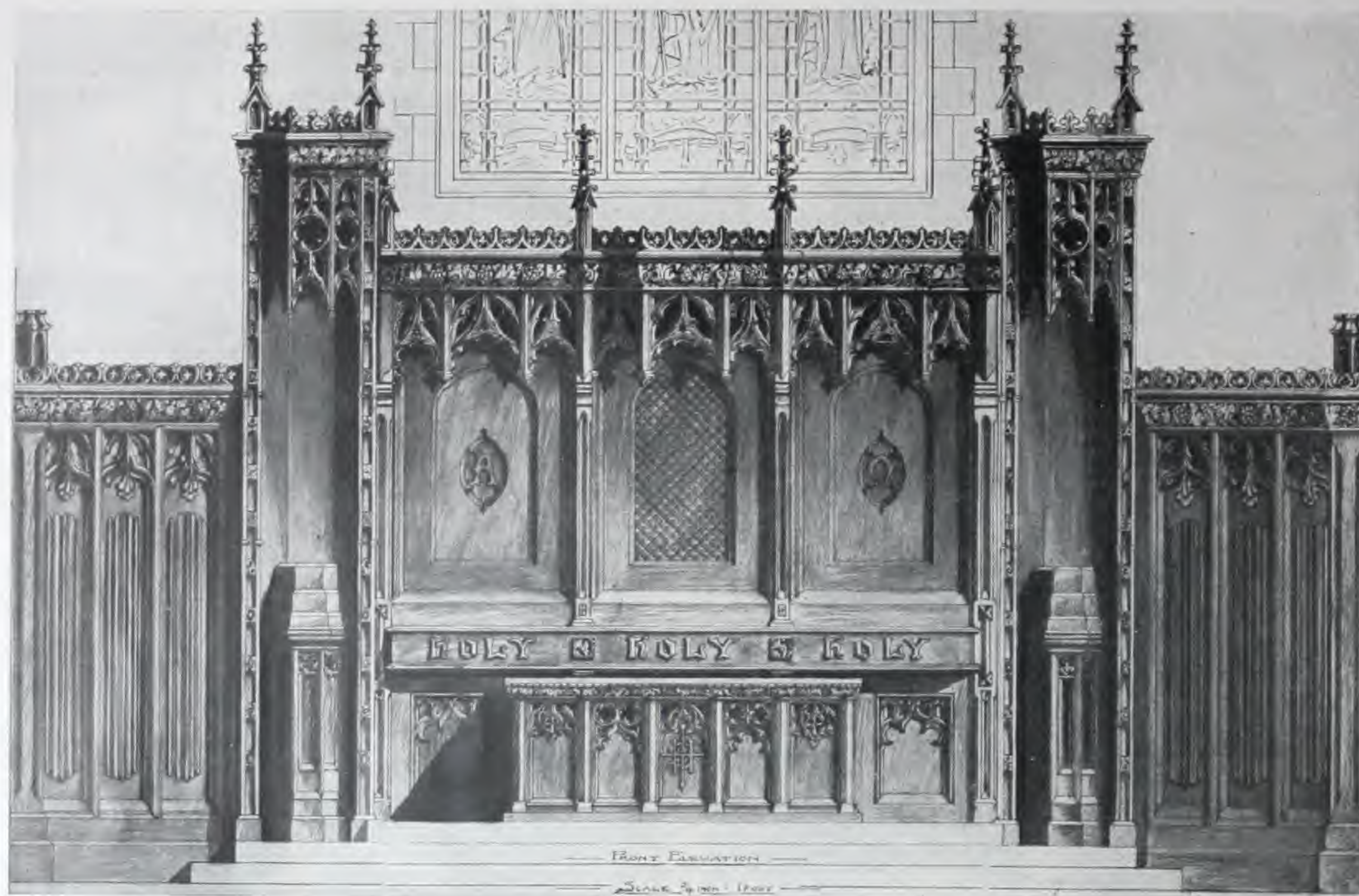
Our Standard Screens for doors and windows are made of clear pine, painted three coats, with enamel finish, in any colour, and fitted with Rustless Copper Screen Cloth and necessary hardware. They can also be made of oak or other hardwoods, finished in any desired shade.

WRITE FOR FURTHER PARTICULARS.

THE VALLEY CITY SEATING CO., LTD.

FOR HIGH CLASS WOOD CRAFTSMANSHIP.

DUNDAS, ONTARIO.



ALTAR REREDOS AND PANELLING.
DESIGNED FOR ALL SAINTS PRO-CATHEDRAL, EDMONTON, ALTA.

WE SPECIALIZE

And will be pleased to submit quotations and specification data in respect to

CHURCH FURNITURE
AND CHURCH SEATING

STRAIGHT OR CIRCULAR
of the Better Kind.

For all Denominations.

HIGH GRADE INTERIOR
WOODWORK

TO ARCHITECTS' DETAILS.

Every enquiry will have prompt and
careful attention.



PEW END NO. 990.

LODGE ROOM FURNITURE.

ASSEMBLY HALL SEATING.

SEATING AND FURNITURE

FOR

PUBLIC INSTITUTIONAL BUILDINGS.

We have a staff of Expert Wood-
carvers and will be pleased to submit
samples of their work and quotations to

ARCHITECTS AND CONTRACTORS.

Illustration shows one of our typical
PEW END DESIGNS. Special designs pre-
pared on request.

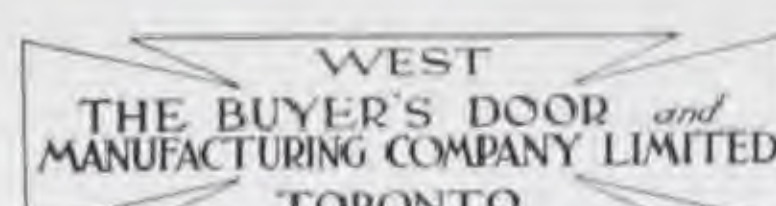
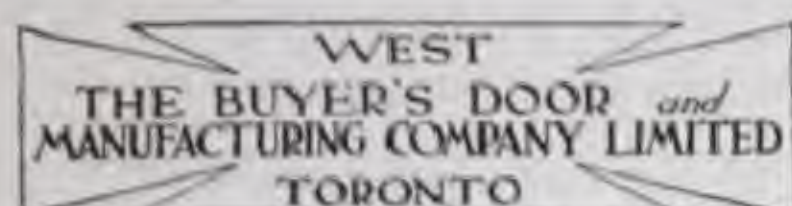
We shall be pleased to forward on request special plates showing Reredos of St. John's Church, Hamilton.

THE BUYERS' DOOR AND MANUFACTURING COMPANY LIMITED

FORMERLY KNOWN AS

BATTS LIMITED

OFFICE AND MILL: 366-400 PACIFIC AVENUE,
(WEST) TORONTO, ONT.



PRODUCTS.

We manufacture VENEERED AND PINE DOORS, STAVED COLUMNS for Exterior and Interior Use, FRAMES, SASH, FLOORING, PINE AND HARDWOOD TRIM, NEWEL POSTS, BALUSTERS, TURNINGS, STAIR MATERIAL, PANELLING, INTERIOR FITTINGS, GREENHOUSE MATERIAL, and we specialize on work from architects' plans and details.

COLUMNS.

High-grade Staved Columns manufactured in all kinds of wood, in any diameter and length, to architects' details, are a specialty with us. A large stock of WHITE PINE COLUMNS of different sizes in THE TUSCAN ORDER, always on hand, enables us to make prompt shipment.

NEWEL POSTS.

In Quarter-Cut Oak, Birch, Georgia Pine and Chestnut. Special Newels to detail quickly made to order.

BALUSTERS.

We carry a large stock of Round, Square and Octagon Verandah and Stair Balusters ready for immediate shipment, and we are well equipped for turning Balusters to detail; also Jacobean Turnings.

SASH.

Our complete, up-to-date Sash Machinery is able to turn out large quantities daily. All sash are dovetailed at the meeting-rail.

DOORS.

We are specially well-equipped in our Door Department, having the best door machinery obtainable. In our Glue-Room we have a 100-ton Power Press, used exclusively on our Veneered Doors. Only thoroughly kiln-dried White Pine is used for our Veneered Door cores. Veneers in cabinet woods are always kept on hand for the manufacture of doors to detail.

Below we show a few cuts of the Doors we manufacture and stock.

DETAIL WORK.

Our facilities for the execution of orders to special design from architects' plans and details are such that we can satisfactorily meet any requirement.



B.L. No. 316. CHESTNUT.



B.L. No. 317. FIR.



B.L. No. 334. 1/4-CUT OAK.



B.L. No. 335. 1/4-CUT OAK.



B.L. No. 340. CHESTNUT.

OUR PRODUCTS ARE OUR OWN MANUFACTURE.



DESIGN B.L. No. 203.



DESIGN B.L. No. 210.



DESIGN B.L. No. 11.



DESIGN B.L. No. 13.



DESIGN B.L. No. 14.



DESIGN B.L. No. 16.



ILLUSTRATED CONSTRUCTION.

The above illustration shows our lock joint and our method of connecting the cap and base to the shaft of our stock columns. Both ends of the shaft are bedded in Mastic Putty. This is our own idea, and, as far as we know, is not in use by any other manufacturer. By this means it is impossible for water or moisture to get to the inside of our columns.

CATALOGUES.

A complete catalogue of our various lines will be mailed on request, and we particularly invite correspondence from architects, builders and contractors regarding special work.

CHAMBERLIN METAL WEATHER STRIP COMPANY, LTD.

KINGSVILLE, ONT.

BRANCHES AND AGENTS:

HALIFAX, N.S., 154 Greenville St.
Phone 374.
KINGSTON, ONT., 41 Clarence St.
Phone 819.
LONDON, ONT., 20 McKinnon Place.
Phone 6339-W.
LONDON, ONT., 30 Evergreen Ave.
Phone 1504.
MONTREAL, QUE., 252 St. James St.
Phone 3436.
MOOSE JAW, SASK., 1120 Seventh St. N.W.
Phone 2111.
PETERBORO, ONT., 773 Aylmer.
Phone 1292.

BRANCHES OR AGENTS IN ALL THE PRINCIPAL
CITIES IN THE DOMINION OF CANADA.

BRANCHES AND AGENTS:

FORT WILLIAM: Gilmore & Hartwright.
REGINA, SASK., 2216 Elphinstone.
Phone 2314.
SYDNEY, N.S., 135 Esplanade.
SASKATOON, 332 1st Ave.
Phone 1699.

BRANCHES AND AGENTS:

ST. JOHN, N.B., 114-1/2 Princess St.
Phone 2479.
STRATFORD, ONT., 296 Erie St.
Phone 1024-K.
ST. THOMAS, ONT., 56 Arthur St.
TORONTO, ONT., 598 Yonge St.
Phone North 4292.
VANCOUVER, B.C., 572 Howe St.
Phone Sec. 1533.
WINDSOR, ONT., 136 Howard Ave.
Phone 1234 W.
WINNIPEG, MAN., Galt Bldg., Princess
and Bannatyne.
Phone Main G. 2499.

PRODUCTS.

METAL WEATHER STRIP IN ZINC, BRASS AND BRONZE.

Our Metal Weather Strip is the result of twenty-seven years of constant study and attention, during which time we have covered the field of practical devices very thoroughly. We are the pioneers in the Metal Weather Strip field, acquiring the first practical invention in 1894. Since then we have acquired, experimented with and tried out hundreds of ideas in an earnest effort to supply an equipment that will not only do what is intended, but will be practically indestructible.

CONSTRUCTION.

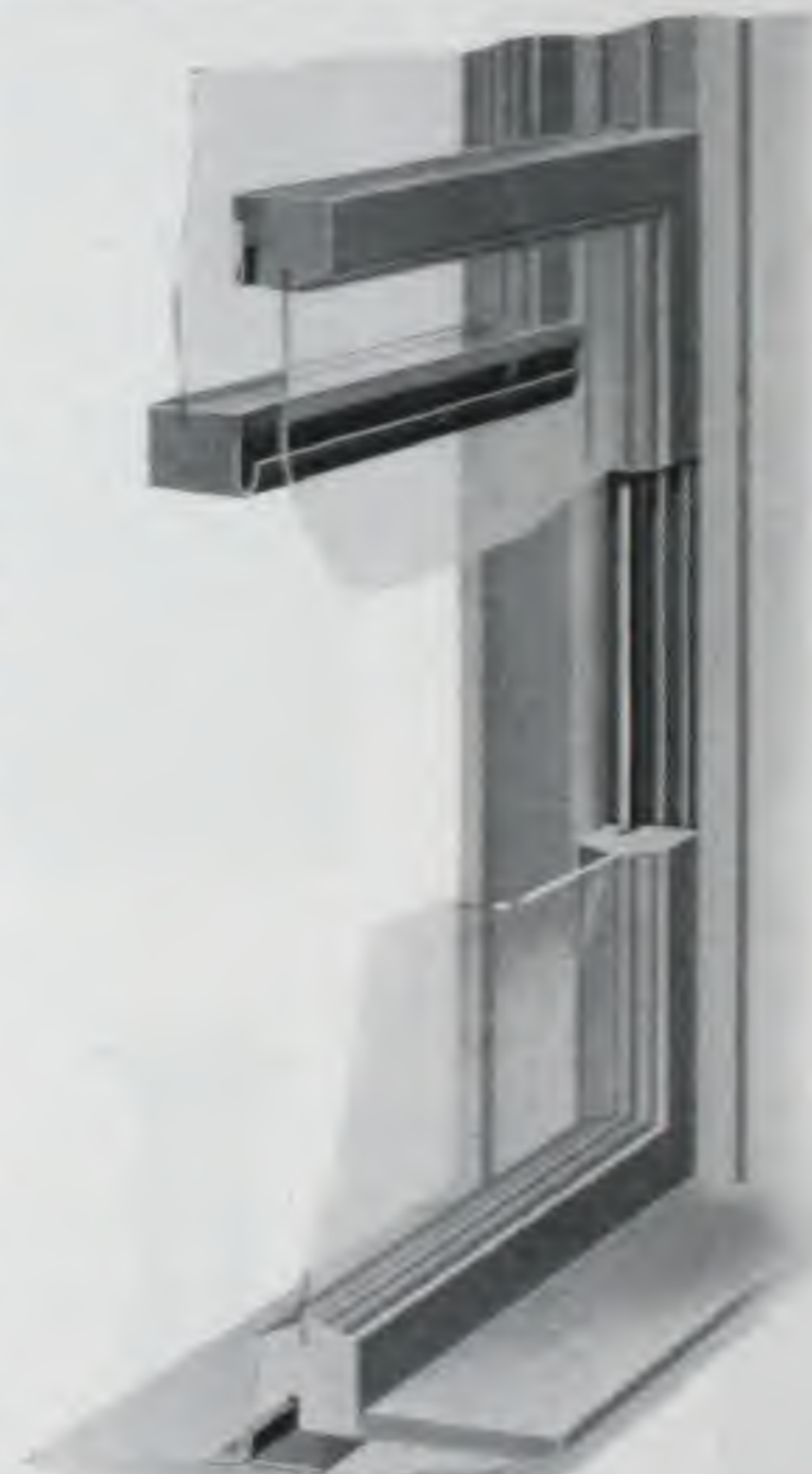
The entire rubbing surface of the metal in the Chamberlin Equipment is against wood. There are no metal or hard rubbing surfaces on which the Strip grinds or wears.

Metal against metal was abandoned by this Company seventeen years ago, when it was conclusively proven that the life of the Strip was short, even if alubricant was used to facilitate easy operation. We experimented with a metal in metal combination for three years, but finally abandoned it on account of its inability to stand the wear.

LOOPED TONGUE.—The tongue of the Chamberlin Strip is wider at its tip than at its base—making a tight window without binding or sticking. The tongue touches the walls of the groove only at its outermost edges, thereby reducing the friction to a minimum and allowing the sash to shrink and swell without destroying the efficiency of the equipment—something impossible with any other type.

CORRUGATED SIDE STRIPS.—The side strips on which the window slides, in addition to having the looped tongue, have raised bearing points or corrugations on which the window slides. These corrugations take up the side play, because they fill the sash and the frame, holding same out evenly from the runway on both sides. This prevents the sash from jamming and sticking when raised or lowered, and permits the window sash to move as smoothly and evenly as a ball-bearing wheel.

MEETING RAIL.—The Chamberlin Meeting Rail is simple and efficient. The Strip is made of two members, the receiving strip being made of heavy metal, forming a rigid receiver for the member that is fastened to the upper rail of the lower sash.



APPRECIATION.

Private Office William C. Bailey,

King Edward Hotel, Toronto.

Chamberlin Metal Weather Strip Co., Toronto.

August 28th, 1914.

Gentlemen:—Every window in the King Edward Hotel is stripped with Chamberlin Metal Weather Strips, and after twelve years they are as good as new. We find them most satisfactory as they keep out the dust as well as the cold, and they hold the window firm and tight, doing away with any rattling or shaking on windy nights. We will be very happy to recommend them to any one desiring a good window strip.

Yours very truly,

KING EDWARD HOTEL,

(Signed) WM. C. BAILEY.

TESTIMONIALS.

List of principal installations, estimates, etc., furnished upon request.

Note how Side and Sill Strips are fitted together. Without this joint it is impossible to make an effective installation.

L. H. PETERS, LIMITED

10 ST. ANGELE STREET,
QUEBEC, QUE.

PRODUCTS.

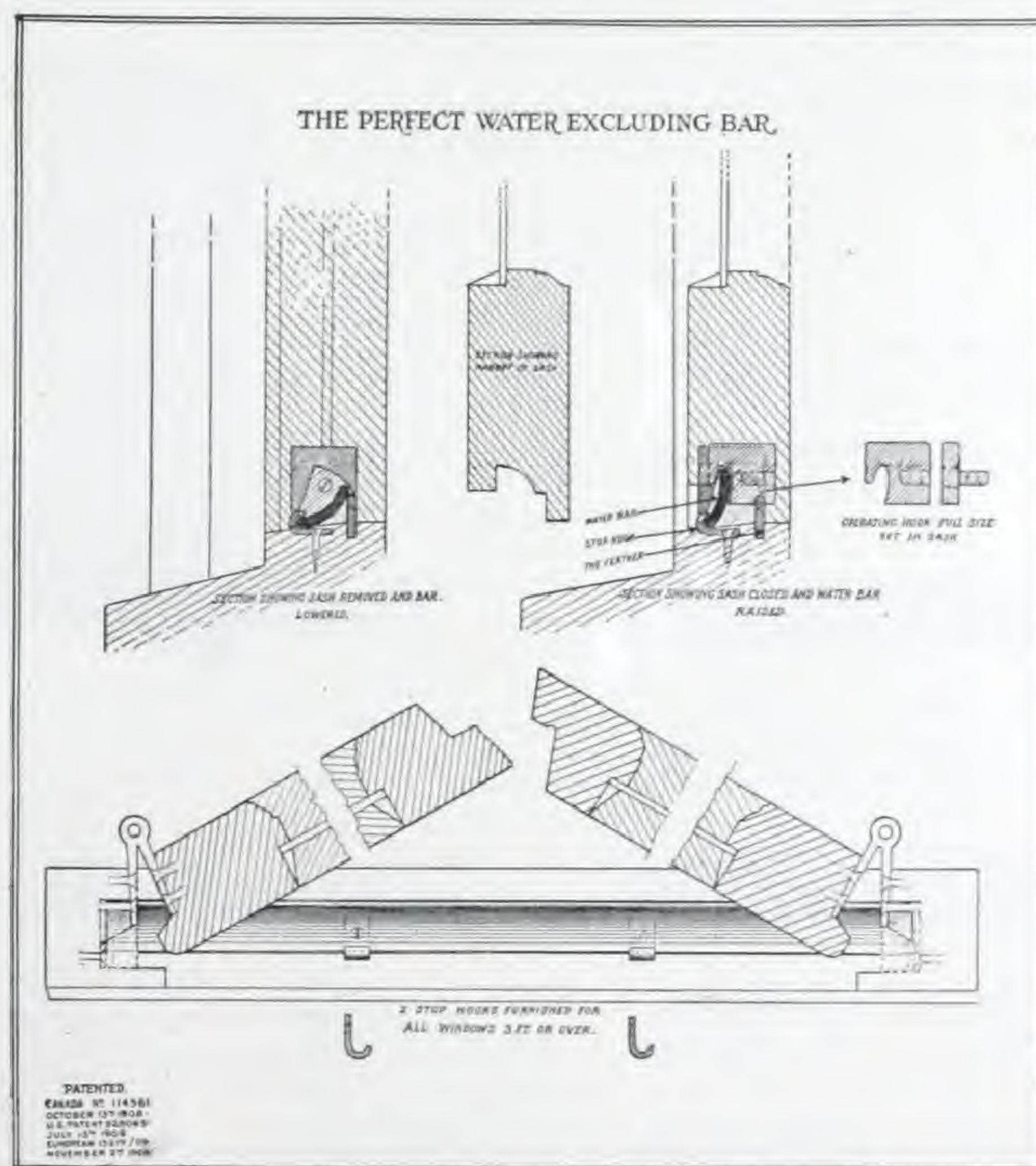
We are manufacturers of the "PERFECT" WATER EXCLUDING BAR, the most perfect excluding bar on the market, for Casement Sashes opening inward.

Also the "PRESTO" PATENT LOCK JOINT for English Window Sashes.

CONSTRUCTION.

The "PERFECT" Water Excluding Bar System consists of the ordinary iron sill bar or feather in use to cut sash joint. The water excluding bar proper is formed of a crescent-shape metal bar, which moves up and down when closing or opening sashes. It is held in place by two sockets, set into the frame, and small clips fixed to the sill. The right-side sash is fitted with a special hook, which catches and moves the water excluding bar in position.

The bars are made in Galvanized Iron, Statuary Bronze, Copper or Brass.



EFFICIENCY.

The efficiency of this bar is plainly shown by the fact that, when the sashes are closed, the bar rises a full 3-8 of an inch underneath the sash and, therefore, absolutely prevents water from getting in.

ADVANTAGES.

This device is very simple in construction, cannot get out of order, will last a lifetime, can be applied to old as well as new sashes, making all joints absolutely weatherproof.

This system is now in use in all kinds of buildings and is giving entire satisfaction.

THE HIGGIN MANUFACTURING COMPANY

ALL-METAL WINDOW SCREENS. ALL-METAL WEATHER STRIPS.

33-35 McCaul Street,
TORONTO, ONTARIO.

SALES AGENCIES IN PRINCIPAL CITIES.

PRODUCTS.

HIGGIN
ALL-METAL
WINDOW
SCREENS.

THE HIGGIN ALL-METAL WINDOW SCREEN; WOOD FRAME DOOR SCREENS; THE HIGGIN SPECIAL SCREEN EQUIPMENT FOR PIVOTED STEEL SASH; THE HIGGIN ALL-METAL WEATHER STRIP.

The Higgin Metal-Frame Window Screen is made entirely of metal and is adapted for use on either wood or metal window casings. It is especially suited to fireproof buildings. It is set just outside the upper sash and requires only 9-16 inch space, which includes the guide strips or channels in which the screen slides.

CONSTRUCTION.—The frame is of hollow construction, so made that no solder is used, thus making it possible to thoroughly enamel the inside as well as the outside of the steel frame and bake it at the high temperature necessary. The corners are reinforced with triple steel angles, locked mechanically, no soldering or brazing being used.

RE-WIRING.—The netting is held in the groove by means of a stiff, non-resilient spline, so formed as to roll into place and lock. This spline can be removed for the purpose of re-wiring the screen without danger of damaging it, making it unnecessary to order new splines from the factory.

SHAPES.—Screens can be made of any necessary shape to fit bow, circle top or round windows.

THE HIGGIN
EQUIPMENT
FOR PIVOTED
STEEL SASH.

Eliminates the necessity for basket or cage screens, and offers the most practical solution of the problem of screening ventilating steel sash.

THE HIGGIN
ALL-METAL
WEATHER
STRIP.

The Higgin Equipment for sliding windows consists of two strips, one of which is attached to the window frame and is made with a $\frac{3}{8}$ -inch tongue or raised portion that forms a track on which the sash slides. This track is usually made of zinc, but bronze may also be used.

The other strip, called the insert, is made of very light spring bronze, and is inserted in a groove made in the sash and slides on the track strip. The spring flanges of the insert lightly contact with the tongue of the track and effectually seal the aperture. As the insert is higher than the tongue of the track, there is no chance for it to cut the insert.

At the meeting-rail a zinc strip is attached to the lower rail of the upper sash and a spring bronze strip to the upper rail of the lower sash in such a manner that, as the sashes are closed, the strips interlock, sealing up the opening completely.

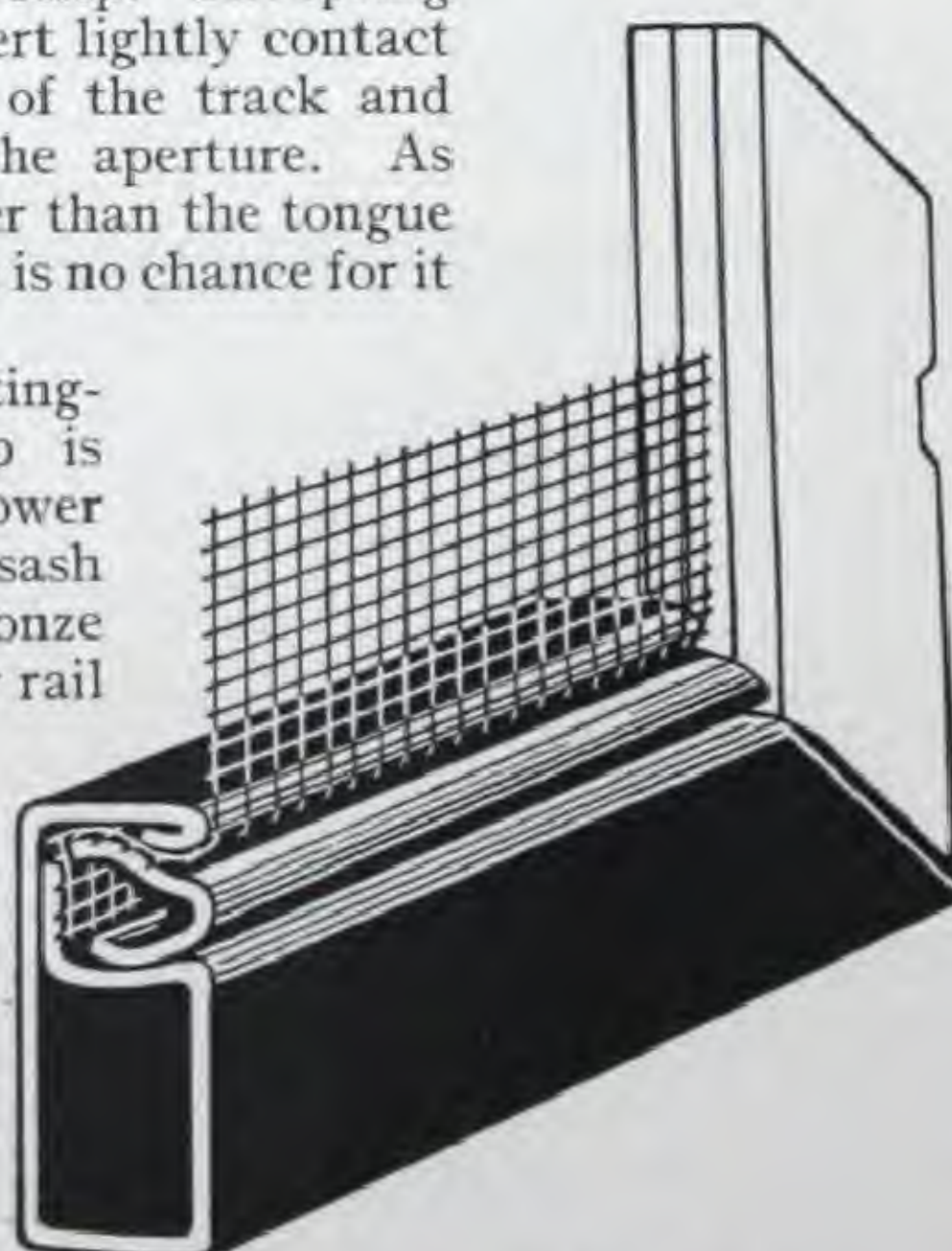
For case-ment windows and doors we make a number of strips specially designed to conform to the different conditions to be met.



EQUIPMENT FOR PIVOTED STEEL SASH.



SECTIONAL VIEW SHOWING COMPLETE WEATHER STRIP EQUIPMENT FOR DOUBLE HUNG WINDOW.



FULL SIZE SECTIONAL VIEW SHOWING CONSTRUCTION.



CORNER SECTION SHOWING LIFT AND SIDE SPRING.

THE HAMILTON COTTON COMPANY, LIMITED

HAMILTON, ONTARIO.

OUR PRODUCTS ARE SOLD BY ALL THE LEADING HARDWARE DEALERS IN CANADA.

PRODUCTS. We manufacture "HERCULES" AND "STAR SPIRAL" brands of BRAIDED SASH CORD.

"HERCULES" BRAND. The reputation of "Hercules" has been thoroughly established in the Canadian market for many years. It compares in quality with the best imported brands, but is sold at a considerably lower price. It can be safely recommended for any job.

"STAR SPIRAL" BRAND. There is no better sash cord on the market. It is made from a superior grade of cotton, designed especially for very heavy sash and will outwear chain. It is known by the blue spiral strand running through the cord.

SPECIFICATION. Architects' specifications should read: "Windows to be hung with No. sash cord (Hercules or Star Spiral)." The size of the cord and the size of pulleys should agree with the manufacturer's list, as printed below.

SCIENTIFIC TESTS. Tests have been made at the University of Toronto (Strength of Material Laboratory) which prove our claims as to quality.

SERVICE. "Hercules" and "Star Spiral" sash cords are stocked by all the leading hardware dealers in Canada. They can be secured without difficulty.

MADE IN CANADA. As there is no possible doubt of the quality of "Hercules" and "Star Spiral" sash cords, why not always recommend and specify *Canadian Made Cord*?

The illustrations and information given herewith may be of use in making up specifications.



SIZE NO. 6. DIAM. 3-16 IN.
About 18 lbs. per doz.; about 66 ft. per lb.
Suitable for weights of less than 5 lbs. Minimum diam. of pulley allowable, 1 1/2 in.



SIZE NO. 9. DIAM. 9-32 IN.
About 33 lbs. per doz.; about 36 ft. per lb.
Suitable for weights from 20 to 30 lbs. Minimum diam. of pulley allowable, 2 1/4 in.



SIZE NO. 7. DIAM. 7-32 IN.
About 22 lbs. per doz.; about 55 ft. per lb.
Suitable for weights from 5 to 12 lbs. Minimum diam. of pulley allowable, 1 3/4 in.



SIZE NO. 10. DIAM. 5-16 IN.
About 44 lbs. per doz.; about 27 ft. per lb.
Suitable for weights from 30 to 40 lbs. Minimum diam. of pulley allowable, 2 1/2 in.



SIZE NO. 8. DIAM. 1/4 IN.
About 27 lbs. per doz.; about 44 ft. per lb.
Suitable for weights from 12 to 20 lbs. Minimum diam. of pulley allowable, 2 in.



SIZE NO. 12. DIAM. 3/8 IN.
About 60 lbs. per doz.; about 20 ft. per lb.
Suitable for weights from 40 to 50 lbs. Minimum diam. of pulley allowable, 3 in.

The number indicates the diameter in 32ds of an inch.

LARGER SIZES.

LARGER SIZES THAN THOSE SHOWN ABOVE.

"Hercules" and "Star Spiral" Cords are also made in larger sizes, from size No. 14, diam. 7/8 in., to size No. 20, diam. 5/8 in., suitable for use for dumb-waiters, etc.

THE BUILDERS MOULDING CO., LIMITED

MANUFACTURERS OF "ACME" FLOORING.

52 NOBLE STREET,
TORONTO, ONT.

PRODUCT.

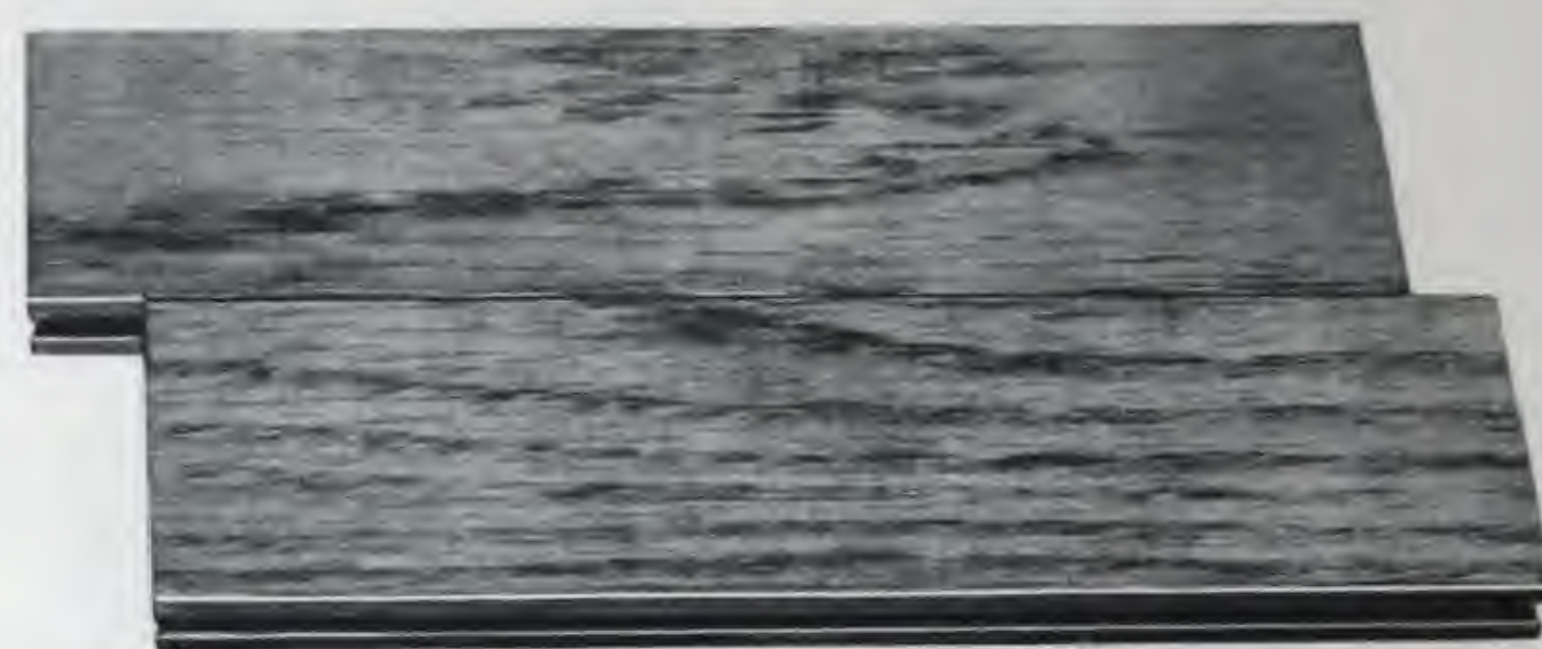
We are manufacturers of "ACME" BRAND HARDWOOD FLOORING, which is made from selected MAPLE, BIRCH, BEECH and OAK (quarter cut and plain).

FACILITIES.

Our Dry Kilns have a very large daily capacity and are equipped with the latest devices for drying lumber artificially. Our workmen are well trained in securing the best results by avoiding "cooking" the stock and thus destroying its fibre, on the one hand, or under-drying it on the other. This is very important, as the life of the floor as well as its appearance largely depends on the material being properly kiln dried, and unless this is done the flooring cannot be depended upon to give entire satisfaction after it is laid.



QUARTER SAWED, TONGUED AND GROOVED, END MATCHED OAK FLOORING.



PLAIN SAWED, TONGUED AND GROOVED, END MATCHED OAK FLOORING.

STANDARD
THICKNESSES
AND WIDTHS.

13/16-in. thickness: Widths, 1½-in. face, 2-in. face and 2¼-in. face.
3/8-in. thickness: Widths, 1½-in. face, 1¾-in. face and 2-in. face.

GRADES.

The grades of oak flooring are known as XXX Clear, which is our best grade, and XX No. 1, which is our second grade.

QUARTER
SAWED.

XXX CLEAR.—Shall have one face practically free from defects; the question of colour is considered; lengths in this grade to be 2 ft. and up, not to exceed 15% under 4 ft.

XX No. 1.—May contain bright sap and will admit pinworm holes, slight imperfections in dressing or a small, tight knot, not to exceed one to every 3 ft. in length; lengths to be 1 ft. and up.

PLAIN
SAWED.

XXX CLEAR.—Shall have one face practically free from defects; the question of colour is considered; lengths in this grade to be 2 ft. and up, not to exceed 15% under 4 ft.

XX No. 1.—May contain bright sap and will admit pinworm holes, slight imperfections in dressing or a small, tight knot, not to exceed one to every 6 ft. in length; lengths to be 1 ft. and up.

USES.

XXX CLEAR, QUARTER SAWED. Red or White.—High class residences, hotels, apartment houses and club houses.

XX No. 1, QUARTERED. Red or White.—Economical substitute for clear quartered where a dark finish is desired. These grades make a flooring equally as durable as the first grade.

XXX CLEAR, PLAIN SAWED. Red or White.—High class residences, hotels, apartment houses and club houses.

XX No. 1, PLAIN SAWED. Red or White.—Medium priced residences, hotels and apartments, schools, office buildings and stores.

ESTIMATES.

We will appreciate architects and builders giving us the opportunity to figure on their flooring requirements.

THE MARBLELOID COMPANY

MANUFACTURERS OF AND CONTRACTORS FOR FIREPROOF PLASTIC FLOORING

461-8th AVENUE AT 34th STREET, NEW YORK, N.Y.

FACTORY: NEW DURHAM, N.J.

CANADIAN AGENTS:

QUEBEC, H. K. FERGUSON, 908 New Birks Bldg., Montreal.
ONTARIO, JOHN LINDSAY, 250 Richmond St. W., Toronto.
ALBERTA, AMERICAN AGENCIES, LTD., 1001-4th St. W., Calgary.

MANITOBA, N. J. DINNEN & Co., Nokomis Bldg., Winnipeg.
BRITISH COLUMBIA, S. A. FOSTER, 425 Standard Bldg., Vancouver.
NOVA SCOTIA, EAGER, COOMBS & Co., LTD., Halifax.

PHYSICAL CHARACTERISTICS, PROPERTIES AND ADVANTAGES.

MARBLELOID is a standardized composition flooring, sanitary base, wainscot, trim, tread, etc. Applied in a plastic state it sets rapidly into a tough, elastic monolithic body having a fine-grained, smooth surface.

It is fire-proof, resilient and of high sanitary value. It is non-dusting, non-absorbent and easily kept clean. It possesses high resistance to compression and abrasion. MARBLELOID resists a tendency to crack and bonds perfectly to wood, concrete or steel; it is applied on old foundations as well as in new construction. It is most attractive in finish and appearance and is made in all colors.

WIDE RANGE OF ADAPTABILITY.

Over 10,000 MARBLELOID installations have been placed for the most diversified types of service. The material is made up in varying formulæ, depending upon the use to which the floors will be put. MARBLELOID is the ideal flooring for office buildings, stores, banks, theatres, churches, hospitals, institutions, clubs, schools, residences and is frequently used in warehouses, industrial plants and power houses where it will withstand severe wear.

Approximately 2,000,000 sq. ft. of MARBLELOID are installed annually.

PHYSICAL TESTS.

MARBLELOID weighs 3 lbs. to the sq. ft.; its resistance to compression is over 6000 lbs. per sq. in.; it possesses a tensile strength of 900 lbs. to the sq. in.; it will withstand a heat of 1700° Fahr. without cracking.

Copies of fire test, or other physical tests, will be furnished upon request.

MARBLELOID SERVICE.

CREWS ARE MAINTAINED AT THE PRINCIPAL BUILDING CENTRES. ALL INSTALLATIONS ARE MADE BY THE COMPANY'S SKILLED MECHANICS ESPECIALLY TRAINED.

Preliminary to starting installation, an inspection of foundations is made by an engineer thoroughly familiar with all phases of building construction.

The Marbleloid Company is at all times prepared to handle work of any extent with dispatch and efficiency.

The laboratory, in charge of a specialized graduate chemist, is constantly engaged in research work and analysis and test of materials entering into the composition.

MARBLELOID SPECIFICATIONS. RELATIVELY LOW COST.

It is advisable that architects and engineers secure a copy of the printed MARBLELOID specification sheet giving foundation requirements and details of construction before specifying the material.

MARBLELOID is permanent. It requires no unusual or expensive foundation and may be installed upon a single wood flooring, directly upon a concrete floor arch or upon a concrete fill thereon. In larger areas it costs little more than linoleum and will outlast many applications thereof.

Prices of MARBLELOID flooring, sanitary base, wainscoting, etc., vary with the area involved, the character of foundation (wood, concrete, steel, etc.), and location.

Upon receipt of data comprehending the above, quotations will be furnished.

IMPORTANT NOTE.

MARBLELOID should be considered upon the basis of merit. It differs from the usual magnesite flooring in components and methods of application. The use of cheap pigments and harmful fillers, used for the purpose of reducing costs, has been avoided. MARBLELOID bears no relation or resemblance to floors based upon dolomitic magnesite, which is chemically unsuited for flooring use. Unfortunately numerous floors manufactured from such a magnesite have been installed in Canada.

GUARANTEE.

The Marbleloid Company rigidly guarantees the quality of its material and all work performed by its mechanics and will repair free of charge all defects due to the use of improper materials or workmanship.

SAMPLES.

Samples, color card, booklet, specifications, list of completed contracts, etc., will be mailed upon request.

REFERENCES.

Among the installations made in Canada are the following:—

St. Denis Theatre, Montreal	Messrs. Barott, Blackader & Webster, Architects
Terminal Warehouse Reg'd, Montreal	Mr. E. P. Hanna, Treasurer.
Devonshire School, Montreal	Ross & MacDonald, Architects.
Lorne School, Montreal	Ross & MacDonald, Architects.
Maisonneuve School, Montreal	Ross & MacDonald, Architects.
Molson's Bank, Montreal	Philip J. Turner, Architect.
Molson's Bank, Windsor	Philip J. Turner, Architect.
Merchants' Bank, Windsor	Wells & Grey, Contractors.
Childs Company, Office Bldg., Toronto	J. C. Westervelt, Architect, New York
New Union Station, Toronto	Ross & MacDonald, Architects.
Northern Aluminum Co. Offices, Toronto	Archibald & Holmes, Engineers and Gen. Con.
Spectator Building, Hamilton	McPhie & Kelly, Architects.
Hamilton & Toronto Sewer Pipe Co., Hamilton	McPhie & Kelly, Architects.
Burlington Steel Co., N. Hamilton	McPhie & Kelly, Architects.
Chipman Holton Knitting Co., Office Building, Hamilton	Stuart & Sinclair, Architects.
Victoria Hospital, Halifax	S. M. Brookfield, Ltd., Contractors.
Wood Department Store, Halifax	J. P. Dumaresq, Architect.
Dominion Government Radio Station, Halifax	Dominion Government.
Dominion Arsenal, Lindsay	Westinghouse, Church, Kerr & Co., New York City.
Bank of Sarnia, Sarnia	Walls & Bennett, Architects.
Sarnia-Hydro Electric System, Sarnia	J. E. R. Phelps, Manager.
Medical and Surgical Clinic, Peterboro	Ephgrave & Barrett, Architects.
Sudbury Mining & Technical School, Sudbury	Sherwood Construction Co., Contractors.
Mutual Life Building, Waterloo	Dickie Construction Company, Contractors.
Office Building, Rindon Pulp & Paper Co., Temiskaming	George A. Fuller Company, Contractors.

MARBLELOID flooring is repeatedly used by many departments of the United States Government, and it is Standard of Specification by prominent Corporations, including the following:—

Pennsylvania Railroad Co.; Carnegie Steel Co.; Standard Oil Co.; Crucible Steel Co. of America; General Chemical Co.; E. I. du Pont de Nemours & Co.; General Electric Co.; Bethlehem Steel Co.; Armour & Co.; American Sheet & Tin Plate Co.; Firestone Tire & Rubber Co.; Remington Arms U.M.C. Co.; American Bridge Co.; Proctor & Gamble Co.; Western Union Telegraph Co.; Westinghouse Electric & Manufacturing Co.; New York Central Railroad Co.; Baldwin Locomotive Co.; Submarine Boat Corporation; Worthington Pump & Machinery Co.; American Car & Foundry Co.; Aluminum Co. of America; Singer Sewing Machine Co.



THE BARBER ASPHALT PAVING COMPANY

MINERS, REFINERS AND PRODUCERS
OF NATIVE LAKE ASPHALTS AND ASPHALTIC PRODUCTS.

NEW YORK. PHILADELPHIA. CHICAGO.
ST. LOUIS. KANSAS CITY. PITTSBURGH. ATLANTA.

AGENTS:
VULCAN ASPHALT AND SUPPLY COMPANY, LIMITED,
WINNIPEG, MAN., and TORONTO, ONT.

PLANTS:
MAURER, N.J.
MADISON, ILL.



PRODUCTS.

GENASCO
VULCANITE
ASPHALT MASTIC.
GENASCO ACID
PROOF MASTIC.
USES OF
MASTIC.

ADVANTAGES OF MASTIC.

APPLICATION.

STANDARD
TRINIDAD
BUILT-UP
ROOFS.

ADVANTAGES.

GENASCO
POSITIVE SEAL
WATER-
PROOFING.

GENASCO
SEALBAC
SHINGLES.

GENASCO READY
ROOFING.

GENASCO
PAINTS.

SPECIFICATIONS
AND
SUPERVISION.

TRINIDAD LAKE ASPHALT, BERMUDEZ LAKE ASPHALT, TRINIDAD LAKE ROOFING ASPHALT, GENASCO VULCANITE ASPHALT MASTIC, GENASCO ACID PROOF MASTIC, GENASCO POSITIVE SEAL WATERPROOFING ASPHALTS, GENASCO WATERPROOFING FELTS AND FABRICS, ASPHALT SATURATED FELTS, GENASCO SEALBAC ASPHALT SHINGLES, GENASCO READY ROOFINGS, ASPHALTIC PROTECTIVE PAINTS, PIPE COATINGS, TILE CEMENTS, ROOF COATINGS.

Genasco Vulcanite Asphalt Mastic is a combination of Refined Trinidad Lake Asphalt, Trinidad Lake Asphalt Flux of proper penetration for the work involved, and clean, dry sand and gravel properly graded to leave a minimum of voids in the mixture.

Acid Proof Mastic differs from the regular mastic mixture, in that the mineral aggregate is a grit of silicious nature free from limestone, lignite, loam or any foreign matter of vegetable or calcareous nature.

Mastic floors are valuable in all industrial establishments, machine shops, chemical plants, warehouses, abattoirs, pulp and paper mills, breweries, train sheds and platforms, shipping departments of stores and factories, schools, public buildings, hospitals, etc.

Mastic is used extensively as a flooring, for sidewalks, waterproofing bridges and other structures, tank and pipe linings, stair treads and similar constructions.

Acid Proof Mastic is adapted for floors in battery rooms, chemical plants and laboratories, for lining wood, metal or concrete tanks subjected to acid solutions and similar uses.

Mastic will waterproof swimming pools and reservoirs, conduits, and other structures.

Genasco Asphalt Mastic floors will resist heavy and continuous traffic, as in round houses and freight stations. It is waterproof, dustless and resilient; therefore easy underfoot. It is easily cleaned; therefore sanitary, and easily repaired if torn up for drain repairs or other causes. It does not become slippery, nor does it transmit heat or cold.

Genasco Mastic floors are easily and quickly applied, and can be laid over old floors while the plant remains in operation. Mastic can be used one hour after installation.

Mastic floors are used in new construction and for resurfacing worn-out floors of concrete, wood or other material.

For heavy traffic, Mastic is laid $1\frac{1}{2}$ " thick; for lighter traffic, a thickness of 1" is used, except when laid over wood, when the minimum is $1\frac{1}{4}$ ". Where the thickness exceeds 1" the Mastic is laid in two layers.

The material is mixed on the job, and laid while hot. It is spread and worked with wooden floats, until free from voids; then fine sand is sprinkled on the floor, and the surface rubbed smooth. The finished surface is a monolithic sheet, free from cracks or laps.

Constructed of Trinidad Lake Asphalt and Asphalt Saturated Felt. Laid over either boards or concrete. When the base is concrete, a priming coat of Genasco Positive Seal Priming Paint first is spread.

A Standard Trinidad Roof over boards consists of two layers of Standard Felt, one layer of cap felt and three layers of roofing asphalt. Contains 128 pounds of waterproofing material and 22 pounds of reinforcing felt per square.

A Standard Trinidad Roof over concrete consists of the Primer, four layers of roofing asphalt, two layers of Standard Felt and one layer of cap felt. This roof contains 168 pounds of waterproofing material and 22 pounds of reinforcing felts per square.

The Felts used are all rag felts—possessing the greatest tensile strength, mullin strength, ductility and absorption.

Standard Trinidad Built-Up Roofs are constructed of all waterproof materials. They require no top coating of gravel or slag to protect the waterproofing factor from the sun and elements, and none is used. Therefore there are no loose stones or other mineral matter to wash free and clog gutters or drain pipes, or to hamper repairs if the roof is damaged by accident. The Trinidad Asphalt is impervious to weather, fumes and gases.

For waterproofing subways, tunnels, foundation work, bridges, conduits, steel construction and other forms of work. Genasco Waterproofing materials are constructed of native asphalts, compounded under technical supervision.

Durable, artistic and easily applied. Waterproofed with Trinidad Lake Asphalt. Made of all rag felt thoroughly saturated and coated on both sides with asphalt. Finely crushed red or green natural color slate is firmly imbedded in the top surface.

Made in individual and strip form—Individual, 8" x $12\frac{3}{4}$ " in size; Strip, 10" x $32\frac{1}{8}$ ".

Waterproofed with Trinidad Lake Asphalt. Made with smooth or slate surface, 32" wide, and packed in rolls of one or two squares. Smooth surface made in three weights—light, medium and heavy.

Asphaltic paints for resisting heat, weather, acids, water and other destructive agencies. Devised for particular purposes and made under laboratory supervision.

Specifications for the laying of Standard Trinidad Built-Up Roofs and Genasco Vulcanite Asphalt Mastic Floors will be furnished upon request.

Our engineers and technical experts will confer with architects, builders, contractors or owners regarding the best methods to be followed in solving roofing, flooring or waterproofing problems. Our complete laboratory service is at the command of those desirous of obtaining the best materials for their requirements.

VULCAN ASPHALT AND SUPPLY COMPANY, LIMITED

604 TRUST & LOAN BUILDING,
WINNIPEG, MAN.

39 YONGE STREET ARCADE,
TORONTO, ONT.

CONTRACTORS AND DISTRIBUTORS:

GENASCO VULCANITE ASPHALT MASTIC.

GENASCO POSITIVE SEAL WATERPROOFING.
COLD STORAGE AND INSULATING ASPHALTS.

T.M.B. COLOURED MASTIC

STANDARD TRINIDAD BUILT-UP ROOFS.

GENASCO READY ROOFING AND SHINGLES.
ASPHALT FELTS AND FABRICS.

AGENTS FOR

THE BARBER ASPHALT PAVING COMPANY, PHILADELPHIA.

MASTIC FLOORS AND WATER- PROOFING.

Genasco Vulcanite Asphalt Mastic is a mixture of Trinidad Lake Asphalt, a softer asphalt or flux, and a mineral aggregate, consisting of properly graded sand or gravel. If an acid-proof mix is desired, the mineral aggregate consists of a grit of silicious nature, containing no limestone, lignite, loam or other matter of vegetable or calcareous nature.

Mastic is adapted for floors, sidewalks, waterproofing, tanks, pipe and reservoir linings, stair treads, etc.

WHERE USED.

As a flooring:

Where heavy traffic is encountered, as in industrial establishments, warehouses, shipping departments, train sheds and platforms, machine shops, docks, etc.

Where acid or water conditions prevail, as in battery rooms, chemical plants, laboratories, pulp and paper mills, bottling establishments, etc.

Where sanitation is essential, as in schools, hospitals, food producing industries, abattoirs, public buildings, etc.

As a waterproofing material:

For lining swimming pools and reservoirs, waterproofing conduits, bridges, tanks, pipes, etc.

MASTIC ADVANTAGES.

Mastic resists heavy traffic, is waterproof, resilient, and does not become slippery. It is dustless, easily cleaned and easily repaired if damaged.

Mastic can be laid over old concrete or wooden floors, as well as in new construction. It hardens quickly and can be used within an hour after laid. In resurfacing operations, it can be installed while the plant remains in operation.

INSTALLATION.

Mastic is mixed on the job, and laid while hot. The thickness ranges from one inch to 1½ inches. If over an inch thick, the floor is laid in two layers.

USERS OF MASTIC.

We have installed more than 200,000 sq. ft. of Genasco Mastic for the Canadian Pacific Railway Company, and over 100,000 sq. ft. for the Dominion Government in various drill halls, post offices, and other Federal buildings. We also number among our clients the T. Eaton Company, Revillion Bros., Ltd., Hudson's Bay Company, Gunns Ltd., Harris Abattoir, Gordon Ironsides Fares, Ltd., and others.

T.M.B. COLOURED MASTIC FLOORING

A material quite distinguished from coloured composition flooring in that it is of an asphaltic nature and, therefore not subject to chemical change. It has all the advantages of ordinary asphalt mastic flooring with the addition of a more pleasing appearance. Supplied in Red, Green, Tan and Black. Applied over cement or wood floors. Suitable for all corridor areas, for Class Rooms in Schools, Wards in Hospitals, Gymnasiums, Laboratories, Lavatories and Offices.

TRINIDAD LAKE ASPHALT BUILT-UP ROOFS.

Standard Trinidad Roofs are constructed of alternate layers of Trinidad Lake Asphalt and asphalt saturated felts. They can be laid over either boards or concrete. The roof over boards contains 128 pounds of waterproofing material and 22 pounds of felt per square; that over concrete containing 168 pounds of waterproofing and 22 pounds of felts. The asphalt is mopped on the roof while hot, the whole forming a smooth, unbroken surface.

Only all-waterproof materials are used in Standard Trinidad roofs. No top coating of gravel or slag is required, or used, to protect the asphalt; hence there are no stones or pebbles to clog gutters and drains. Resists fumes, gases and weather for years.

STANDARD TRINIDAD INSTALLATIONS.

Standard Trinidad roofs have been installed by us on the Manitoba Parliament Buildings, Westminster Military Hospital, Quaker Oats Building, Saskatoon, Dominion Linseed Company, Winnipeg, and many other buildings.

WATERPROOFING BY GENASCO- POSITIVE SEAL METHODS.

Materials compounded from native asphalts meet every water and damp-proofing requirement in subway or tunnel construction, foundation work, bridges or conduits, steel construction, etc.

Specifications and complete information for any waterproofing operation will be furnished on request. We have installed the waterproofing systems at the Manitoba Parliament Buildings, Canadian Pacific Railway Station at Winnipeg, High Level Bridge of the C.P.R. at Edmonton, and other operations.

COLD STORAGE AND INSULAT- ING ASPHALTS.

Asphalts especially designed for use in refrigerating, cold storage and other plants, and for insulating purposes.

READY ROOFING AND SHINGLES.

Roll roofings, either smooth or slate surface, suitable for use on all classes of buildings except those with flat roofs. Slate surface roofings coated with red or green crushed slate, applied firmly imbedded in asphalt.

Genasco Sealbac Shingles, made with the Sealbac, a heavy coating of asphalt on the under side, which assists in closer adhesion of the shingles, and resists condensation. Surfaced with natural color, red or green, crushed slate. Waterproofed with Trinidad Lake Asphalt Cement. Made in individual and strip forms.

ASPHALT FELTS AND BURLAP.

Felts and fabrics scientifically treated to resist water and dampness; useful in many processes of building construction.

SERVICE.

With a wide experience in laying Mastic, installing built-up roofings, and waterproofing under exacting conditions, we are in a position to render exceptional service, no matter what the conditions may be.

Specifications and detailed information regarding our several lines of activity gladly will be furnished.

DOMINION OILCLOTH & LINOLEUM COMPANY, LIMITED

MONTREAL, CANADA.



Upper illustration shows Battleship Linoleum in Public Ward of Montreal General Hospital.

Lower illustration shows Battleship Linoleum in Hallway of Montreal General Hospital.



BATTLESHIP LINOLEUM.

Battleship Linoleums are made in Canada by us, thus ensuring promptness of delivery. Two weights are available, "AAA" with a thickness of 6 millimetres, and "AA" 4.60 millimetres. One shade, a rich brown, is available, while we manufacture grade "A" Linoleum in plain brown and also in plain green.

USED ON BATTLESHIPS.

Perhaps the most unique test to which our Battleship Linoleums have been put is on the decks of Battleships—H.M.S. "Carnarvon," one of the battle-scarred vessels that passed through the "Falkland Islands Engagement," having specified our Battleship Linoleum. Large quantities are supplied the C. G. Merchant Marine. Rigid as are the requirements of the War and Navy Departments, our Battleship Linoleums have met every test.

CONSTRUCTION.

Battleship Linoleum is constructed of finely-ground cork incorporated with a wear-resisting cement made of oxidized linseed oil, kauri gum, resin, etc., imbedded under many tons' pressure into a strong burlap base of jute canvas. Thus made, one of the most durable floor coverings known is secured, Battleship Linoleums being practically indestructible in use.

SOME OF ITS FEATURES.

In Battleship Linoleum your clients are offered a floor covering that is sanitary, durable, attractive, comfortable and economical. Its resilient surface solves the noise problem—a serious one where quiet is essential. Made in widths of two yards and done up in rolls twenty-five yards long, it is possible to lay large areas and make them appear jointless when cemented.

INSTRUCTIONS FOR LAYING.

CAUTION.—In cold weather linoleum should be thoroughly warmed before unrolling, at a temperature of 70 degrees Fahrenheit, for about 48 hours.

Battleship Linoleum is heavy and therefore difficult to lay; it is advisable in all cases to have work done by experienced hands. (Most dealers have linoleum-laying experts.)

Floors, whether of wood or concrete, should be smooth, dry and clean. Uneven floors cause linoleum to break and wear more rapidly. Damp floors cause mold to form under linoleum, which is then liable to bulge or buckle and leave the floor.

Do not fit linoleum tight at first; cut oversize along walls and let seams overlap. Allow goods to lie loose on floor as long as possible, when expansion will have ceased and linoleum can be trimmed and fitted to room.

The best practice is to cement or glue linoleum to floor and for this purpose there are a number of special waterproof cements.

Roll linoleum up half way (or as much as desired), and proceed with cementing that portion; then roll back and cement other portion and lay in like manner. Be careful not to spill cement on surface. Quickly remove with wood alcohol any that may accidentally come in contact with surface.

Best results are obtained by coating entire back of linoleum with cement, but sometimes only edges or joints are cemented.

Use lawn roller to press linoleum firmly into place, passing this back and forth over entire surface. Then weight surface down with sand bags so it will adhere uniformly. If sand not available, use planks and weight with iron, bricks or other material.

Proceed in like manner in laying Cork Carpet.

Sold by Dry Goods Stores, General Stores, House Furnishing and Furniture Stores, Departmental Stores.

Architects may specify our products without hesitation. They are made in Canada by Canadian workmen to meet every climatic and other requirement.



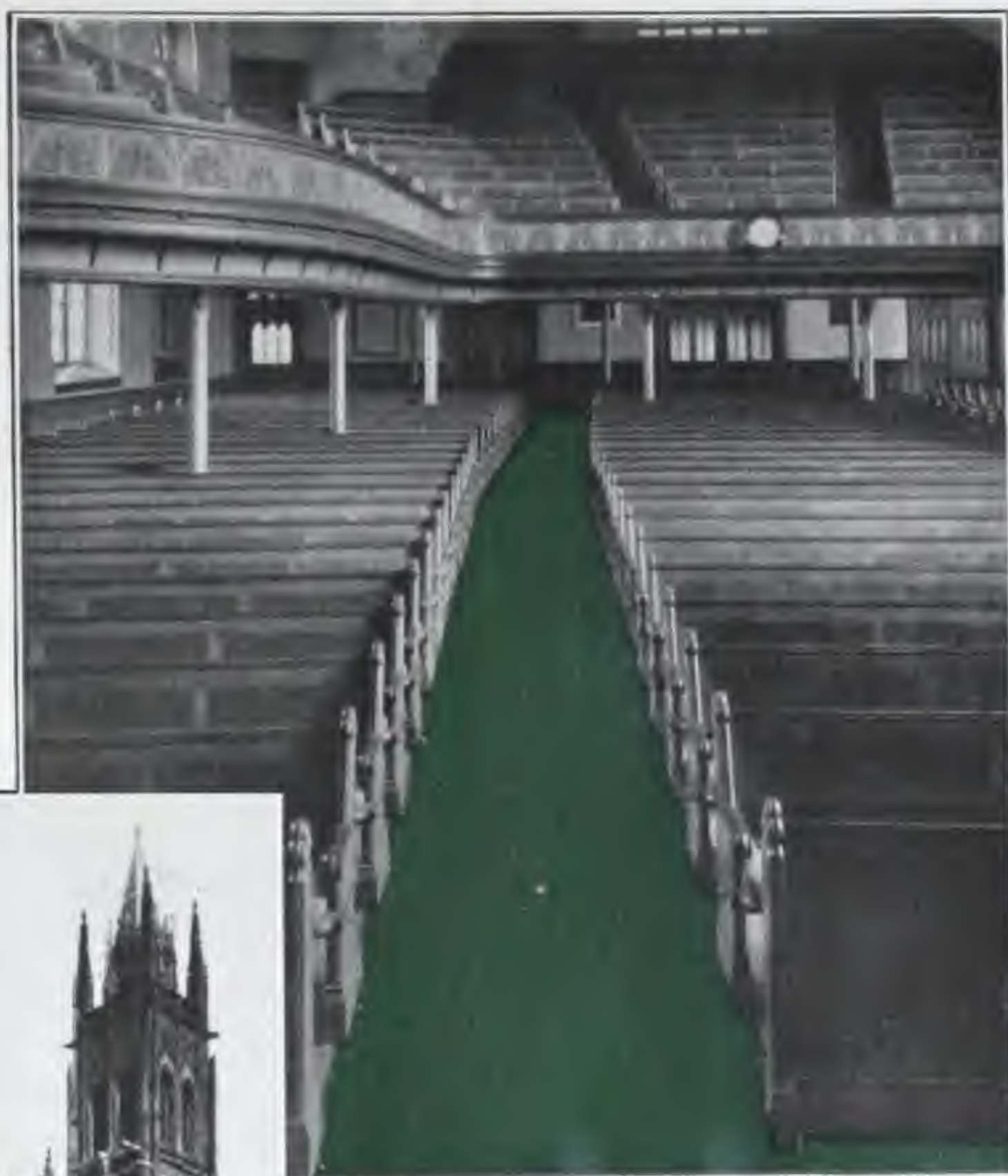
DOMINION OILCLOTH & LINOLEUM COMPANY, LIMITED

MONTREAL, CANADA.



Upper illustration shows Cork Carpet on the Aisles of St. James' Methodist Church, Montreal.

Lower illustration is a view of St. James' Church, one of the oldest and best known Methodist Houses of Worship in Canada.



CORK
CARPET.

Cork Carpet is one of our special products, being finely-ground cork, combined with oxidized linseed oil, imbedded in a base of selected burlap. As the name implies, it is soft and carpet-like, affording a cushion treading surface. For Churches, Halls, Sunday Schools, Conservatories, Museums, Private Libraries, etc., it is very desirable. Grade "A" is one quarter inch thick and Grade "B" three-sixteenths of an inch. Both are made in brown and green shades. Surface is non-slipping.

DECORATIVE
WALL
BURLAP.

Architects will find our Decorative Wall Burlaps ideal as wall coverings. Made of selected jute canvas and impregnated with germ-killing pigments, these products are particularly well suited for covering various walls. For use in public buildings, residences, stores, offices, halls, hotels, summer homes and elsewhere, they are ideal.

Decorative Wall Burlaps are made in three oil-coated shades—white, drab and green. Each shade forms a suitable ground over which any desired finish may be secured by painting. Either flat or gloss finishes readily available.

Lengths and Widths: Oil-coated Decorative Burlaps are supplied in widths of 30, 36, 45, 54, 72 and 90 inches, and in rolls 30 and 60 yards long. Where considerable quantities are wanted, special sizes will be supplied on request.

INSTRUCTIONS
FOR PREPARING
PASTE FOR
BURLAP.

On Plastered Walls: Use strong flour, four pounds to pail, and mix with lukewarm water. Add one ounce alum on top of batter, then boiling water to fill pail, stirring constantly to avoid lumps.

On Rough Walls: Use same formula, adding six to eight ounces white pulverized glue, dissolved, and a few tablespoons molasses. This will ensure permanent results.

SANITILE.

Sanitile is an oilcloth wall covering which fills the need for a sanitary finish, being specially adapted for use in bathrooms, dressing rooms, laundries, closets, kitchens, pantries, halls and other rooms. Made in attractive flat finishes in soft, pleasing tints, and suited to a wide variety of uses. Also made in glazed tile patterns. It is waterproof, durable, sanitary, attractive, inexpensive—easily cleaned with a damp cloth. Will not crack or tear and is hung same as wallpaper, using good paste. In applying, do not lap—butt seams. If sufficient quantities wanted, special shades made to order. About thirty-five shades to choose from.

SAMPLES MAILED ON REQUEST.

OTHER LINES
OF OUR
MANUFACTURE.

Plain and Printed Linoleums, Linoleum Rugs, Table and Enamelled Oilcloths, Floor and Stair Oilcloths, Shelf and Carriage Oilcloths, Floor Oilcloth Rugs, Passage Cloth, Feltol Floor Covering.

Sold by Dry Goods Stores, General Stores, House Furnishing and Furniture Stores, Departmental Stores.

Architects may specify our products without hesitation. They are made in Canada by Canadian workmen to meet every climatic and other requirement.

MANITOBA GYPSUM COMPANY LT'D.

MANUFACTURERS OF

"EMPIRE" WALL PLASTERS, "EMPIRE" HYDRATED LIME, "EMPIRE" WALL BOARD, ETC.

GENERAL OFFICE, SALES OFFICE, MILL AND PLANT:

WINNIPEG, MAN.

QUARRIES: GYPSUMVILLE, MAN.

PRODUCTS.

"EMPIRE" BRANDS OF WALL PLASTER:—"EMPIRE" WOOD FIBRE PLASTER, HARDWALL PLASTER No. 1, "GOLD DUST" FINISH (No. 2), "EMPIRE" FINISH PLASTER, "GILT EDGE" PLASTER OF PARIS, "ACOLITE" BOND (for concrete), "EMPIRE" HYDRATED LIME, "EMPIRE" WALL BOARD, "EMPIRE" KEENE'S CEMENT, "MEDUSA" WATERPROOFING, "EMPIRE" FIREPROOF TILE, "GYPSOLITE" WALL TINT.

SUPERIORITY OF GYPSUM WALL PLASTERS.

Wall Plaster manufactured from Gypsum, has entirely taken the place of all other Wall Plasters.

Gypsum Plasters are fireproof and practically indestructible.

Gypsum Plasters are easily worked and have good setting and maturing qualities, thus enabling the plasterer to cover more space in a given time than with any other plastering material.

TESTS.

All our products are thoroughly tested and are guaranteed to give good results—provided materials are used in accordance with our published specifications.

"EMPIRE" KEENE'S CEMENT.

"EMPIRE" Keene's Cement is fully equal to any of the imported Keene's; and is a particularly adaptable material for Base, Mouldings, Wainscoting, Castings, or where any work requires hardness, which can only be obtained by the use of high-grade Keene's Cement. Write for specifications.



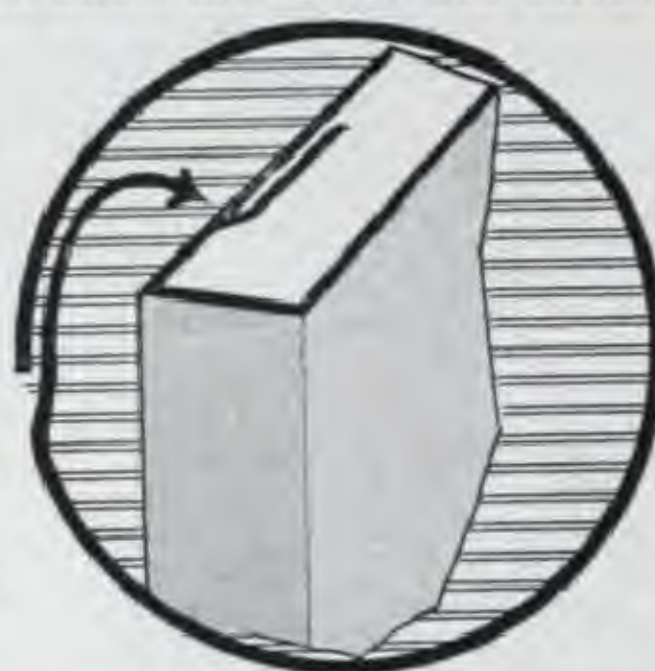
"EMPIRE" Wall Board is composed of Gypsum (Plaster of Paris) fibred with wood—rigidly compressed between two sheets of strong fibrous paper to a uniform thickness and a smooth surface.

"EMPIRE" Wall Board won't burn, warp, buckle, swell nor shrink.

"EMPIRE" Wall Board is sound proof, vermin proof and sanitary.

"EMPIRE" Wall Board is permanent and economical.

"EMPIRE" Wall Board is a non-conductor of heat and cold.



STANDARD SIZES.

"EMPIRE" Wall Board is made in the following Standard Sizes, which meet practically every building requirement:—

$\frac{5}{16}$ in. thick x 32 in. wide x 3, 4, 6, 8 and 10 ft. long.

$\frac{3}{8}$ in. thick x 48 in. wide x 4, 6, 8 and 10 ft. long.

THE TURNED EDGE IMPROVEMENT.

The reinforced, turned edge, as illustrated, is an exclusive feature of "EMPIRE" Wall Board. It provides an extra strong edge for nailing; and as all edges are true and of uniform thickness, tight flush joints are assured.

"EMPIRE" Wall Board takes any form of decorative treatment—Paint, Calcimine or Wall Paper, and can be panelled if desired. It can also be used as a base on which to plaster and for sheathing under siding or shingles. Write for our booklet giving advantages, uses and specifications.



USED AS A PANELLED WALL BOARD.



USED AS A BASE FOR HARDWALL OR WOOD FIBRE PLASTER.

"GYPSOLITE" WALL TINT.

"Gypsolite" is a Cold Water Paint or Calcimine. Write for Colour Card and Instructions for using.



"EMPIRE" Hydrated Lime is a product formed by the addition of quantities of water to known weights of freshly burned quicklime, the finished material being a flour-like powder of great fineness, covering capacity and tensile strength. It is all pure white lime.

"EMPIRE" Hydrated Lime should be specified for White Coat (plaster finish), Brick and Stone Work, Waterproofing Concrete—when used with "Medusa" Waterproofing, also for Whitewashing and other Sanitary Purposes. Write for Specifications and Instructions in regard to using "EMPIRE" Hydrated Lime.

"EMPIRE" FIREPROOF TILE.

"EMPIRE" Fireproof Tile is a Fireproof material composed of pure Gypsum Plaster, bonded with fibre and made into block form. It is used for fireproofing of structural steel, for wall furring, block tile, insulation from heat and cold and for sound deadening.

"EMPIRE" Fireproof Tile is light in weight, low in cost, high in quality, fireproof, sound-proof, an insulator, and quickly erected.

"EMPIRE" Fireproof Tile is an insulator of sound.

"EMPIRE" Fireproof Tile is absolutely straight and can be laid perfectly true and to a line.

"EMPIRE" Fireproof Tile is made from 2 to 6 inches in thickness.

Standard Sizes and weights of "EMPIRE" Fireproof Tile:—

2" x 12" x 30"	weighs	9¼ lbs. per sq. ft. solid.
2" x 12" x 30"	weighs	6¼ lbs. per sq. ft. furring.
3" x 12" x 30"	weighs	9¼ lbs. per sq. ft. hollow.
4" x 12" x 30"	weighs	12¼ lbs. per sq. ft. hollow.
5" x 12" x 30"	weighs	15 lbs. per sq. ft. hollow.
6" x 12" x 30"	weighs	16½ lbs. per sq. ft. hollow.



"EMPIRE" FIREPROOF TILE.



THE PEDLAR PEOPLE LIMITED

EXECUTIVE OFFICES, OSHAWA, CAN.

Factories: OSHAWA AND MONTREAL

ADDRESS NEAREST BRANCH.



QUEBEC,
263 St. Paul St.

MONTREAL,
26 Nazareth St.

OTTAWA,
Banque Nationale Bldg.

TORONTO,
473 College St.

HAMILTON,
Clyde Block,
King & Hughson Sts.

WINNIPEG,
80 Lombard St.

"PERFECT" EXPANDED METAL LATH.

"THE KEY IS THE THING."

Pedlar's "Perfect" Expanded Metal Lath has a neat, small mesh, which is formed by the natural bend of the strands in expanding the metal, overcoming any tendency to rupture the fabric. These strands furnish a superior bonding surface by allowing the mortar to completely embed the lath on both sides, the clinch bonding at the back.

"Perfect" Lath has been used on many prominent buildings erected in Canada in recent years. Furnished in 26, 24 and 23 gauge, painted or galvanized.

Size of sheets, 24 in. wide x 97 in. long (length charged for, 96 in.).

BUNDLES.—Number of sheets in a bundle, 9. Number of yards in a bundle, 16.



"PERFECT" EXPANDED METAL LATH.

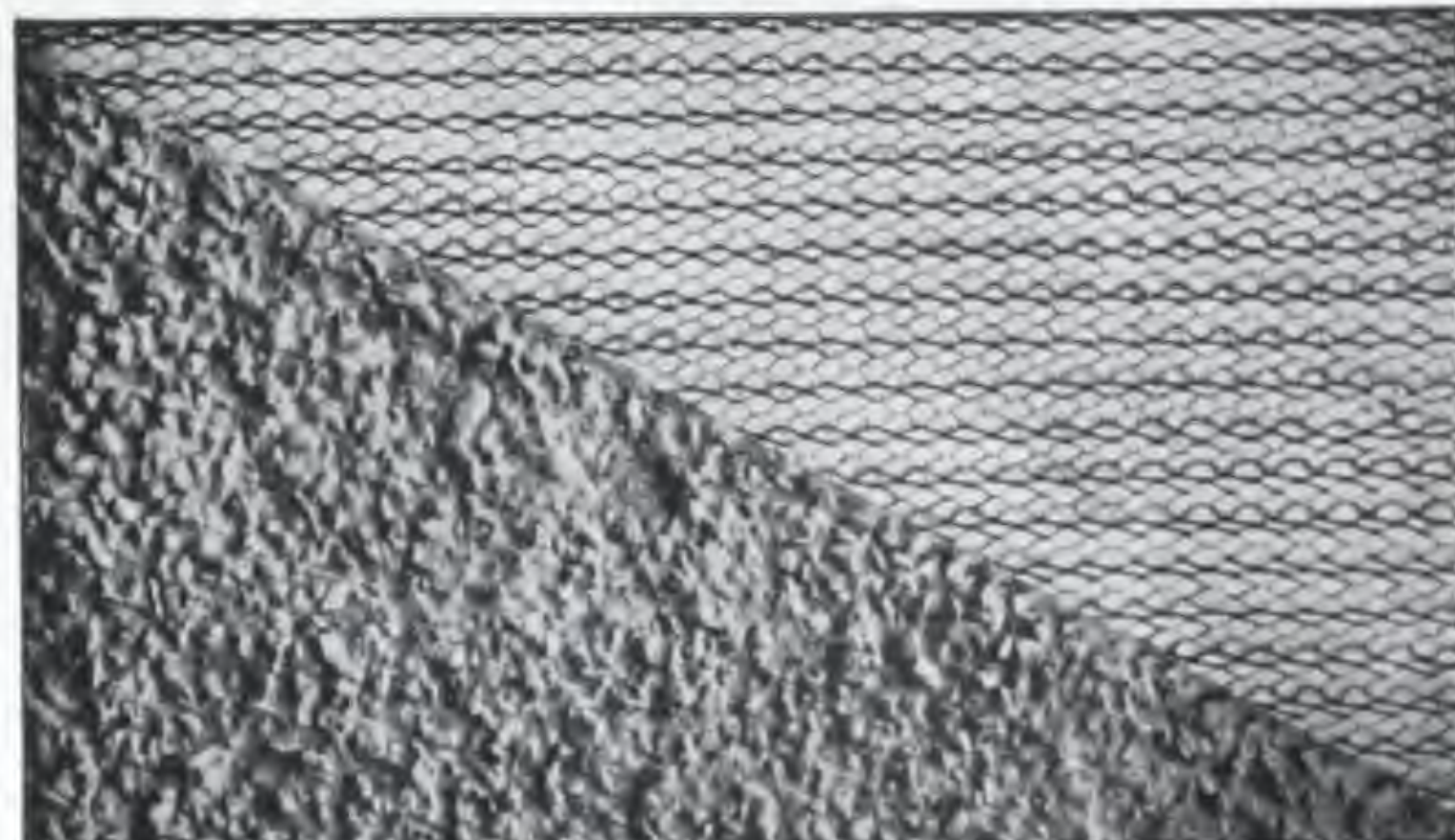
TRUSS FABRIC FOR STUCCO WORK.

Pedlar's "Perfect" Truss Fabric is the "Perfect" Metal Lath corrugated after being expanded. By corrugating the lath, an absolute key is secured behind the face of the fabric, and the slab becomes reinforced, rendering cracking of plaster and disintegration impossible; an incomparable medium for all stucco or roughcast work.

Standard sizes of sheets, 22 in. x 96 in.; furnished either painted or galvanized; applied with metal lath staples or our special flat-headed nails. Full directions for stucco work on application.



SECTIONAL VIEW.



TRUSS FABRIC PARTIALLY PLASTERED.

METAL CORNER BEADS.

"PERFECT,"
"SUPERIOR,"
AND
"IMPERIAL."

The efficiency of Pedlar's Metal Corner Bead, made in three styles as illustrated, as a builder and protector of all plastered corners and angles, its ready and easy adaptability to all conditions that may exist in a building which reduces its cost of application, its straight and rigid construction, which insures a perfect alignment of the corner, recommends its use for all buildings.

Made of galvanized stock, in lengths of 4, 5, 6, 7, 8, 9, and 10 feet. In three distinct sizes, adaptable to every requirement.

METAL LUMBER.

Pedlar's Metal Lumber is made of heavy gauge pressed steel, either painted or galvanized, designed to secure the maximum of strength with minimum weight.

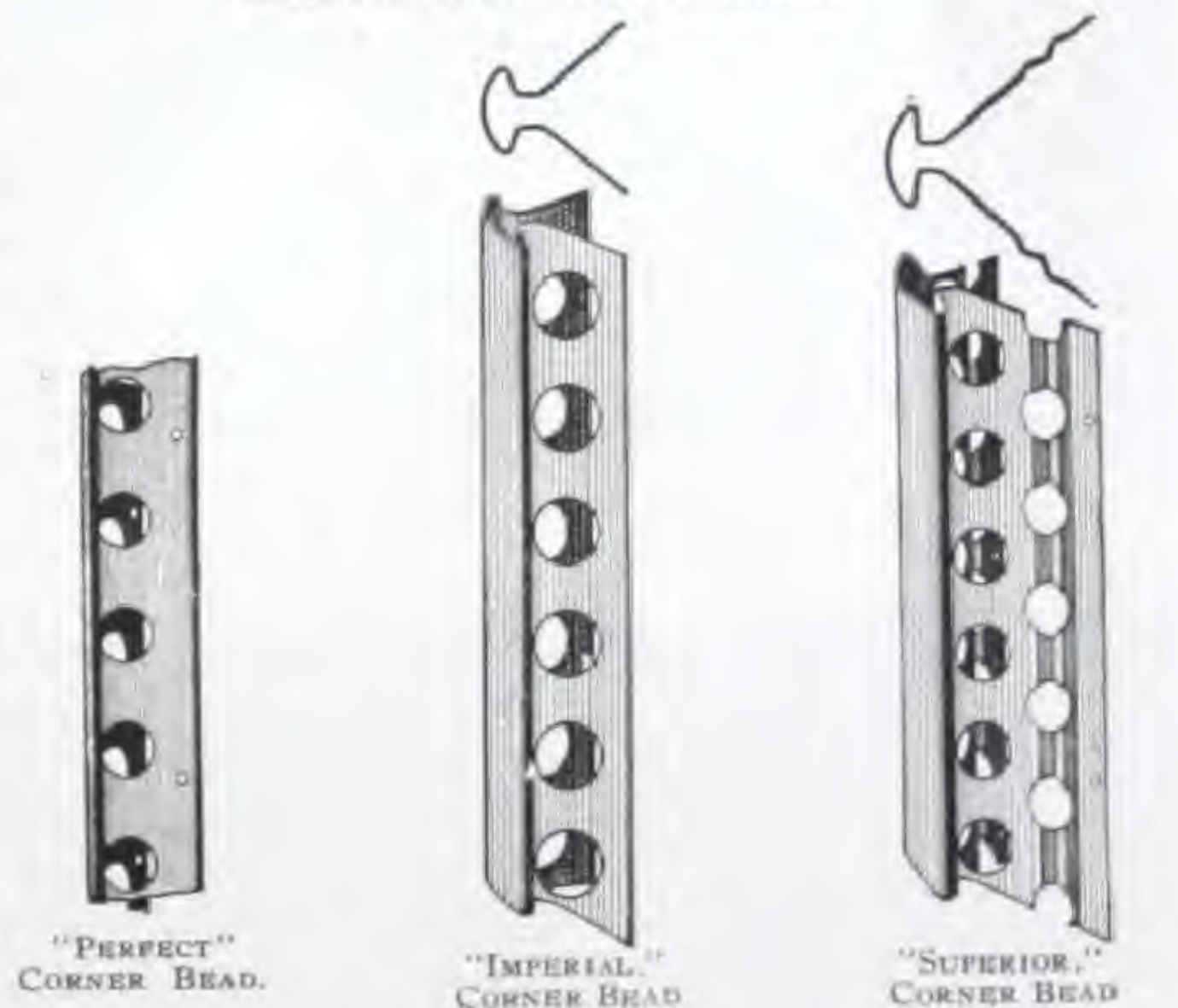
FURRINGS, CHANNELS, STUDS, Etc.

Pedlar's Metal Lumber is made in the form of Furring Strips, T and Channel Studs, Channels, Angles, etc. These, used in conjunction with "Perfect" Lath, Rib Fabric and Ferro Dovetail Plates, make a fireproof construction.

REED CONCRETE CLIP.

The Reed Concrete Clip is a scientifically constructed clip for wrapping Beams, Girders, Channels, Columns, etc., consisting of steel wire members running parallel to beams, etc., with rigidly welded clips at specified intervals.

Made in 4 and 5 foot lengths with clips at 6, 8, or 11½ inch centres—supplied with 1, 2, or 3 longitudinal members as required. Write for full particulars.



"PERFECT" CORNER BEAD.

"IMPERIAL" CORNER BEAD.

"SUPERIOR" CORNER BEAD.



SHEET STEEL CHANNEL STUD FOR HOLLOW PARTITION.



SHEET STEEL FURRING STRIP.



REED CONCRETE CLIP FOR BEAMS, ETC.

Write us for free Catalogues on these products. Also see our advertisements on pages 15-17 and 60.



YOU CAN'T EXPECT BEAVER BOARD RESULTS UNLESS THIS TRADE-MARK IS ON THE BACK OF THE BOARD YOU BUY.

THE BEAVER COMPANY, LTD.

MANUFACTURERS OF

BEAVER BOARD, BEAVER BLACKBOARD (BLACK AND GREEN) AND VULCANITE ASPHALT SHINGLES AND ROLL ROOFING.

ADMINISTRATION OFFICES:

THOROLD, ONT., CANADA.

BUFFALO, N.Y., U.S.A.

LONDON, ENGLAND.

TIMBER OPERATIONS AT FREDERICKHOUSE AND CHARLTON, ONT.

MILLS AND PLANTS AT THOROLD AND OTTAWA, ONT.

EASTERN SALES OFFICE:

THOROLD, ONT.

WESTERN SALES OFFICE:

WINNIPEG, MAN.

Distributors and Dealers Everywhere.

BEAVER BOARD.

The Beaver Company, Ltd., is the sole manufacturer of Beaver Board, for better walls and ceilings, and the world's largest producer of wood fibre wall-board. This company also produces Beaver Blackboard in black and green finish and Vulcanite Asphalt Shingles and Roll Roofings.

Beaver Board is actually re-created lumber built up from the shredded fibre of Northern Canada Spruce into large, sturdy, flawless panels three-sixteenths of an inch thick, 32 or 48 inches wide and from six to sixteen feet long. It weighs about one-half pound per square foot.

WHERE BEAVER BOARD IS USED.

Beaver Board builds better walls and ceilings in new homes and old, in stores, offices, factories, garages; in short, wherever crack-proof, jar-proof, trouble-proof and repair-free walls and ceilings are desirable. "Beaver Board and Its Uses" describes many of the good uses of Beaver Board. Send for a copy.

APPLICATION OF BEAVER BOARD.

In new frame construction Beaver Board is nailed directly to the studding and joists, headers being inserted where necessary to provide a nailing surface for all panel edges and back of all mouldings, top of baseboard, and behind plumbing, lighting and heating fixtures.

Brick or concrete walls must first be furred with strips of about 1" x 3" lumber. Over old plaster or matched lumber walls no preparation is necessary.

Panel centres should be nailed first, using three-penny finishing nails about fifteen inches apart. Then all four edges should be nailed with three-penny flathead nails about six inches apart and at least three-eighths of an inch in from the edge of the panel.

Immediately after nailing, the panels may be painted with any good interior flat or oil paint or calcimine. Decorative strips or mouldings over the panel intersections complete the job and the room is ready for immediate use.

"The Application and Decoration of Beaver Board" outlines the various steps of Beaver Board construction more fully than is possible here. A copy will be sent gratis on request.

BEAVER BLACKBOARD.

BLACK AND GREEN FINISH.

BEAVER BLACKBOARD.

Beaver Blackboards provide better writing surfaces for school rooms at reasonable cost. All processes in the manufacture of these boards are carried out within the Beaver Board organization, making it possible to give them a uniformity of color and quality that natural slate does not have.

The base of Beaver Blackboard is made of a special 5-ply Beaver Board which insures a large flawless slab that will not crack or disintegrate.

DURABLE WRITING SURFACE.

The writing surface is developed by a series of slating coats that have been worked out scientifically by the Beaver Board laboratories. In addition to the usual dull black surface, Beaver Blackboard may be obtained in a restful green color that relieves eye-strain and gives a pleasing touch of color to otherwise sombre walls.

SIZES AND WEIGHTS.

The boards come in standard blackboard widths of 3, 3½ and 4 feet, and even foot lengths from six to sixteen feet. Weight, crated, about one pound per square foot.

Write the Thorold office for samples of Beaver Blackboard in both colors and the name of your nearest distributor.



See also our advertisement on page 59.

EBSARY GYPSUM CO., LIMITED

AGENTS:

MONTREAL: H. K. FERGUSON.

HALIFAX: EDGAR COOMBS CO.

WINDSOR, ONT.:

CALDWELL SAND & GRAVEL CO.

OFFICE: 81 VICTORIA STREET, TORONTO, ONT. .

MILL: CALEDONIA, ONT.

GYPSUM BLOCK.

MADE IN CANADA.

EBSARY
GYPSUM
PARTITION
BLOCKS

EBSARY GYPSUM PARTITION BLOCKS are the best material for partitions, column covering, wall furring and vent flues. They are light in weight, fireproof, non-conductors of heat, cold and sound; economical to use and are APPROVED BY THE NATIONAL BOARD OF FIRE UNDERWRITERS. They are 2" to 8" thick, 12" wide and 30" long.

EBSARY
GYPSUM
ROOF BLOCKS

EBSARY GYPSUM ROOF BLOCKS are precast at the mill, and are kiln dried before shipping. They are 15" wide, 4" thick and in various lengths up to 7' 0" and are laid up on top of steel beams or purlins and all four joints filled with gypsum mortar. Each block is reinforced to carry the necessary roof loads. On account of their lightness in weight—about 20 lbs. per sq. ft.—and freedom from condensation they are the ideal material for the construction of roofs of industrial plants, power houses, theatres and garages.

EBSARY
GYPSUM
FLOOR FILLER
BLOCKS

EBSARY GYPSUM FLOOR FILLER BLOCKS are used in reinforced concrete floors as a filler between concrete beams. The advantages of this type of floor construction are that it is light in weight,—thus saving in structural steel; only a minimum amount of forms are required; it gives a flat ceiling, and only two coats of plaster are required. In freezing weather the block helps largely to protect the concrete from freezing when being placed. This type of floor is more sound proof than any floor now on the market.

INFORMATION

Full information and estimates will gladly be given to Architects, Engineers and Contractors.



PARTITION WITH BLOCKS GROUPED IN FRONT.



ROOF OF TEMPLE THEATRE, BRANTFORD, ONT.



FLOOR OF KING EDWARD HOTEL, TORONTO, ONT.

KEYSTONE FIREPROOFING CO. OF CANADA, LTD.

MONTREAL AGENT:
DOUGLAS-MILLIGAN, LIMITED,
NEW BIRKS BUILDING.

MARBRIDGE BUILDING,
NEW YORK, N.Y.

TORONTO AGENT:
JOHN LINDSAY,
250 RICHMOND ST. W.

PRODUCT.

METROPOLITAN SYSTEM of Fireproof Floor and Roof Construction.

For the past twenty-five years the METROPOLITAN SYSTEM has been installed and is giving entire satisfaction in all types of buildings, more especially in Office Buildings, Hotels, Hospitals, Apartments, Theatres, Churches and Industrial Plants.

ADVANTAGES.

The Metropolitan System of Fireproofing has many advantages, but the chief of these may be summed up as follows:

SAFETY AND STRENGTH—Steel Wire Cables support the entire load and the strength may be calculated with absolute accuracy.

ECONOMY OF FIRST COST—(a) Is the lightest type of fireproof floor and roof construction. (b) Owing to lightness of slab a smaller tonnage of steel is required. (c) Can be mixed and handled faster than concrete. The composition sets within 30 minutes after the slab is poured and the forms can be dropped within 60 minutes. Cold weather does not affect its installation.

DURABILITY—Gypsum, the principal ingredient of Metropolitan System, is recognized as the best preservative of metal work against corrosion of any material available for fireproofing purposes.

FIRE RESISTANCE—By numerous tests as well as actual fires it has convincingly demonstrated its superiority over other fireproofing methods and materials.

LOW MAINTENANCE—Owing to its elasticity the annoyance and expense of constant repairs are eliminated. The System remains intact under severest conditions.

NON-CONDUCTIVITY.

The Composition used in the METROPOLITAN SYSTEM consists principally of pure calcined gypsum, together with a percentage of wood chips. Calcined gypsum is generally recognized as the most effective fireproofing material that is known commercially. It develops the highest degree of fire resistance and non-conductivity ever obtained in any material used for this purpose.

The wood chips give to the composition a degree of toughness and elasticity far greater than found in any other fireproofing material. The quantity being small, they are completely insulated by the greater mass of gypsum in which they are embedded and in no way detract from the fire-resistance of the composition.

Gypsum has a far greater insulating value than clay or cement tile, stone or cinder concrete. The co-efficient of expansion of METROPOLITAN COMPOSITION is practically zero.

A series of interesting tests recently conducted by Professor C. L. Norton of the Massachusetts Institute of Technology prove conclusively the superiority of METROPOLITAN COMPOSITION as a non-conductor over all other fireproofing materials on the market. A copy of Professor Norton's report will be mailed free upon request.

ABSENCE OF CONDENSATION.

Condensation troubles can be traced directly to materials possessing an inadequate insulating value. Differences between interior and exterior temperatures cause moisture to collect, with consequent annoyance and damage.

The high insulating value of METROPOLITAN COMPOSITION insures against condensation. Striking proof on this point is furnished by the experience of a large power company in Canada.

Prior to their first experience with the METROPOLITAN SYSTEM, they had found it necessary to install a hung ceiling about six feet below the concrete roofs on their turbine stations. This air space prevented condensation.

During 1914 they installed the METROPOLITAN SYSTEM on their newest and largest turbine station, without the hung ceiling. With a temperature under the slab exceeding 100°, combined with outside temperatures running as low as 30° below zero, they advise that there has not been the slightest trace of condensation on the under side of the METROPOLITAN Slab.

ABSENCE OF CONDENSATION AND NON-CONDUCTIVITY PARTICULARLY ADAPTABLE TO PAPER AND SILK MILLS.

GUARANTEED CONSTRUCTION.

The METROPOLITAN SYSTEM is installed only by our own Construction Department. By scientific training and organization of our field forces we are able to install same for the absolute minimum cost. To this policy we attribute the fact that no Metropolitan Floor or Roof has ever failed in a test or an actual fire.

We guarantee every square foot of the Metropolitan System which we install against any defects in materials, workmanship or design and against failure from any cause, under the conditions for which it was designed.

This company regards each contract that it executes as a sale of service as well as material and workmanship.

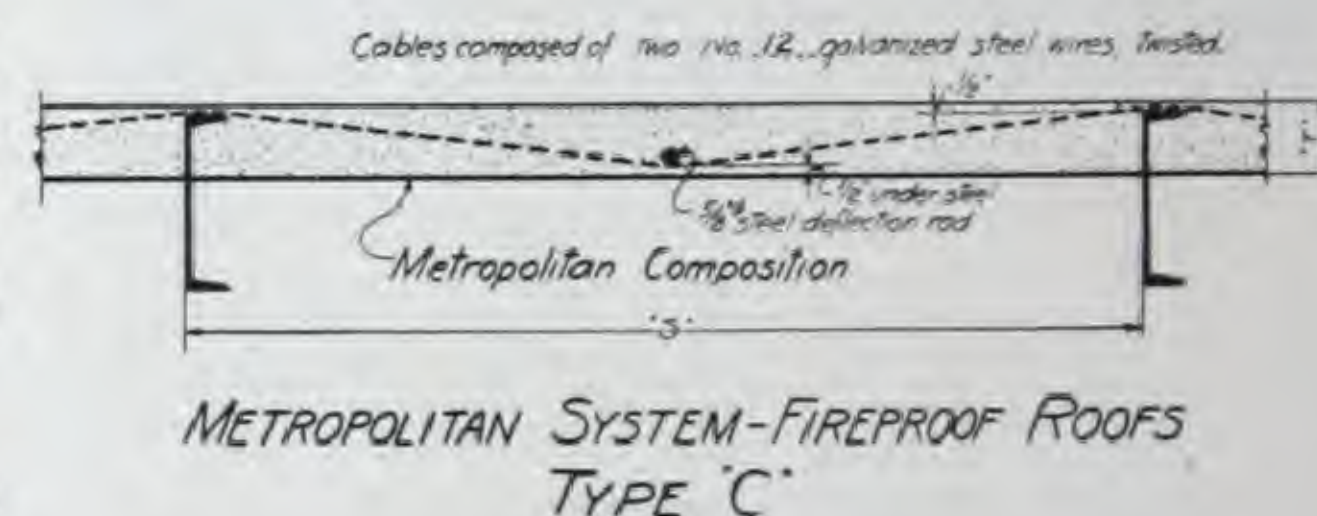
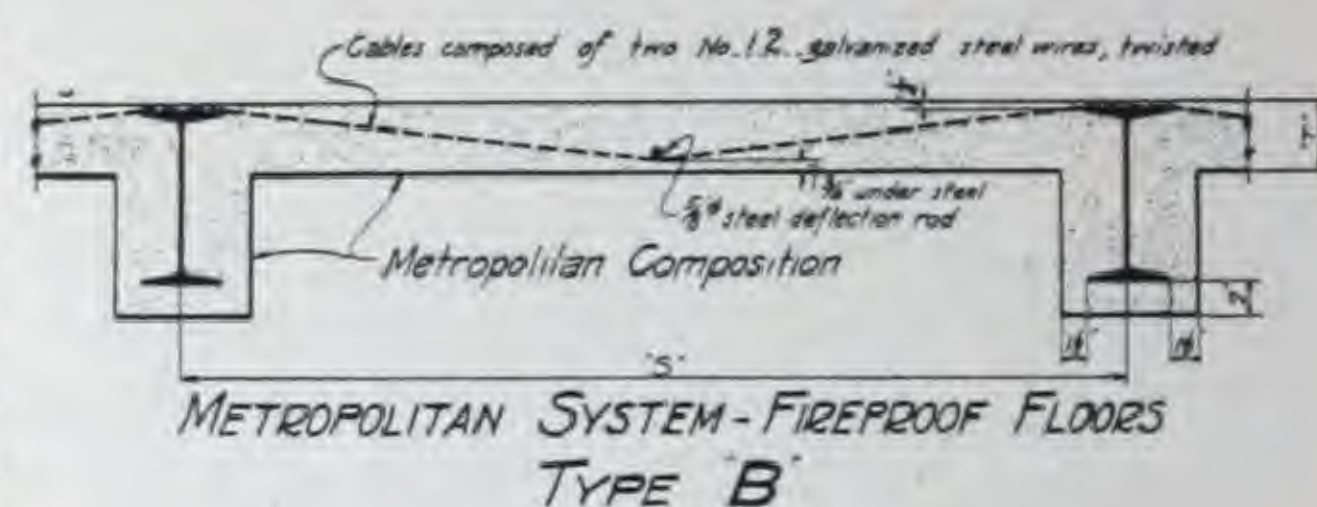
INSTALLATIONS.

For one large Industrial Plant we have made no fewer than 24 installations, representing over 1,600,000 square feet. In others we have made as many as 12 and 15 installations.

The following are a few of our many Canadian installations:

Main Building, Brown's Copper & Brass Rolling Mills, Toronto.
Gurney Foundry Co., Ltd., Toronto. Witchall & Sons, Gen. Cont.
Technical School, Toronto. Norcross Bros. Co., Gen. Cont.
Theatre, Toronto. Jos. T. Turner, Architect.
Pantages Theatre, Toronto. Jackson-Lewis Co., Ltd., Gen. Cont.
Motor & Axle Buildings, General Motors, Ltd., Walkerville, Ont.
Royal Bank of Canada, London, Ont. Purdy & Henderson, Gen. Cont.
Machine Shop Extension, Montreal Locomotive Works, Montreal.

Foundry, Montreal Locomotive Works, Montreal.
Crane Runway Building, Steel Co. of Canada, Montreal.
Office Bldg., Can. Vickers, Ltd., Montreal. E. G. M. Cape, Gen. Cont.
Longueuil School, Montreal. Guertin & Bouchard, Gen. Cont.
Bell Telephone Co. Addition, Montreal. Anglin's, Ltd., Gen. Cont.
Wayagamack Pulp & Paper Co., Three Rivers, Que.
T. Pringle & Sons, Gen. Cont.
Machine Room, Abitibi Paper & Pulp Co., Iroquois Falls, Ont.



THE ONTARIO GYPSUM CO., LIMITED

HEAD OFFICE AT
PARIS, ONTARIO.

FACTORY AND MINES AT
CALEDONIA, ONTARIO.

BRANCH OFFICE: 34 VICTORIA STREET, TORONTO.

PRODUCTS.

HARDWALL PLASTER (hair fibred and wood fibred), CONCRETE PLASTER, PREPARED FINISH, PLASTER OF PARIS, HYDRATED LIME, KEENE'S CEMENT, GYPSUM BLOCK, GYPSUM BOARD and GYPROC WALL BOARD.

HARDWALL
PLASTER
"PARISTONE"
"BEAVER"
"THISTLE."
HARDWALL
PLASTER
"PULPSTONE."

These brands are hair fibred gypsum plasters made to be mixed with sand at the job. They have replaced lime mortar for brown and scratch coat plastering almost entirely wherever introduced. They set in two or three hours, with many times the density and hardness of lime mortar, and inside of thirty-six hours the walls are dry. There is no waiting for weeks for the plaster to dry, and months, perhaps years, for it to attain its full strength.

Pulpstone is a wood fibred gypsum plaster. It requires no addition of lime, sand, hair or other materials. It is ready for use by adding enough water to make it spread easily under the trowel. It makes a plaster of a peculiar toughness, sets in a few hours hard and solid and at the same time elastic.

Good work can be done with one coat, and the surface can be either trowelled down smooth for papering or tinting or floated to resemble the ordinary stucco or sand finish. This can be done at once, or as soon as the material has begun to set and it is only necessary to erect the scaffolding once.

Hardwall Finish (unfibred) in two coat work is used with a small quantity of sand (not over equal parts). It may be applied in the usual way over a scratch coat or applied in two coats in one job, the finish following as soon as the first coat hardens.

It has the advantage over fibred Hardwall Plaster of not showing the fibre in the finished surface. Pulpstone (fibred or unfibred) is especially recommended for plastering on Gypsum Board.

Bondstone is a gypsum plaster especially recommended for plastering all interior surfaces of concrete or masonry. It adheres strongly to concrete and overcomes all the objections of common mortar for this purpose.

Strong, cool working plasters that make a good finish. They are largely used throughout Ontario, being cheaper than other white plasters and practical for all kinds of work.

CONCRETE
PLASTER
"BONDSTONE."

PLASTER OF
PARIS
"STANDARD
WHITE" AND
"CROWN WHITE."

PLASTER OF
PARIS "SHIELD
BRAND."

HYDRATED
LIME
"ALABASTER."

A gray plaster that is different from the best plaster only in color. It makes a gray finish that is preferred by many, and is much cheaper.

Alabaster Hydrated Lime is a white dolomitic or high magnesium lime of the greatest purity and strength, which has been slaked or hydrated at the kilns by adding to the freshly burned lime just the right amount of water. It does not air slake or lose strength with age, does not pit, pop or blister, and eliminates the cost of slaking, aging and waste. It comes in convenient, uniform 50-lb. paper bags making handling easy and proportioning exact.

MORTAR AND FINISH.—Alabaster Hydrated Lime is perfectly suitable for plastering, bricklaying and masonry. It has many advantages over lump or stone lime, especially for white coat plastering.

WATERPROOFING AND LUBRICATING CONCRETE.—5 to 15% of Alabaster Hydrated Lime, the amount varying as the sand is fine or coarse, added to the Portland Cement in concrete provides a most practical and effective waterproofing. It lubricates the mass, prevents the separation of the aggregate, makes it flow freely out of barrows or chutes, eliminates spading of forms, and the formation of stone pockets or honeycombing, reduces the quantity of water necessary for right consistency of mix and thereby increases the strength, producing water-tight concrete and perfect finished surfaces.

STUCCO.—Alabaster Hydrated Lime should be used for all stucco work. For exterior Stucco in the proportions of one part of Hydrated Lime, two parts Portland Cement, five parts sand.

It is well to soak the lime 12 to 24 hours and use it in the putty form for this and all work.

A fire resisting, sound proof, vermin proof, permanent lathing material, made of a layer of gypsum between two layers of porous paper. It forms a perfect plastering surface for gypsum plaster, eliminates buckling, warping, cracking, checking, lath marks and stains. Can also be used instead of wood sheathing and acts as a fire stop, insulator and sound deadener in roofs, floors and walls. It is the only fireproof board for finishing attics, basements and storerooms. When treated with tar or asphalt it makes a cheap and fireproof roofing of good wearing quality.

Size 32 x 36 x $\frac{3}{8}$ ". Weight 2 lbs. per sq. ft. Nails: We supply special nails required, $1\frac{1}{4}$ " x 11 ga., 7-16" head.

SPECIFICATIONS
FOR C. P.
GYPSUM BOARD.

Grounds $\frac{7}{8}$ "; lathing $\frac{3}{8}$ " C.P. Gypsum Board, spacing Boards $\frac{3}{8}$ " to $\frac{1}{2}$ " apart on all joints which do not come on studs or joists. Joints on studs or joists either butted or open. Bearings on studs or joists $\frac{3}{4}$ " nailed with nails supplied by us 4" apart. Joints broken at right angles with wall studs and at right angles with ceiling joists.

GYPROC
WALL
BOARD.

GYPROC WALL BOARD.—A large, strong sheet of Pure Gypsum, moulded and compressed between two layers of specially prepared paper. Gyproc forms a permanent wall without plaster. Will not warp, shrink, crack or buckle and is fireproof. Sizes 32" and 36" wide by 4, 5, 6, 7, 8, 9, 10 ft. lengths. We supply nails required.



APPLYING GYPROC WALL BOARD

STINSON-REEB BUILDERS' SUPPLY COMPANY, LIMITED

9TH FLOOR READ BLDG.,
MONTREAL.

DEALERS IN GENERAL BUILDING MATERIALS.

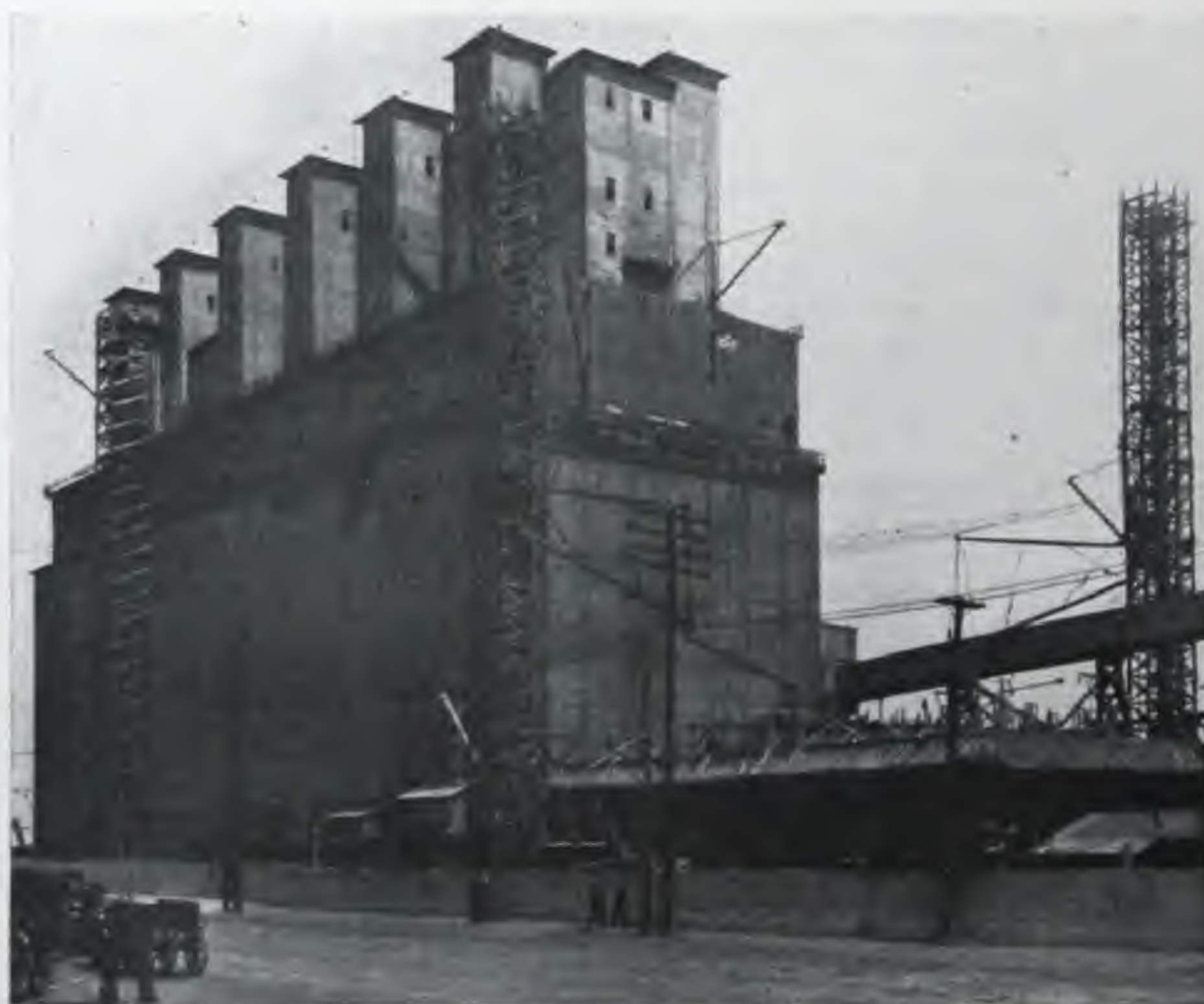
PRODUCTS.

We manufacture: MEDUSA WATERPROOFING COMPOUND.
"FLAWLESS" WALL PLASTERS.
CAEN STONE CEMENT.
POZZO STUCCO.
CRUSHED MARBLE.

REPRESENT-
ING.

We are representatives for:

AMERICAN ENAMEL BRICK & TILE Co.,	Enamel Brick and Tile.
BRANTFORD ROOFING Co. LIMITED,	Prepared Roofing and Paints.
METROPOLITAN PAVING BRICK Co.,	Paving Blocks.
NAILCRETE CORPORATION,	Fireproof Nailing Compound.
SOUTH AMBOY TERRA-COTTA Co.,	Ornamental Terra-Cotta.
SANDUSKY CEMENT Co.,	Medusa White Cement.
SONNEBORN SONS INC.,	Floor Hardeners, etc.
SPECIAL SERVICE FLOORING CORP.,	Mastic Floors.
WILSON CORPORATION, J. G.,	Steel Doors and Diffuselite Blinds.
KNAPP BROTHERS,	Plasterers' Metal Specialties.



30,000 LBS. MEDUSA WATERPROOFING USED IN
No. 2 ELEVATOR, MONTREAL HARBOR COMMISSIONERS.
MESSRS JOHN S. METCALFE CO., LIMITED, ENGINEERS AND CONTRACTORS.

PRATT & LAMBERT-Inc.

VARNISH MAKERS, BRIDGEBURG, ONTARIO. OFFICE AND FACTORY, 32 COURTWRIGHT STREET.

FOREIGN FACTORIES:

NEW YORK

BUFFALO

CHICAGO

PRODUCTS.

"61" FLOOR VARNISH, the "Hammer Test" Floor Varnish.
 "61" FLOOR VARNISH, Dull Finish.
 "38" PRESERVATIVE VARNISH, for the highest grade of inside work.
 "110" CABINET VARNISH, for general inside work.
 SPAR FINISHING VARNISH, for exposed or exterior work.
 ALCOLAC, a first coater for close-grained woods.
 IMPERMALIN, an absolutely waterproof varnish for interior or exterior work.
 HYGIENIC GLOSS FINISH, for hospitals, schools and institutions.
 DULKOTE, a preservative varnish which dries with a dull finish without rubbing.
 OIL AND ACID STAINS, in a variety of colours to produce every practical effect known to the finishing trade.
 PASTE FILLERS of every colour.
 VITRALITE, the Long-Life Enamel, for inside and outside work, in White and Tints.
 VITRALITE EGGSHELL, an eggshell enamel for a semi-gloss enamel finish without rubbing.
 VITRALITE ENAMEL UNDERCOATING, for the second and third undercoats of enamel work.
 VITRALITE CEMENT COATING, as a coating by itself or as undercoating for enamel on cement, brick, etc.
 LYT-ALL, a better industrial wall coating.

WHY THESE SPECIFICATIONS ARE OF VALUE.

The service which any suggested specifications can render the architect depends to a great extent upon the experience back of such recommendations.

On the subject of interior finishing, PRATT & LAMBERT-INC. occupy a position of unique importance and advantage. They were the first to enter the field of special architectural finishes, and the P & L Line has never been equalled for the beauty and variety of effects possible, or the durability of the finish.

SAMPLE PANELS AND SPECIFICATION BOOK SENT ON REQUEST.

We shall be glad to send you panels showing effects obtainable with Pratt & Lambert Stains, Fillers, and Varnishes, also copy of our Specification Book, compiled especially for Architects.

OVER SEVENTY YEARS' EXPERIENCE AT YOUR DISPOSAL.

The following specifications, of course, can give only in a general way the best methods to follow and the possible effects in the different kinds of finishing. Whenever, therefore, you desire any particular advice, information or suggestions, do not hesitate to ask us.

SPECIFICATIONS.

EXTERIOR WORK—

Open-Grained Woods—

One coat of Paste Filler of desired colour.
 One coat of "61" Floor Varnish.
 Two coats of Spar Finishing Varnish.

Close-Grained Woods—

One coat of Pratt & Lambert Oil Stain of the desired shade, if stained finish is desired. If not, stain is not required.
 One coat of "61" Floor Varnish.
 Two coats of Spar Finishing Varnish.

FINE INTERIOR WORK—NATURAL—

Open-Grained Woods—

One coat of Paste Filler.
 Three coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Close-Grained Woods—

One coat of Alcolac.
 Two coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

REGULAR RUN OF INTERIOR WORK—NATURAL—

Open-Grained Woods—

One coat of Paste Filler.
 Two coats of "110" Cabinet Varnish, rubbed dull or left in gloss.

Close-Grained Woods—

One coat of Alcolac.
 Two coats of "110" Cabinet Varnish, rubbed dull or left in gloss.

ONE-TONE COLOUR EFFECTS—

Close-Grained Woods—

One coat of Acid or Oil Stain.
 Over Acid Stain, one coat of pure shellac. Over Oil Stain, one coat of Alcolac.
 Two coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

Open-Grained Woods—

One coat of Paste Filler of the required shade. If desired depth of colour cannot be obtained with the coloured paste filler, a coat of Acid Stain should be applied before the filler, followed when dry with a coat of Paste Filler of the same colour.
 Over Acid Stain and Paste Filler, one coat of pure shellac, two coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.
 Over Paste Filler only, three coats of "38" Preservative Varnish, left in gloss, rubbed dull or polished.

TWO-TONE COLOUR EFFECTS—

One coat of Acid Stain.

One coat of Shellac.

One coat of Paste Filler, of a different colour than was the acid stain.

One coat of Shellac.

Two coats of Palest Interior Varnish or "38" Preservative Varnish, left in gloss, rubbed dull or polished.

NOTE.—Two-Tone Effects can be procured on open-grained woods, such as oak, etc., only, and are produced by the combination of acid stains and a white or tinted paste filler of a different colour.

TWO-TONE COLOUR EFFECTS—Continued.

Example: For instance, the Pratt & Lambert Wood Finish Effect No. 7220 is a combination of a dark brown, English Oak Acid Stain and Special Green Paste Filler. A thin coat of white shellac is applied over the acid stain, which is applied first. After this, green filler is applied. This coat of shellac allows the filler to "take" only in the porous parts of the wood, and the result is a beautiful combination of the brown and green.

DULL FINISH WITHOUT RUBBING—

Use the foregoing suggestions for specifications; substituting, however, one coat of Dulkote in every case where "38" Preservative Varnish, Palest Interior Varnish or "110" Cabinet Varnish is specified, and omit rubbing.

ENAMEL WORK—

Interior—Wood—

One coat of lead and oil.
 Two coats of Vitralite Enamel Undercoating.
 Two coats of Vitralite Enamel, left in the gloss or rubbed.

Exterior Woodwork—

Use lead and oil instead of Vitralite Enamel Undercoating.

Eggshell or Dull Finish, Without Rubbing—

One coat of lead and oil.
 Two coats of Vitralite Enamel Undercoating.
 One or two coats of Eggshell Vitralite Enamel.

INTERIOR AND EXTERIOR BRICK, CONCRETE AND STUCCO—

One or two coats of Vitralite Cement Coating, the first coat reduced 20% with turpentine.
 One or two coats of Vitralite Enamel (Gloss).

INTERIOR PLASTER—

One bond coat, consisting of one part Vitralite Enamel Undercoating, one part raw linseed oil and one part turpentine.
 One or two coats Vitralite Enamel Undercoating.
 One or two coats Vitralite Enamel (Gloss or Eggshell).

FLOORS—

Oak and All Open-Grained Woods—

One coat of Paste Filler.
 Two or three coats of "61" Floor Varnish.

Maple, Pine and All Close-Grained Woods—

Two or three coats of "61" Floor Varnish.

NOTE.—For Dull Finish apply one coat "61" Floor Varnish, Dull Finish, over two coats "61" Clear Gloss.

INDUSTRIAL WALL WORK—INTERIOR—

Wood, Plaster, Cement, Concrete and Brick Surfaces—

One coat of Lyt-all Flat.
 One coat of Lyt-all Gloss, Eggshell or Flat, as desired.

NOTE.—On very porous surfaces it may be necessary at times to apply an additional coat of Lyt-all Flat. On new concrete and cement surfaces it is advisable to apply a first coat consisting of 4 parts Vitralite Cement Coating and 1 part turpentine to hold back and keep down any excess alkali existing in the cement or concrete.

Old White Painted Surfaces—

One coat Lyt-all Gloss, Eggshell or Flat, as desired.

Old Discoloured or Dark Painted Surfaces—

One coat of Lyt-all Flat.

One coat of Lyt-all Gloss, Eggshell or Flat as desired.

INTERNATIONAL VARNISH CO., LIMITED

MONTREAL.

HALIFAX.

TORONTO.

WINNIPEG.

VANCOUVER.

MANUFACTURERS OF

VARNISHES, STAINS, ENAMELS, PAINT, WHITE LEAD AND PUTTY.

A FULLY GUARANTEED PRODUCT TO SUIT EVERY FINISHING NEED.

It is impossible in the space at our disposal to give full working specifications covering all of our products; in fact, it would require a book the size of this one to do this properly.

What we want to do is to put before the architect, contractor, and painter a list of our principal architectural finishes with a few general remarks regarding their use. Then if a detailed specification is required for a particular finish, an inquiry addressed to our Service Department will elicit the fullest specifications and instructions for obtaining the finish desired.

Just a word as to this Architectural Service Department: This department is under the direct charge of an expert whose whole life has been spent in this kind of work. He is ably assisted by several others who are themselves experienced finishers. The department is constantly working out new ideas as to finishes and the methods of obtaining them, and the mass of research work conducted therein is enormous. All this expert knowledge and assistance is at your service in the way of preparing special samples, giving specifications for the use of our materials, or advice as to the feasibility of this or that finish to meet certain conditions.



FOR ALL
EXTERIOR
WORK.

For finishing front doors and all woodwork exposed to the weather, where greatest durability is requisite. Dries free from dust in eight to ten hours. Hardens sufficiently in about five days to permit of being rubbed. Possesses the maximum elasticity attainable in any varnish. Produces a beautiful lustre over natural, painted or grained woods, and may be rubbed with pumice-stone and water to a dull finish. ELASTICA No. 1 excels all other finishes or varnishes on the market for use on steamships, yachts, boats, canoes, spars, etc., effectually resisting the action of both fresh and salt water. Does not mar, scratch white nor spot. Resists atmospheric influences better than any other varnish, is water-proof and unaffected by hot or cold water.



FOR FINEST
INTERIOR WORK.

Extreme paleness and durability are distinguishing features of this varnish. It works with surprising freedom, covers the maximum surface area, and produces a brilliant, permanent gloss finish. Dries free from dust in four to six hours. May be rubbed to a dull finish in from three to four days.

Especially recommended and intended for finishing finest woodwork in palatial residences, apartments, bank, office and hotel buildings.



Combines quick and hard drying properties without sacrificing elasticity or durability in any degree, and protects floors under severest wear and frequent washing. Does not mar, scratch white nor spot. Works easily, dries dust free in four to six hours, hardens over night and can be rubbed. On grained, painted or old floors, linoleum or oil cloth, one coat is sufficient. Remove all grease and dirt from floors before applying. Reduce with turpentine when necessary. Do not apply Elastica Floor Finish over Shellacs, Liquid Fillers or patent "First Coaters."



Flat Varnish
FOR A RUBBED
EFFECT.

For use as a final coat where a rubbed effect is desired, without the labour and cost of rubbing. Is used over natural or stained woods, and produces a finish closely resembling a gloss varnish, rubbed. Particularly recommended for use over mahogany or mahogany stained woods, as it does not cloud same. "Kleartone" Flat Varnish applied as a final coat over "Elastica" No. 2 will produce an exceptionally good finish.

"Kleartone" Flat Varnish is unaffected by water, and, unlike most flat varnishes, does not contain wax or pigment. It does not need stirring and is exceptionally tough and elastic.



These Fillers are recommended for the filling of woodwork and flooring in public and private buildings, where open grain woods are used. They are made in a wide variety of shades, of the best and most adaptable raw materials, by experts in this line.

"Kleartone" Paste Wood Fillers will not shrink, and the finish applied over them will not "pit." They produce a perfect foundation for the succeeding coats of varnish.



Cabinet Finish

Is the one satisfactory pigment flat varnish. It dries hard over night, contains no wax, surfaces well, and produces an even "flat" or Mission Finish without rubbing.

"Flatline" Cabinet Finish has proved a very popular finish and is highly recommended.

For use where a Dead Flat or Mission effect is desired.

This product is a Pigment Varnish and must be thoroughly agitated before applying; the pigment will settle and care must be used to see that this varnish is properly agitated until the container is empty.

KLEARTONE Stains

"Kleartone" Oil Stains are labour-saving stains, requiring only one brushing operation. They penetrate as deeply as acid stains, but, unlike acid stains, do not require that the wood be sponged first or sandpapered after staining.

The shades are: Light Mahogany, Dark Mahogany, Extra Dark Mahogany, Brown Mahogany, Cherry, Walnut, Olive Green, Sage Green, Dark Forest Green, Light Brown, Dark Brown, Flemish Oak, Early English, Circassian Walnut, Dark Fumed, Light Fumed, Bog Oak, Dark Oak, Light Oak, Pollard Oak, English Oak, Golden Oak, Weathered Oak.

"Kleartone" Acid Stains are used to produce certain stained effects which are only obtainable with an acid stain. They are the most perfect of their kind, the colours being absolutely fast, and not injurious to the woods or succeeding finishing coats. The shades are: Silver Gray, Light Fumed Oak, Dark Fumed Oak, Light Mahogany, Dark Mahogany, Extra Dark Mahogany.

NOTE.—Do not use shellacs over Kleartone Stains. For permanent effects our Kleartone Sealers or Coaters must be used over our stains to secure the effects of our finished samples.

Any special shades can be matched, if sample be furnished for our guidance.

KLEARTONE Sealers

LIGHT AND
DARK.

"Kleartone" Sealers are prepared especially for use in conjunction with "Kleartone" Stains and insure correct results, clearness of tone and uniform lasting colour. They are of the proper consistency and should be used just as they come from the can. Do not sandpaper.

"KLEARTONE" SEALER (LIGHT).

"Kleartone" Sealer (Light) should be used over the following shades of "Kleartone" Stain:

Olive Green.	Flemish Oak.	English Oak.
Sage Green.	Early English.	Weathered Oak.
Dark Forest Green.	Bog Oak.	Circassian Walnut.
Light Fumed.	Pollard Oak.	Hague Oak.
Dark Fumed.		

"KLEARTONE" SEALER (DARK).

"Kleartone" Sealer (Dark) should be used over the following shades of "Kleartone" Stain:

Light Oak.	Dark Oak.	Golden Oak.
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KLEARTONE Coaters

"Kleartone" Mahogany Coater should be used over the following "Kleartone" Stains: Cherry, Mahogany, Walnut, Light and Dark Brown.

It is a thin alcohol coater, which enriches the colour of the stain and *positively prevents fading*. By the use of the above-mentioned stains and "Kleartone" Mahogany Coater, an effect is produced that is matchless and permanent.

"Kleartone" Silver Gray Coater is a thin, gray, spirit coater, which is especially intended for use over our "Kleartone" Silver Gray Acid Stain. It prevents the yellowness of the wood from showing through. It works easily, dries quickly, and can be sandpapered in a few hours.

Satinette Enamel

Is the immaculate finish of refinement, time tested and approved since 1834. It works freely under the brush, is quick drying, does not settle nor harden in the can, and will not skin; it is unequalled for obtaining a perfect enamel finish.

A surface finished with "Satinette" Enamel can be repeatedly washed, without injury to the finish.

We are the sole Canadian Licensees of Pinchin, Johnson & Co., of London, England. Established 1834.

WHITE (GLOSS)—FOR EXTERIOR OR INTERIOR WORK.

Intended for use as final coats over a foundation surface prepared with "Satinette" Undercoat or "Satinette" Cement Undercoat. It will not turn yellow.

"Satinette" Enamel White (Gloss) produces a perfect gloss finish, which may be rubbed with pumice-stone and water to produce a semi-gloss finish.

WHITE (FLAT)—FOR INTERIOR WORK.

Produces a durable and smooth flat white enamel finish. Works freely under the brush, hardens quickly, and does not turn yellow.

It is intended for use as final coats over a foundation surface properly prepared with "Satinette" Undercoat or "Satinette" Cement Undercoat.

Satinette Undercoat

Is used for the foundation coats on work to be finished with "Satinette" White Enamel. Its covering capacity is remarkable, and it flows out with surprising freedom, producing a satin-like surface, which requires only light sandpapering.

It dries quickly, hard and tough, and does not show brush marks. "Satinette" Undercoat is much superior to white lead in oil, as it will not affect the succeeding enamel coats. The success of an enamel finish depends upon the preparation of the foundation surface.

Satinette Cement Undercoat

This material is a scientifically prepared product, solely for the purpose of preparing a suitable foundation on Cement, Concrete, Stucco, Keene's Cement, Plaster, Brick or Stone, upon which to apply "Satinette" Enamel, an enamel finish being so desirable on these surfaces in Hotels, Public Buildings, Hospitals and similar structures, both from the economical and sanitary standpoints.

"Satinette" Cement Undercoat is the result of exhaustive laboratory research, weather tests, and practical experience. It has a neutralizing effect and resists chemical action.

It has splendid working qualities and covering capacity. A gallon covers approximately 300 square feet, depending upon the porosity of the surface.

CANADIAN AGENCIES:
 MONTREAL—SEYMOUR & Co.,
 13 St. Nicholas Building.
 TORONTO—THE ANDREW MUIRHEAD Co.
 OTTAWA—McDOUGAL'S LIMITED.
 HALIFAX—FRANK A. GILLIS Co.
 QUEBEC—G. I. LACHANCE.
 VANCOUVER—HENRY DARLING.

SAMUEL CABOT, INC.
MANUFACTURING CHEMISTS,
BOSTON, MASS., U.S.A.

CANADIAN AGENCIES:
 WINNIPEG—BRAID & McCURDY.
 SASKATOON—SASKATCHEWAN
 SUPPLY & FUEL Co.
 CALGARY & EDMONTON—For Sheathing
 and Deadening Quilt only:
 GORMAN, CLANCEY & GRINDLEY, LIMITED.
 CALGARY—For Shingle Stains only:
 McDONALD-BAKER Co.

PRODUCTS.

Inventors and sole manufacturers of CABOT'S "CREOSOTE" SHINGLE STAINS, SHEATHING AND DEADENING "QUILT," "CONSERVO" WOOD PRESERVATIVE, WATERPROOF BRICK AND CEMENT STAINS, DAMP-PROOFINGS, PROTECTIVE PAINT, ETC.

**CABOT'S
 "CREOSOTE"
 SHINGLE
 STAINS.**

The Cabot Stains are the original Creosote Stains invented by Samuel Cabot over thirty-five years ago, and the beauty and variety of their soft, artistic colouring effects has made the wide vogue of the shingled house possible. They have been used all over the world, and are acknowledged to be "the standard shingle stains."

They are beautiful, durable, preservative and economical, and are the only genuine Creosote Wood-preserving Stains.

**APPLICATION
 OF SHINGLE
 STAINS.**

The Stains are sold ready for use, and no thinning or adulteration should be permitted. The shingles can be dipped before laying, or the Stain can be applied with a brush after laying. Dipping more thoroughly preserves the shingles and prevents unstained wood from showing, if the shingles shrink after laying. Brush coating takes less stain but more labour. The colouring effect is about the same in either case. If applied with a brush, two coats should always be used, because one coat is not a thorough job in any material. After dipping, a brush coat on the laid shingles is worth while, as it takes but little stain, covers any raw spots, and adds to the durability.

STIRRING.—The Stains should be kept thoroughly stirred, and should be applied to dry wood to insure uniform and durable results.

**COVERING
 CAPACITY.**

One gallon to 100 sq. ft., two brush coats; $2\frac{1}{2}$ to $2\frac{3}{4}$ wine gallons to 1,000 shingles dipped two-thirds; 3 gallons for dipping and afterwards brush coating.

**SPECIFICATION
 FOR SHINGLE
 STAINS.**

Specify "Cabot's 'Creosote' Shingle Stains, in original packages bearing Cabot's trade mark. Colour to be selected by architect or owner." State whether shingles are to be dipped or brush coated, or both.

SAMPLES.

Samples on shingle cedar, showing all the regular colours, will be sent on request.

**CABOT'S
 OLD VIRGINIA
 WHITE.**

Gives a clean, brilliant "whitewash white" effect that has real distinction. A softer but brighter white than paint, and essentially different, having no "painty" look. As handsome as new whitewash and as lasting as paint.

**WATERPROOF
 STUCCO
 STAINS.**

Transparent Stains that delicately colour stucco and concrete without hiding the texture. Will not crack or peel, and rainproof. One gallon covers 100 to 250 square feet, two coats. All shades.

**WATERPROOF
 BRICK STAINS**

For colouring and waterproofing brickwork these Stains are vastly superior to paint, from either the artistic or practical standpoint. For evening up off-coloured and mis-matched brick, or restoring the colour of old, faded and discoloured walls, they are unequalled.

**CABOT'S
 DAMP-
 PROOFING.**

A permanent waterproof and adhesive coating for interior brick and concrete walls on which plaster can be laid directly without furring or lathing. It forms a perfect bond between wall and plaster. Also for stone, brick or concrete walls, above or below grade. Prevents staining of delicate stone. Elastic and permanent. One gallon covers 80 to 100 square feet, two coats.

**CABOT'S
 CLEAR
 WATER-
 PROOFINGS.**

Transparent waterproofings which penetrate into the pores of Brick or Cement and make the surfaces thoroughly and permanently rainproof. Applied with a brush to any brick or cement wall.

CABOT'S
SHEATHING
AND
DEADENING
"QUILT."

PURPOSES.—For heat insulation in dwellings, cold stores, ice houses and all buildings where uniform temperature is desired, and for deadening sound in school houses, flats, hotels, hospitals, lodges, etc.

"QUILT" is a scientific non-conductor of both heat and sound. It consists of a matting of *cured eel-grass* (*Zostera Marina*) stitched between two layers of remarkably strong Kraft paper. The long ribbon-like fibres of eel-grass cross each other at every angle, and form within each layer of "Quilt" innumerable minute cells of "dead" air, making a soft, elastic cushion which is a wonderfully effective non-conductor. It is therefore not a mere felt or paper, but has a structure like a bird's plumage, that is, first a layer of matter, then a layer of dead air. These dead-air cells prevent the transmission of heat, and they break up and absorb sound-waves. One layer of "Quilt" is equal to more than forty of the cheap building papers.

DECAY AND
VERMIN-
PROOF.

UNIN-
FLAMMABLE.

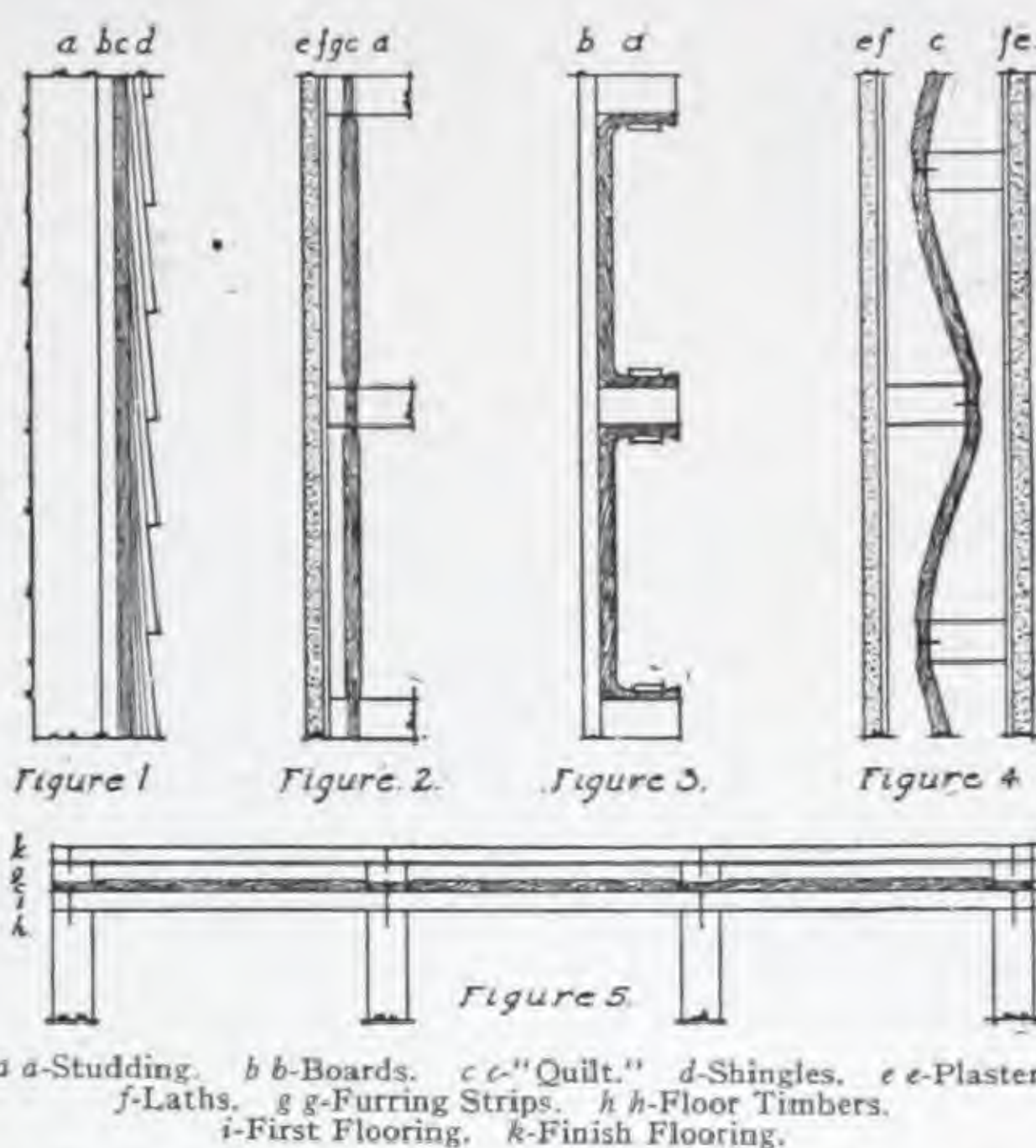
WHY EEL-GRASS?—"Quilt" is made of eel-grass because that substance more perfectly meets the requirements than any other known. (1) It has a long, flat fibre, and when felted, as we use it, these ribbons form the successive air-spaces which give "Quilt" its chief power, and which would be impossible with a round fibre; (2) Eel-grass is indestructible by decay,* and because of its saline origin and percentage of Iodine is repellent to insects and vermin; (3) It will not burn, as it is composed of Silicon in place of the Carbon of plants that grow in the air, and is therefore an efficient fire-retardant; (4) It is very tough and never loses its elasticity.



OLD PIERCE HOUSE, DORCHESTER, MASS.

Built about 1635.

*The walls of the old Pierce House, Dorchester, Mass., were stuffed with eel-grass when the house was built, about 1635, and the grass is still in a perfect state of preservation. We have a sample of this 285-year-old eel-grass in our office, as here shown.



Figs. 1 and 3 show methods of heat insulation in dwellings, etc. Figs. 2, 4 and 5 show methods of sound deadening in floors and partitions. Cold storage drawings on request.



*Specimen taken from the
Pierce House, Dorchester, Mass.
The house was built about 1635 and the eel-
grass was still in a perfect state of preservation.
See Francis Pierce
Oct. 20, 1905*

FAC-SIMILE OF LABEL ON BOTTLE SHOWN ABOVE.



HOUSE
INSULATION.



The above three houses stand side by side in Duluth, Minn. The largest one is insulated with Cabot's Quilt, and the two smaller ones with other products. One of the smaller houses used 42% more coal than the largest house, and the other used 70% more—proving the efficiency and economy of Cabot's Quilt.

"It is cheaper to build warm houses than to heat cold ones," and Cabot's Quilt will pay for itself in two winters in saving fuel, and will keep a house warm and comfortable for all time.

Cabot's Quilt costs one-fifth as much as cork and equals it in efficiency, is more durable and a better fire resistant.

COLD
STORAGE
INSULATION.

LOWE BROTHERS, LIMITED

STRUCTURAL IRON PAINT,

263-269 SORAUREN AVENUE,
TORONTO, ONT.

DISTRIBUTORS: MACKENZIE BROS., LIMITED, WINNIPEG, MAN.

"At one time paintmaking was an art, then it became a trick, now it is a science."

GENERAL.

Each architect is interested in securing for the steel fabric or other metal work under his supervision the best coating possible for present and future results. To prepare such a paint requires knowledge, experience and willingness to put money into the products. The Principals of Lowe Brothers, Limited, have had sixty years of experience. Its experts have kept themselves abreast of the most advanced knowledge and experience in manufacturing requirements and the performance of preservative and protective coatings for all materials of modern building.

DESIRABLE
FEATURES OF AN
ANTI-CORROSIVE
METAL COATING.

1. It should hide the surface.
2. Should cement itself together, and also cement itself to either damp or dry metallic surfaces.
3. Should expand and contract without breaking its own body.
4. Should present a hard, yet tough, outer surface.
5. Should be impervious to water, carbonic acid, or other gases.
6. Should be unaffected by sunshine, heat, frost, dew or climatic changes.
7. Should be unaffected by ordinary mechanical abrasion.
8. Should wear evenly.
9. Should fail by gradual wear, not by disintegration.
10. Should leave a good surface for repainting.
11. Should not require an unreasonable amount of skill or muscle in application.
12. Should be homogeneous.
13. Should dry fast enough.
14. Should not be readily ignited.
15. Should have power to absorb and remove moisture or dampness from the metal.
16. Should have properties that will prevent corrosive action of traces of water in contact with the metal.

(Quoted from "Paints for Steel Structures," by Mr. Houston Lowe. Published by John Wiley & Sons, New York.)

"Paintmaking has been rescued from the domain of empiricism and has become an exact science. One skilled in it can now practice it with a certainty of results, in an exact proportion to his knowledge of its principles, and to his ability in applying them to work in hand."

RED LEAD
LUTE.

Red Lead Lute is designed upon the theory that undercoats should dry more quickly and harder than those above them; that the difference in drying between adjoining coats should not be very great; that priming coats should be of a preservative nature, and that finishing or topping paints should be of a protective nature—that is, the priming coat should prevent oxidation of the metal, and the finishing coats should protect the preservative or foundation coating from the action of rainfall, sunshine, or special exterior conditions.

Iron and steel do not rust in dry air or in water free from air and carbon dioxide; but these conditions never obtain in practice.

Several applications of paint, known as coats, are usually necessary to secure a solid appearance, and to form a layer of sufficient thickness to keep moisture away from the metal and to protect it from rust for a certain time. The first or priming coat upon any surface in fit condition to receive paint is of the greatest importance, especially as to its drying, hardening and binding properties.

METALCOTE.

Metalcote is black in colour. The pigment portion has been compounded from materials recognized as the best for a preservative and protective coating. Manufacturers do not all agree as to what pigments are best for a coating of this kind, but a recent five-year test of all the various pigments entering into the manufacture of a paint for metal surfaces, and of paints containing various proportions of some of these pigments, proved that Lowe Brothers Metalcote contained the correct proportions of the proper pigments, as the paint, after five years' wear, received the highest rating given to any paint, regardless of its class.

The easy working properties of Metalcote are remarkable when we consider the fact that it dries in a short time with firm yet elastic coating.

SPECIFICATIONS.

SHOP COAT.—Before assembling, each surface, together with all bored holes, rivet heads and bolts, shall receive a coating of Lowe Brothers Red Lead Lute. After assembling, the steel shall be cleaned, and it shall then be given a coating of Lowe Brothers Red Lead Lute, and all small openings that will retain moisture shall be filled up with Lowe Brothers Red Lead Lute.

HANDLING AND TRANSPORTATION.—The metal shall be housed and cared for until the Inspector decides that the paint applied, as specified under previous sections, is sufficiently dry to be in fit condition for transportation. It is understood that at no time after the first coating of paint has been applied shall the metal be laid upon the bare ground, but that it shall be placed upon skids or trestles. In the transportation of this metal, the parts shall be so loaded and handled that the paint will not be subject to unnecessary abrasion.

FIRST FIELD COAT.—After erection, the metal shall be inspected; and if rusty spots are found, these shall be cleaned and reprimed with Lowe Brothers Red Lead Lute; the exposed edges and angles must then be painted with the same paint, at least an inch from the edge on each side, and the under and inner sides of girders, bolt heads, nuts, rivets, etc., shall have an extra coat to prevent the incursion of water; when this is dry, the entire surface shall receive a final coat of Red Lead Lute.

FINAL COATS.—The work shall be finished with one or more coats of Lowe Brothers Metalcote.

PUBLICATIONS.

Which will be mailed on request.

"High Standard" Paint Specifications (a book of forms).

"Protective and Preservative Paint."

"Test by Technologists."

Colour Cards of all Products, giving details of the best methods of usage.

"Paints for Steel Structures," by Houston Lowe (Published by John Wiley & Sons, New York City).



LOWE BROTHERS, LIMITED

PAINT MAKERS, VARNISH MAKERS,

263-269 SORAUREN AVENUE,
TORONTO, ONT.



DISTRIBUTORS: MACKENZIE BROS., LIMITED, WINNIPEG, MAN.

MELLOTONE.

"Soft as the
Rainbow Tints."

A flat finish for Interior Decoration of walls, ceilings and woodwork, producing a sanitary, washable velvet finish that is restful to the eye and appealing to a refined taste. Plaster, Burlap and Wall Board should be primed with Lowe Brothers' Sealcote mixed with "Mellotone" in the proportion of three quarts of Sealcote to one or more quarts of "Mellotone." Woodwork should be primed with one coat of "High Standard" Liquid Paint thinned with turpentine and used according to directions then allowed at least forty-eight hours to dry and harden before applying "Mellotone."

When desired, the finishing coat can be frescoed, picked out in gold, embellished in relief or otherwise. Mellotone is made in the following colors:

	IVORY TINT 695		LIGHT TAN 619
	CREAM TINT 612		GOLDEN YELLOW 696
	ROSE TINT 610		DARK TAN 620
	BLUE TINT 611		BROWN 618
	GRAY TINT 661		DARK GRAY 662
	GREEN TINT 613		NEUTRAL GREEN 614
	OLIVE GREEN 615		CRIMSON 617
	DARK GREEN 616		DELFT BLUE 621

Also WHITE 622

Also BLACK 623

PUBLICATIONS.

"High Standard Paint Specifications" (a book of forms)—"Hints to Architects"—"Paint and Painting"—"Protective and Preservative Paint"—"Test by Technologists"—"Architects' Mellotone Combinations," and "Common Sense About Interiors," also color cards of each product, giving details of the best methods of usage. These may be secured without charge upon request.

SPECIAL PORTFOLIO.—"The House, Outside and Inside," containing eighteen beautiful color plates with complete description for obtaining similar effects, and booklet "Homes Attractive."

THE DOUGALL VARNISH COMPANY, LIMITED

305 MANUFACTURERS STREET,
MONTREAL, CANADA.ASSOCIATED WITH
MURPHY VARNISH COMPANY,
U.S.A.

PRODUCTS.

Our TRANSPARENT FINISHES are the finest, most beautiful, most durable Architectural Varnishes that were ever used. They cost less by the job than varnishes which cost but half as much by the gallon, and they last several times as long.

DOUGALL
TRANSPARENT
INTERIOR VARNISH.

For use upon Interior finish of natural wood or over grained or painted surfaces. It is also recommended for use on Walls and Ceilings of Asylums, Hospitals, etc.

DOUGALL
TRANSPARENT
FLOOR VARNISH.

For use on Wood Floors of every description, especially where the use is severe. Will not show white marks from hard wear.

DOUGALL
TRANSPARENT
SPAR VARNISH.

For use upon Exterior work where the exposure to the elements is constant and severe, such as Front Doors, Vestibules, Window Casings, etc. It is an absolute anti-damp and a preventive against dry rot or moisture.

DOUGALL NOGLOSS
INTERIOR VARNISH.

When dry, shows no lustre whatever. Is almost invisible, but develops clearly the grain pattern. May be used alone with the proper number of coats, or as a final coat over any of the varnishes named for Interior Decoration; saving the labour of rubbing when a lustreless finish is desired. Dougall Nogloss Interior should never be used on Exterior work.

DOUGALL VELVET
FLOOR VARNISH.

For final coats only over Transparent Floor Varnish when a semi-gloss finish is desired. Has the effect of wax without the slipperiness, and requires no rubbing.

DOUGALL
UNIVERSAL VARNISH.

One varnish for all uses. For use on anything that needs varnishing. Extremely durable and elastic. Will not turn white in water. Resists alcohol, ammonia, acids, etc. Dries to recoat in from 24 to 36 hours; to rub in 3 days. Supplied in clear and six transparent wood colours. Fine for Floors, and all Interior work, Furniture, and Outside work generally.

DOUGALL
WHITE ENAMEL.

A very durable enamel of the finest quality. It dries hard, so that it can be used indoors, yet is elastic, so that it will wear wonderfully outdoors. It can be tinted, of course. On straight flat work two coats are enough over undercoating; if there are sharp corners, use three coats.

Colour: Pure White. Dries dust free in 16 hours. Dries to recoat in 36 to 48 hours. Dries to rub in 4 to 6 days.

DOUGALL
SEMI-GLOSS
ENAMEL.

Similar to Dougall White Enamel, except that it dries with a beautiful semi-gloss effect. To be used as a final coat over Dougall White Enamel, where a semi-gloss finish is desired without the expense of rubbing.

DOUGALL ENAMEL
UNDERCOATING.

Dense covering, flat drying. More suitable than lead and oil for this work. Makes a hard but not brittle surface. Two coats should be used on clean, smooth woodwork; three on dark surfaces or corners.

Colour: White. Dries dust free in 3 to 6 hours. Dries to recoat in 24 to 30 hours. Dries to sand in 24 to 36 hours.

KONKRETO.
(MADE IN THREE SHADES,
LIGHT AND DARK GREY
AND RED.)

A composition for the sanitary treatment of concrete or cement floors, walls and ceilings. It gives them a smooth and moisture-proof surface; prevents their wearing dusty and getting mouldy; makes them as easy to clean as tiling.

One gallon of each will cover from 500 to 650 square feet of surface, according to the porous nature of the concrete.

DOUGALL
BLANCHITE WALL
COATING (GLOSS AND
FLAT WHITE).

Blanchite Wall Coatings are very solid covering—one coat covers fine over any dirty plastered wall—two coats give a beautiful job over brick or wooden walls of any colour. Blanchite Wall Coatings are a beautiful clean white, as pretty as anyone could wish for, and they stay white. They can be tinted to any shade desired.

EDUCATIONAL
BOOKLETS.

We will be glad to send you descriptive booklets further describing our lines, on application.

BERRY BROTHERS, INCORPORATED

WORLD'S LARGEST VARNISH MAKERS,

WALKERVILLE, ONTARIO.

TORONTO OFFICE, 34 VICTORIA STREET.

LIQUID GRANITE.

THE VARNISH FOR FLOORS.—This is the most durable floor varnish made, combining the three principal requisites of a perfect floor finish—elasticity, durability and appearance. As a floor varnish it has never been equalled and there is more Liquid Granite in use to-day than any other floor varnish.

Specify as follows: Two coats of Liquid Granite applied over one coat of Berry Brothers' Paste Filler on open-grained woods; on close-grained woods omit the filler. Never use shellac or liquid fillers on floors that are to be varnished. If an under coat is wanted use Berry Brothers' Elastic First Coater.

LUXEBERRY
WOOD FINISH
LIGHT.

FOR GENERAL INTERIOR TRIM.—This is an Interior Varnish of the highest quality, and should be used in all specifications where the finest gloss or rubbed finish is required. It is full bodied, flows perfectly and dries with a full rich and durable finish. It is strongly recommended for all kinds of interior wood work, for offices, public buildings, hotels, or wherever the highest class of work is desired. It should be rubbed with pumice stone and water for a flat finish, and with pumice stone and oil if a soft velvety finish is desired (known as an egg-shell gloss).

Specify as follows: On open grain woods, one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S.D.C. White Shellac, and three coats of Berry Brothers' Luxeberry Wood Finish Light. On close grain woods omit the filler.

ELASTIC
INTERIOR
FINISH.

FOR INTERIOR TRIM SUBJECTED TO SEVERE USAGE.—Intended for interior work subjected to severe exposure or usage. It possesses great elasticity and durability, and will resist the action of hot water, soap, etc., to a greater degree than any other varnish.

Specify as follows: On open-grained woods, one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S.D.C. Shellac, and two coats of Elastic Interior. On close-grained woods omit the filler.

LUXEBERRY
SPAR VARNISH.

FOR FRONT DOORS, STORE FRONTS AND SUCH EXTERIOR WORK AS IS SUBJECTED TO SEVERE EXPOSURE AND CHANGING WEATHER CONDITIONS.—This material is the standard of quality in a spar varnish, and has a reputation nearly sixty years old. This varnish is made especially for use on all types of marine architecture wherever a durable and lasting finish is desired. It can be used as both an exterior and interior varnish, as it is made to withstand severe wind, weather and water exposure and does not turn white.

Specify as follows: Two coats of Luxeberry Spar Varnish, over one coat of Berry Brothers' Paste Wood Filler on open-grained woods. Omit the filler on close-grained woods. Last coat can be rubbed if desired.

BERRY
BROTHERS'
CEMENT
COATING.

Berry Brothers' Cement Coating is a sanitary preservative coating for all cement and concrete surfaces, excluding dirt and preventing chipping and the formation of dust caused by friction; makes a hard glossy finish and can be rubbed if desired.

We make Cement Coating in colours and transparent, and solicit inquiries from any one interested in a handsome, healthful and economical finish on cement and concrete surfaces.

BERRY
BROTHERS'
FLOOR WAX.

FOR INTERIOR WAX FINISH.—A new combination of hard waxes, especially adapted for finishing purposes. Easy to apply. Makes a hard finish. Will not soften after applying.

Directions for Use.—Open-grained woods like Oak, Chestnut, Ash, etc., should be first filled with Berry Brothers' Paste Filler.

Allow the Filler at least 24 hours to harden and then apply a coat of floor wax with a rag. Let it remain a few minutes, then use a long-handled weighted floor brush to bring up the finish.

It is well to rub the floor with the grain and then across the grain to get the best results.

A final rubbing with a soft dry cloth improves the finish.

In waxing old worn floors that have been finished with varnish or shellac, clean the surface well with turpentine and then use the wax as directed above, omitting the filler coat unless the floor is badly worn in places.

Close-grained woods like Maple, Pine, etc., do not need filling.

DULGLOSS.

FOR INTERIOR TRIM WORK WHERE A FLAT VARNISH IS DESIRABLE.—This material produces in one coat an imitation rubbed effect over shellaced or varnished surfaces. It is light in colour, flows freely under the brush, dries dust-free in about an hour and hardens in twelve hours with a soft velvety finish.

Specify as follows: For imitation waxed effect—one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S.D.C. Shellac and one coat of Dulgloss.

For imitation rubbed effect—one coat of Berry Brothers' Stain, one coat of Berry Brothers' Paste Wood Filler, one coat of Berry Brothers' S.D.C. Shellac, two coats of Luxeberry Wood Finish and one coat of Dulgloss.

On close-grained woods omit the filler.

LUXEBERRY
WHITE ENAMEL.

FOR BATHROOMS AND BEDROOMS.—This enamel is especially designed for the practical finisher and decorator. It possesses full body, flows very freely and dries without showing brush marks. It will rub perfectly in three to four days, and can be polished on the fifth day to a piano finish. It can be used on the finest interior or furniture work. It is pure white in colour and stays white.

Note.—We can also furnish ivory, cream, light gray, pearl gray, and French gray tints when desired. If an egg-shell gloss or imitation rubbed effect is desired, we will furnish it at the same price as the high gloss goods.

LUXEBERRY
WHITE
PRIMER.

Especially designed for use under Luxeberry White Enamel. It is much better than a zinc coat, and holds up the Enamel coat perfectly.

Specify as follows: Apply one coat of pure white lead reduced with equal parts of linseed oil and turpentine to a brushing consistency. Follow with two coats of Luxeberry White Primer and two coats of Luxeberry White Enamel, each coat to be allowed to thoroughly harden and to be lightly sanded with oo sandpaper before the succeeding coat is applied. If an egg-shell gloss is desired the final coat should be rubbed with pulverized pumice stone and water.

SHINGLETINT.

FOR HALF-TIMBERED WORK OR SHINGLE STAIN SPECIFY "SHINGLETINT."—"Shingletint" represents the highest results yet attained in the manufacture of shingle stains. It possesses great penetrative and preservative qualities, being a scientific combination of colours finely ground in pure linseed oil, creosote oils and the necessary drying agents. It prolongs the life of the shingles by retarding decay, at the same time imparting a very artistic finish.

FACTS WORTH
REMEMBERING.

All open-grained woods such as Oak, Ash, Chestnut, etc., should be filled with Berry Brothers' Paste Filler to match the colour of the wood or to match the colour of the stain if the wood is stained.

Close-grained woods such as Pine, Maple, Gumwood, etc., need no filling, but a first coat of Berry Brothers' S.D.C. Shellac is desirable and is especially so on Pine. The shellac coat should be applied directly to the wood and then finished in the natural colour and should follow the staining when the wood is stained.

The use of liquid fillers is not desirable for high grade work and should never be used on floors.

SPECIAL NOTE.

If you want to see samples of wood finished up in any particular way;

If you want advice as to the use of varnish, or on the treatment of woods to get the best results in the way of a finish;

If you are in doubt on any matter concerning varnish or its uses, or on the subject of wood finishing in any of its phases—

ASK BERRY BROTHERS.

THE RUBEROID CO., LIMITED

FORMERLY

THE STANDARD PAINT CO. OF CANADA, LIMITED

SALES OFFICES AND WAREHOUSES:
TORONTO. WINNIPEG. VANCOUVER.52 VICTORIA SQUARE,
MONTREAL.FACTORY:
HIGHLANDS, LACHINE CANAL,
MONTREAL.

PRODUCTS.

We manufacture DAMP-PROOFING PAINTS, CONCRETE MASONRY AND CONCRETE FLOOR FINISHES, P. & B. PRESERVATIVE PAINTS, P. & B. ELECTRICAL INSULATING VARNISHES AND COMPOUNDS. (For full list of our products, see pages 48-51 and 278.)

S.P.C. DAMP-PROOFING PAINT, BLACK.

For coating the inside surface of brick, masonry and concrete wall above ground. It forms a perfect bond between the wall and plaster, and avoids the necessity of furring and lathing. At the same time, it insures a thoroughly moisture-proof building. This paint should be used only where no actual water pressure is encountered. Copy of specifications for applying will be forwarded on request.

S.P.C. DAMP-PROOFING PAINT, CLEAR.

A colourless paint for application to the exposed surface of brick, masonry and concrete walls. A wall may be made damp-proof without affecting its colour. This paint, also, is adapted only for work above ground.

"IMP" BRAND WATERPROOF MASONRY FINISH.

Manufactured in the form of a primer and finishing coat. The primer contains a vehicle which acts as a cement and fills the voids of the masonry, and, at the same time, combines with the free alkali which is present with either concrete or the mortar used in laying up the brick wall, and which proves so destructive to ordinary paints. IMP Waterproof Masonry Finish coat is manufactured in White and various colours. Colour card on request.

"IMP" BRAND CEMENT FLOOR FILLER AND FLOOR FINISH.

IMP Cement Floor Filler (Clear) can be classed as a priming coat and neutralizes any alkali present in the floor. Manufactured without pigment, and in eight standard colours. It may be applied as a finishing coat. Dries to a glossy surface and will withstand hard wear and usage. Floors treated in this manner will not dust under service and are non-absorptive, waterproof, oil-proof and sanitary.

"P. & B."—"S.P.C." PRESERVATIVE PAINTS.

For wood, iron or metal, exposed or submerged. Marketed for over 30 years, under the well-known P. & B. and S.P.C. trade marks, and demonstrated unique for preservation against weather, water, heat, cold, acids, alkalies, fumes, gases, etc. Prevent rust, rot, corrosion, oxidation and guard against electrolysis. Write for our book on PAINTS for full information.

"P. & B." ELECTRICAL COMPOUNDS.

Recognized as standard for over 30 years on account of their insulating properties and effectiveness for the special purposes they are designed to meet. Made in two grades:

No. 1.—To be used where a light surface and deep penetration is desirable.

No. 2.—For all general electrical purposes.

These Compounds protect wires, exposed or underground, against gases, corrosion, dampness or wet, and afford high insulating efficiency. Guard against electrolysis and leakage.

For fuller particulars, write for our book on INSULATION.

"P. & B." ELECTRICAL INSULATING VARNISHES.

These varnishes are of two distinct classes, namely, Baking Varnishes, which harden by oxidation when subjected to artificial heat; and Air-Drying Varnishes, which harden or set by evaporation of the solvent. These may be sub-divided as follows:

CLASS 1. BAKING VARNISHES.—Entirely oil-proof. P. & B. Clear Baking Varnish, P. & B. Black Baking Varnish and P. & B. Baking Core-Plate Varnish.

CLASS 2. AIR-DRYING VARNISHES AND COMPOUNDS.—Entirely oil-proof. S.P.C. Armature and Field Coil Varnish and P. & B. Black Finishing Varnish.

OIL-RESISTING.—P. & B. Black Air-Drying Varnish, P. & B. Air-Drying Core-Plate Varnish, and P. & B. Electrical Compound.

For fuller information, write for our book entitled "INSULATION."

WATERPROOFING PRODUCTS.

FOR MEMBRANE METHOD.

RU-BER-OID ASPHALT SATURATED FELT.—Made in the following weights:

No. 7, weighing 11 lbs. to the square. No. 10, weighing 14 lbs. to the square.

No. 14, weighing 25 lbs. to the square.

This Felt has unusually great tensile strength, and is guaranteed to contain no coal tar or coal tar products. Will not dry out or harden in storage or in service.

FOR INTEGRAL METHOD—IMPERVITE.



is a soluble paste composed largely of mineral Asphaltum, and is manufactured in a neutral colour and various tints, including Slate, Terra Cotta, White and Green. It is not a paint or a wash. It is an integral waterproofing compound that is mixed through and through the mortar or concrete, or applied as a facing. IMPERVITE contains no soap or saponifiable constituents. It does not detract from the strength of the mortar or delay its set. Write for our booklet for fuller information.



FLORIDA BREWING CO., TAMPA, FLORIDA.
P. & B. PAINT USED THROUGHOUT.

S. C. JOHNSON & SON, LIMITED, BRANTFORD

JOHNSON'S ARTISTIC WOOD FINISHES

PREPARED WAX
PERFECTONE UNDERCOAT
FLOOR VARNISH

WOOD DYE
PERFECTONE ENAMEL
FINISHING VARNISH

PASTE WOOD FILLER
UNDERLAC
FLAT VARNISH

SPECIFICATIONS
FOR FINISHING
NEW WOODWORK.

FOR HIGH GLOSS ENAMEL FINISH specify two coats of Johnson's Perfectone Undercoat and two coats of Johnson's Gloss Enamel. FOR A RUBBED ENAMEL FINISH specify two coats of Johnson's Perfectone Undercoat and two coats of Johnson's Satine Enamel.

FOR A NATURAL FINISH ON OAK, CHESTNUT AND OTHER OPEN GRAINED WOODS specify one coat of Johnson's Natural Paste Wood Filler No. 10—and two coats of Johnson's Prepared Wax, or two coats of Johnson's Finishing Varnish.

FOR A NATURAL FINISH ON SOFT WOOD specify two coats of Johnson's Finishing Varnish upon the bare wood, or one coat of Johnson's Finishing Varnish and one coat of Johnson's Prepared Wax.

FOR STAINED EFFECTS, SUCH AS GOLDEN OAK, MISSION, MAHOGANY, WALNUT, ETC., specify a coat of Johnson's Wood Dye, the desired shade, upon the bare wood, one coat of Underlac—then one coat of Johnson's Prepared Wax, or one coat of Johnson's Finishing Varnish, or one coat of Johnson's Flat Varnish.

FOR FINISHING
WOODWORK AND
WALLS OF KITCHEN,
PANTRY, BATH
ROOM.

Specify two coats of Johnson's Undercoat and two coats of Johnson's Gloss Enamel. This will give a fine, smooth, high-gloss, glass-like, germ-proof finish which can be freely washed without injury to the gloss, color or finish.

SPECIFICATIONS FOR
FINISHING HARD-
WOOD FLOORS.

FOR A NATURAL FINISH specify one coat of Johnson's Natural Paste Wood Filler No. 10 upon the bare wood. Then two coats of Johnson's Prepared Wax, or two coats of Johnson's Floor Varnish.

FOR DARK OAK OR GOLDEN OAK effects specify Johnson's No. 30 Dark Oak Paste Wood Filler or No. 20 Golden Oak Paste Wood Filler—then two coats of Johnson's Prepared Wax, or Johnson's Floor Varnish, depending upon whether waxed or varnished floors are desired.

SPECIFICATIONS FOR
FINISHING SOFT
WOOD FLOORS.

FOR OTHER SHADES, SUCH AS MISSION, MAHOGANY, WALNUT, ETC., specify one coat of Johnson's Wood Dye, the desired shade and one coat of Floor Finish No. 1, then one or two coats of Johnson's Prepared Wax, or Johnson's Floor Varnish.

FOR A NATURAL FINISH specify one coat of Johnson's Floor Finish No. 1, and then one coat of Johnson's Prepared Wax or one coat of Johnson's Floor Varnish.

FOR COLORED EFFECTS SUCH AS MISSION, MAHOGANY, WALNUT, ETC., specify one coat of Johnson's Wood Dye, the desired shade, and one coat of Floor Finish No. 1, then one coat of Johnson's Prepared Wax or Johnson's Floor Varnish.

SPECIFICATIONS FOR
FINISHING KITCHEN
PANTRY, BATH ROOM
AND OTHER FLOORS
WHICH REQUIRE
WASHING.

Specify one coat of Johnson's Natural Paste Wood Filler No. 10 and Johnson's Floor Finish No. 1. Subsequent coats of Johnson's Floor Finish No. 1 may be applied as required without removing the first coat.

MADE IN CANADA — BY CANADIANS



STURGEONS LIMITED

PRESERVATIVES AND PAINT SPECIALTIES.

AGENTS:—

64-6 RICHMOND ST. EAST, TORONTO, ONT.

DODWELL & PIERS, Halifax; P. CAMPBELL & Co., St. John, N.B.; SPIELMAN AGENCIES, Montreal; (for Flintex) BEVERIDGE PAPER Co., Montreal; WALKERS LIMITED, Winnipeg; MACDONALD BAKER Co., Calgary; WM. N. O'NEIL Co., LTD., Victoria and Vancouver.



Manufactured by Major & Co., Ltd., Hull, England.

This is a wood preservative made from heavy oil of coal tar. By distillation the light oils are eliminated, also tar acids which are so destructive to spikes, etc. It does not evaporate, thus an oil of strong antiseptic value is permanently deposited in the wood eliminating any chance of dry rot, fungoid growth, or bacteriological decay.

It is recommended to use:—

Hydro quality for all preservative work such as timbers set in concrete, piles, joists, etc. Architectural Grade in browns, greens, reds and grays, for shingles, half timber work, fences, etc.

Interior Solignum is a beautiful stain supplied in browns, green and mahogany, recommended for all interior staining; it may be left in plain stain or wax or varnish finish. Solignum-lac should be used as a first coater over Solignum when varnish or wax is to be used for finish.

PARIPAN

Manufactured by Paripan Limited, London, England.

This material is one of the oldest enamels on the market and is made with the finest grade of zinc and lacquer. Its reputation for the high gloss finish and lasting qualities are instanced by testimonials which show its use, without being renewed for over twenty years, on such buildings as the London Hospital, England, etc. It was also used exclusively on the Toronto General Hospital. It is supplied in colors in flat or gloss and it is recommended that the special Paripan undercoatings be applied first to get the certain results which mean such satisfaction.

FLINTEX

CONCRETE SPECIALTIES.

FLINTEX SURFACE HARDENER. This is a liquid hardener which makes old as well as new concrete floors dust, wear and water-proof. It unites chemically with the cement, filling the pores or voids so as to render the mass solid, compact and indestructible. It also protects against disintegration, acids and frost. Three applications as directed are recommended.

FLINTEX INTEGRAL WATERPROOFING. This is a powder used to waterproof foundation walls, swimming pools, boiler pits, tanks, etc. It unites with the cement to make the aggregate permanently waterproof and should be employed wherever water or dampness may be encountered. It must be mixed thoroughly dry with cement before putting into the concrete.

FLINTEX ACCELERATOR. This is a liquid which acts upon the cement in the aggregate so as to quicken the final set, simplify trowelling, increase the tensile strength, produce a hard surface, assist in waterproofing and prevent freezing. It is recommended for all concrete and cement mixtures. It is mixed with the water to be used in the aggregate.

STURGEONS

FRENCH POLISH WAX.

This is manufactured by us from the finest grades of Beeswax and other hard waxes, reduced with pure Turpentine. This gives the splendid wearing qualities as well as the beautiful soft finish. This may be used directly on top of the Solpar Wood Filler without any undercoating between and a few applications will give the desired effect. We recommend its use particularly on floors, trim and furniture.

STURGEONS

MILL WHITE.

This is manufactured from zinc, lithophone, etc., with a splendid hard wearing varnish which will stand the washing and hard wear of public buildings, offices, warehouses and schools. It is recommended to use Sturgeons Mill White Undercoating in bringing up the work; the finish may be had in either gloss or flat and it may be applied to any surface, plaster, brick, stone, woodwork or metal.

ROCKFACE

WATER PAINT.

We recommend that Rockface for brick be used on any surface of brick, stone, concrete or similar material. The reputation of Rockface is second to none. It has been used on the latest factories of the T. Eaton Co. Ltd., Robt. Simpson Mail Order Building, etc. It will not rub off and becomes practically part of the base to which it is applied. It is the cheapest and best article for factories on the market.

FERROLASTIC

METAL PAINT.

This is made with Ferrodor pigment (Griffiths Bros. & Co., London, Eng.), and gives "perfect protection" to any metal surface.

TOCH BROTHERS

ESTABLISHED 1848.

TECHNICAL AND SCIENTIFIC PAINTS, ENAMELS, VARNISHES, COLORS, DAMP-PROOFING AND WATER-PROOFING PAINTS AND COMPOUNDS, ETC.

320 FIFTH AVENUE, NEW YORK.

WORKS: LONG ISLAND CITY, N.Y.

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PREMIER PAINT & VARNISH CO., REGD., 8 McGill College Avenue, MONTREAL, CAN.

E. F. DARTNELL, 259 Bleury St., MONTREAL, CAN.

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DISTRIBUTORS IN PRINCIPAL CANADIAN CITIES.

PROTECTIVE
PRODUCTSWATER-
PROOFING.

"R. I. W." TOXEMENT (PATENTED).—An integral water-proofing compound, in powder form, for concrete, cement mortar, stucco, etc.

A two pound measure full is simply thrown in the mix each time a bag of Portland cement is added.

STONE
BACKING.

No. 110 "R. I. W." (BLACK).—For stain-proofing and damp-proofing cut stone, Bedford stone, marble, granite, limestone, etc.

DAMP-
PROOFING.

"R. I. W." MARINE CEMENT.—For brush application to foundation walls, footings and damp course. Also on concrete floor slabs and abutting walls and wood sleepers laid in concrete. Requires no heating.

No. 232 "R. I. W."—For brush application to the interior of exterior masonry walls. Bonds perfectly with plaster. Saves the cost of furring and lathing.

Not recommended for use on concrete walls or on ceilings of any kind.

"R. I. W." LIQUID KONKERIT.—Priming and finishing coats for damp-proofing, beautifying and overcoming the natural porosity of concrete, stucco and masonry walls.

Priming coat furnished in neutral shade. Finishing coat furnished in white or colors. Special shades to order.

"R. I. W." TOXLOXPOR (TRANSPARENT).—A species of gutta percha in solution. To be applied direct to brick, concrete, stucco, limestone, Bedford stone, and wood. Prevents efflorescence and the penetration of dampness.

BACK PAINTING
WOOD TRIM.

"R. I. W." TRIMBAK.—An alkali-proof and water-proof black, elastic coating for protecting wood trim, underside of wood floors, ends and sides of wood sleepers.

CEMENT FLOOR
HARDENERS.

*"R. I. W." CEMENT FILLER (REGULAR). *"R. I. W." NO. 2626 CEMENT FILLER (EXTRA HARD DRYING).—Transparent coatings for brush application to dry concrete floors to prevent "cement dusting." Proof against oil, grease and water.

May be painted over with "R. I. W." Cement Floor Paint for decorative effect.

*"R. I. W." CEMENT FLOOR PAINT.—A protective and decorative coating for application to dry concrete floors over a priming coat of "R. I. W." Cement Filler (either regular or No. 2626).

May also be applied to wood and composition floors without a primer.

Twelve standard shades. Special shades to order.

"R. I. W." DUSTOP.—Transparent composition for application to dry concrete floors with a mop. Dust-proof, oil-proof, water-proof and resists abrasion. Must not be painted over.

"R. I. W." FLINTOX CRYSTALS.—For chemically hardening and dust-proofing concrete floors. May be applied to wet or damp floors.

Use 1-8/10 lbs. to a gallon of water to make one gallon of concentrated solution.

Dilute first coat with 50% of water, by volume. Apply second coat full strength. Use a mop, broom or Tampico whitewash brush for applying Flintox.

Avoid use of metal-bound brushes and metal containers.

MILL AND
FACTORY
WHITE.

"R. I. W." EVERLITE MILL WHITE.—A two-coat mill and factory white that is water-proof, easily cleaned with soap and water, and may be applied to brick, concrete, iron, wood or plaster. Furnished in flat and semi-gloss finishes. High gloss finish can be made up specially, if desired.

ENAMELS.

"R. I. W." HOSPITAL AND LABORATORY ENAMEL.—Water-proof and resists the action of sulphuretted hydrogen, gases, fumes of acids and chemicals. Used largely in chemical works, laboratories, hospitals, cold storage plants, bathrooms, etc. Not intended for application to furniture.

"R. I. W." MACHINERY ENAMEL.—Heat, steam, oil and water-proof. Used on dynamos, transformers, steam and electric stationary engines, compressors and all kinds of machinery and pipes not exposed to the elements. Any color desired.

STEEL
PROTECTION.

"R. I. W." TACKOLITH (GRAY).—The patented cement paint for priming steel, iron and other metal. Prevents progressive rust.

No. 110 "R. I. W." (BLACK).—For painting metal lath, grillage and foundation beams, etc., and the interior or exterior of vats.

No. 112 "R. I. W." (BLACK).—Water-proof, renders steel impervious to acids, alkalis or electrolysis. For finishing coat over "Tackolith" on steel embedded in masonry, steel work inside of factories where dampness and fumes are present, on brine and condenser pipes, etc.

No. 49 "R. I. W." (BLACK AND DARK OLIVE GREEN).—Withstands action of locomotive gases, acids and other fumes to which railroad bridges and viaducts are subjected.

Also used on fences, fire escapes, tin roofs, lined smoke stacks, and other exposed metal surfaces.

CATALOGUE.

Send for literature describing complete line of preservative paints.

* (Patented.)



TRADE MARK REGISTERED.

PILKINGTON BROTHERS LIMITED

GLASS MANUFACTURERS.

Central Office for Canada:
ST. CATHARINES, ONT.

Factories:

ST. HELENS, ENGLAND; THOROLD, ONTARIO.

CANADIAN DEPOTS:

HALIFAX, 109 Queen St.

TORONTO, Mercer St.

EDMONTON, 10316 107th St.

VANCOUVER, Powell St.

MONTREAL, Busby Lane.

WINNIPEG, Market Street.

CALGARY, Eleventh Ave. E.

PILKINGTON'S GLASS

PRODUCTS.

CONSTRUCTIONAL GLASS of all descriptions.

POLISHED PLATE.—For Store Fronts, Office Windows and Partitions, etc.

BEVELLED PLATES.—For Doors, Show Cases, etc.

MIRRORS.—For Interior Fittings and Furniture.

POLISHED WIRED GLASS.—For Elevator Doors, Windows, and Glass Partitions, where security against spread of fire is required.

Wired Glass (RIBBED OR ROUGH CAST).—For Windows and Sky Lights of factory buildings, etc. About $\frac{1}{4}$ inch thick with wire mesh embedded in centre, eliminating danger of falling broken glass to life and property.

Ribbed Rolled, $\frac{1}{8}$ " to $\frac{3}{8}$ " thick; *Rough Cast*, $\frac{3}{16}$ " to $\frac{3}{8}$ " thick.—For Buildings and Roof Lights requiring a good, strong, semi-transparent glass.

Figured Rolled, ARCTIC, MOROCCO, JAPANESE, MURANESE, ETC.

PRISMATIC GLASS.—For diverting light into dark places.

Chipped Glass, *Muffled Glass*, *Enamelled Glass*, *Fluted Glass*.—Ornamental glasses for partitions, screens, vestibules, etc.

Rolled Cathedral Glass.—For Leaded Windows, etc.; made in white and various tints.

WINDOW
GLASS.

PILKINGTON'S WINDOW OR SHEET GLASS is now made in Canada at our factory at Thorold, Ont.

QUALITY.

PILKINGTON'S GLASS is specified for the better class of buildings throughout Canada and all over the world. Pilkington's Glass is a name known wherever glass is used, and an assurance always of reliable quality and efficient service.

AGENTS
ALSO FOR
KAWNEER.

We are sole Canadian agents for the Kawneer Manufacturing Company, makers of all kinds of Kawneer Metal Store Fronts and Architectural Mouldings. Stocks carried at Depots as above. Write for descriptive booklet.

THE SMITH MARBLE AND CONSTRUCTION CO., LIMITED

IMPORTERS, MANUFACTURERS, CONTRACTORS.

GENERAL OFFICE AND WORKS: 145 VAN HORNE AVENUE, MONTREAL, QUE.

PRODUCTS.

Direct Importers of MARBLES and Manufacturers of these and CANADIAN MARBLES of various kinds now being extensively used in the construction of important buildings. We carry a large and varied stock of Marble and Tiles. With our thoroughly equipped plant and facilities, can assure the highest grade of workmanship and prompt deliveries.

CONTRACTORS.

Contractors for all kinds of Interior Marble, Onyx, Tile and Slate Work, such as Marble Carving, Marble Walls, Floors, Treads, Electric Switchboards, Plumbers' Marble, Slate Blackboards, Floor and Wall Tile, Terrazzo, Mosaic and Ceramic Floors.

Special attention to MARBLE ALTARS, FONTS, CHURCH MEMORIAL TABLETS, MARBLE MANTELS, AND DECORATIVE MARBLE WORK FOR PRIVATE RESIDENCES.



MARBLE ALTAR, ST. MAEO CHURCH, QUEBEC.

All Marble in this Altar Manufactured and Erected by us.

BUILDINGS COMPLETED.

We give below some representative buildings recently completed as samples of our work:

BUILDING.	CITY.	BUILDING.	CITY.
Bank of Montreal	St. John's, Nfld.	McGill Office Building . . .	Montreal.
Post Office	Halifax, N.S.	Read Building	Montreal.
Power Building	Montreal, Que.	Post Office "H"	Montreal.
McDonald College	St. Anne, Que.	Mappin & Webb Store . . .	Montreal.
Lake of Woods Building . .	Montreal, Que.	Bank of Toronto	Montreal (St. James St.).
Bank of Montreal	Montreal, Que. (Peel St.).	Sun Life Bldg.	Montreal.
Bank of Toronto	Montreal, Que. (Guy St.).	Loew's Theatre	Montreal.
Royal Bank	Winnipeg, Man.	Union Station (Centre Block)	Toronto.
Victoria Memorial Museum		Parliament Bldg. (Balustrade,	
Building	Ottawa, Ont.	Commons Entrance) . . .	Ottawa.
Place Viger Extension . . .	Montreal.	Bank of Nova Scotia . . .	Montreal.
Chateau Laurier	Ottawa.	Dominion Tire Bldg. . . .	Kitchener, Ont.
Great West Life (Interior) .	Winnipeg, Man.	Drummond Apartments . .	Montreal.
Capitol Theatre	Montreal.	Bank of Hochelaga (St. Cath-	
Molsons Bank	St. Thomas, Ont.	erine Street Branch) . . .	Montreal, Que.
		Salada Tea Building	Montreal, Que.

THE ITALIAN MOSAIC AND MARBLE CO. OF CANADA, LTD.

OFFICE:

442 KING STREET WEST,
TORONTO, CANADA.

PHONE: ADELAIDE 6669.

PRODUCTS.

MARBLE WORK, MARBLE MOSAICS, VENETIAN MOSAICS, CERAMIC MOSAICS, GLAZED AND UNGLAZED TILE WORK, PERIOD AND DECORATIVE DESIGNS, INSERTS, BORDERS, Etc., TERRAZZO WORK OF ALL KINDS.



KNOX COLLEGE, TORONTO. CHAPMAN & MCGIFFEN, ARCHITECTS.



McCONKEY RESTAURANT. E. J. LENNOX, ARCHITECT.
TILE FLOORS, TILE AND MARBLE WALLS, TILE CEILING THROUGHOUT.

ADVANTAGES.

Marble Mosaic and Terrazzo Floors are artistic in appearance, durable in wear, and sanitary in effect, and cheaper in comparison with all other floors.

Rich, soft colours, permanent materials, sanitation, and moderate cost are the qualities that make Mosaic floors superior to all others.

REFERENCES.

Partial list of Buildings in which the Italian Mosaic and Marble Co. of Canada, Ltd., have executed designs and work:

Parliament Buildings, Toronto, Ont.
New Government House, Toronto, Ont.
Hart House, University of Toronto.
City Hall, Toronto, Ont.
New Technical School, Toronto, Ont.
Canadian Westinghouse Co., Hamilton, Ont.
Public Utilities Office Bldg., London, Ont.
London Sanatorium, London, Ont.
King Edward Hotel, Toronto, Ont.
Knox College, Toronto, Ont.
Toronto General Trust Bldg., Toronto, Ont.
Royal Bank Building, Toronto, Ont.
Methodist Book Room, Toronto, Ont.
15 Public Schools, Toronto, Ont.
St. Augustine Seminary, Toronto, Ont.
St. Joseph's Novitiate, Toronto, Ont.
St. Francis R.C. Church, Toronto, Ont.
Broadview Y.M.C.A. Building, Toronto, Ont.
West End Y.M.C.A. Building, Toronto, Ont.
St. John Post Office, St. John, N.B.
Childs' Restaurants, Toronto, Ont.

Customs Examining Warehouse, Ottawa, Ont.
Dominion Savings Bank, London, Ont.
St. Cecilia's Church, Toronto, Ont.
Public Library, Weston, Ont.
Knox Presbyterian Church, Stratford, Ont.
Trust & Guarantee New Building, Toronto, Ont.
Weston Hospital, Weston, Ont.
Bank of Commerce, Windsor, Ont.
Merchants Bank, Niagara Falls, Ont.
Merchants Bank, Georgetown, Ont.
Technical Art School, London, Ont.
Sarnia School, Sarnia, Ont.
Ford School, Ford, Ont.
Byron Sanitarium, London, Ont.
Rosedale Military Hospital, Toronto, Ont.
Christie Street Military Hospital, Toronto, Ont.
Canadian Westinghouse Bldg., Hamilton, Ont.
Acadia Coal Co., Ltd., Stellarton, N.S.
Dunfield's Mosaic Store Front, Toronto, Ont.
Royal Bank, Sault Ste. Marie, Ont.

OTIS-FENSOM ELEVATOR COMPANY, LIMITED

MANUFACTURERS OF

PASSENGER AND FREIGHT ELEVATORS,

DUMB WAITERS, ESCALATORS, INCLINED FREIGHT ELEVATORS AND GRAVITY PACKAGE CONVEYORS.

HEAD OFFICES: 50 BAY STREET,
TORONTO, ONT.WORKS:
HAMILTON, ONT.

BRANCH OFFICES:

MONTREAL.....368 St. James Street.
OTTAWA.....254 Queen Street.
QUEBEC.....1070 1/4 St. Valier Street.HALIFAX.....215 Lower Water Street.
WINNIPEG.....316 Cumberland Ave.
REGINA.....11th Ave. and Lorne Street.
CALGARY.....322-6 9th Ave. W.EDMONTON.....10252 105th Street.
VANCOUVER.....1152 Mainland Street.
VICTORIA.....635 Dominion Road.

GENERAL.

In presenting the accompanying layouts of elevators, our object is to place in the hands of architects and engineers who have the preparing of plans for buildings exact and reliable data which will enable them to make proper provision for the reception of the elevator equipment, thus insuring from the start a proper installation without having to make expensive alterations when the building is about completed in order to obtain same.

ADDITIONAL LAYOUTS.

Owing to space limitations, we are only able to give a few carefully selected standard layouts of Belt-Driven, Direct-Connected Freight Elevators and of Drum Type Passenger Elevators, but we are prepared to furnish any architect with a complete set, comprising all our standard elevator layouts, for his office reference files on request.

The drawings submitted are carefully prepared along the lines of established standard practice, and it is only necessary, therefore, to select the type of elevator required, and provide in the plans the required clearances at top and bottom, in the hatch and the space required for the machinery.

STANDARD-IZING ELEVATOR CONSTRUCTION.

We have taken considerable pains to standardize elevator construction, as from our past experience we have repeatedly felt this would be of great benefit to the architect, in that the cost of installation could be materially reduced and deliveries facilitated if standard sizes were adopted; at the outset it would enable the architect, in preparing his plans, to provide the necessary accommodation, instead of the troublesome necessity of altering plans later on. We, as the manufacturers, could then make the parts in large quantities, instead of a few at a time, as is now rendered necessary owing to the innumerable varying conditions. This would enable us to ship promptly from stock when required.

We are convinced that those interested will see the great advantage to all concerned by the use of standard layouts and standard sizes. We, therefore, suggest to those who have the preparing of plans for buildings in which elevators are required, that they do their part to co-operate with us in attaining this very desirable end.

ILLUSTRATION.

The Elevator Equipment illustrated on this page is the Otis 1 : 1 Gearless Traction Elevator, similar to the equipment in the Singer Building, Woolworth Building, Bankers Trust, and other large New York sky-scrapers, and the following Canadian Buildings are equipped with this type of elevator:—Eastern Townships Bank, Montreal; Transportation Building, Montreal; Customs House, Ottawa; Dominion Bank, Toronto; Royal Bank, Toronto; Excelsior Life Building, Toronto; Fort Garry Hotel, Winnipeg; Calgary Herald Building, Calgary; McLeod Building, Edmonton; Dominic Burns Building, Vancouver; Parliament Buildings, Ottawa.

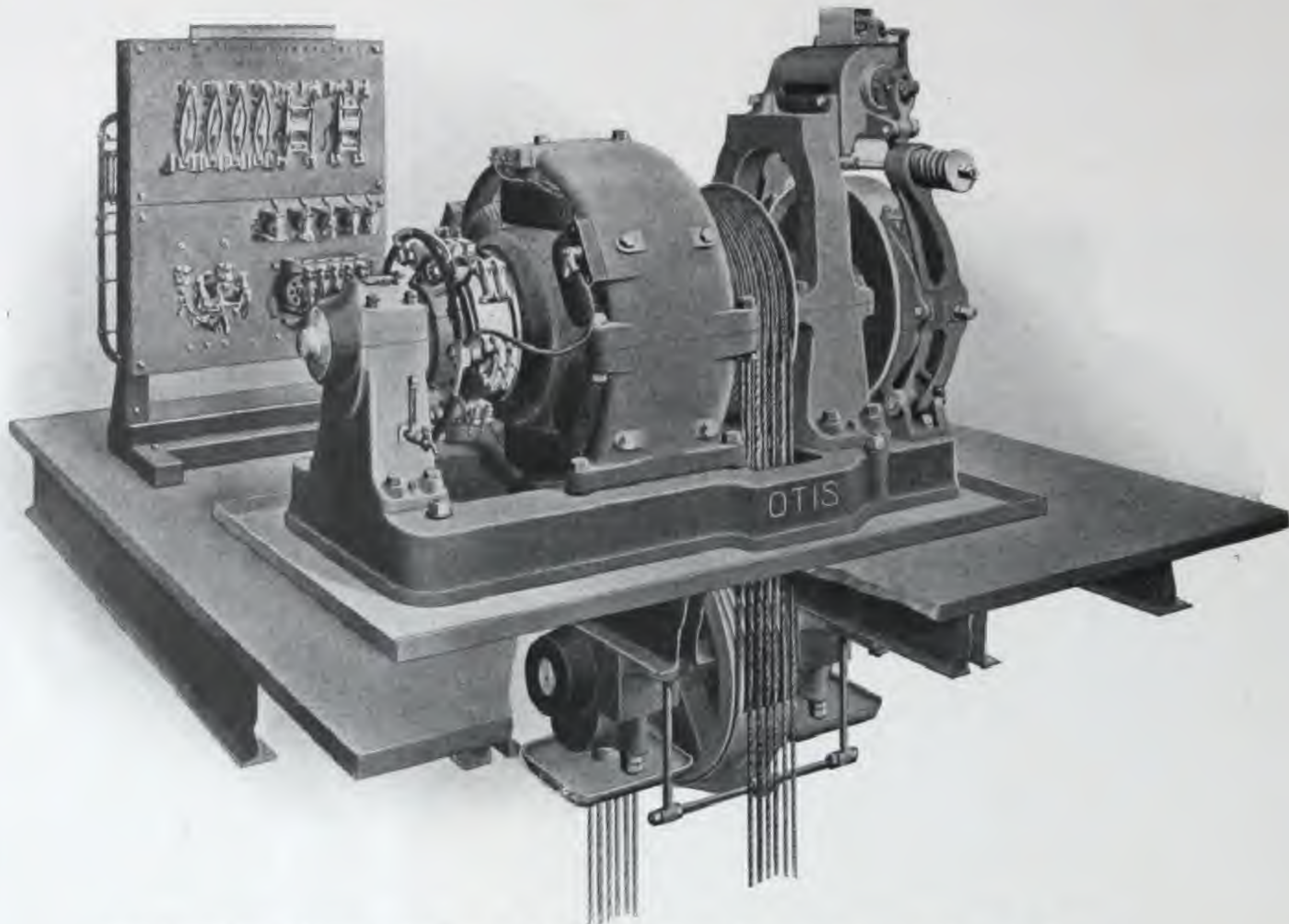


OTIS-FENSOM ELEVATOR COMPANY, LIMITED

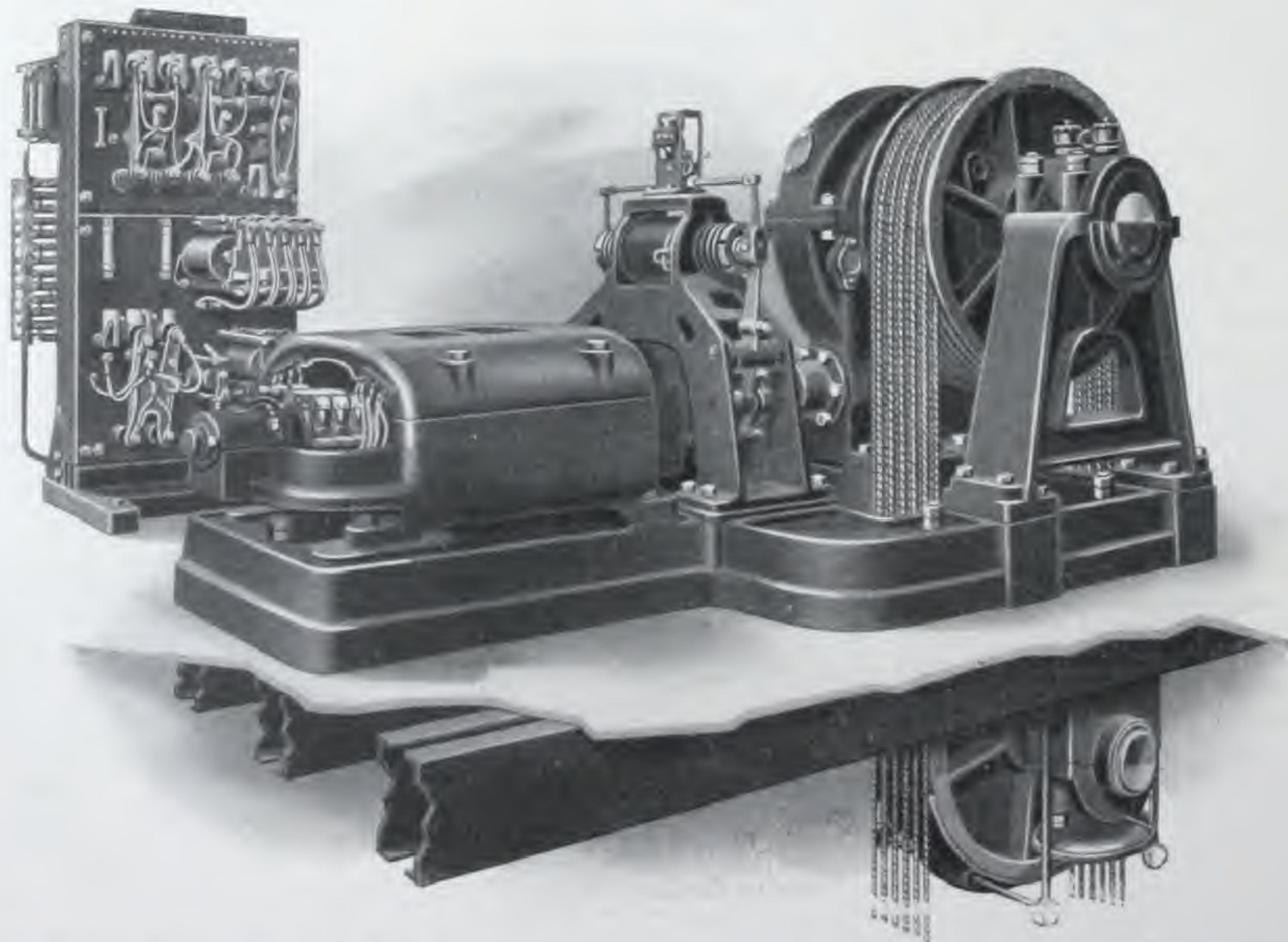
HEAD OFFICES:

OTIS-FENSOM BUILDING, 50 BAY STREET,
TORONTO, ONT.

OFFICES IN ALL PRINCIPAL CITIES OF CANADA.



OTIS GEARLESS TRACTION ELEVATOR, OVERHEAD TYPE, DIRECT CURRENT, SWITCH CONTROL.



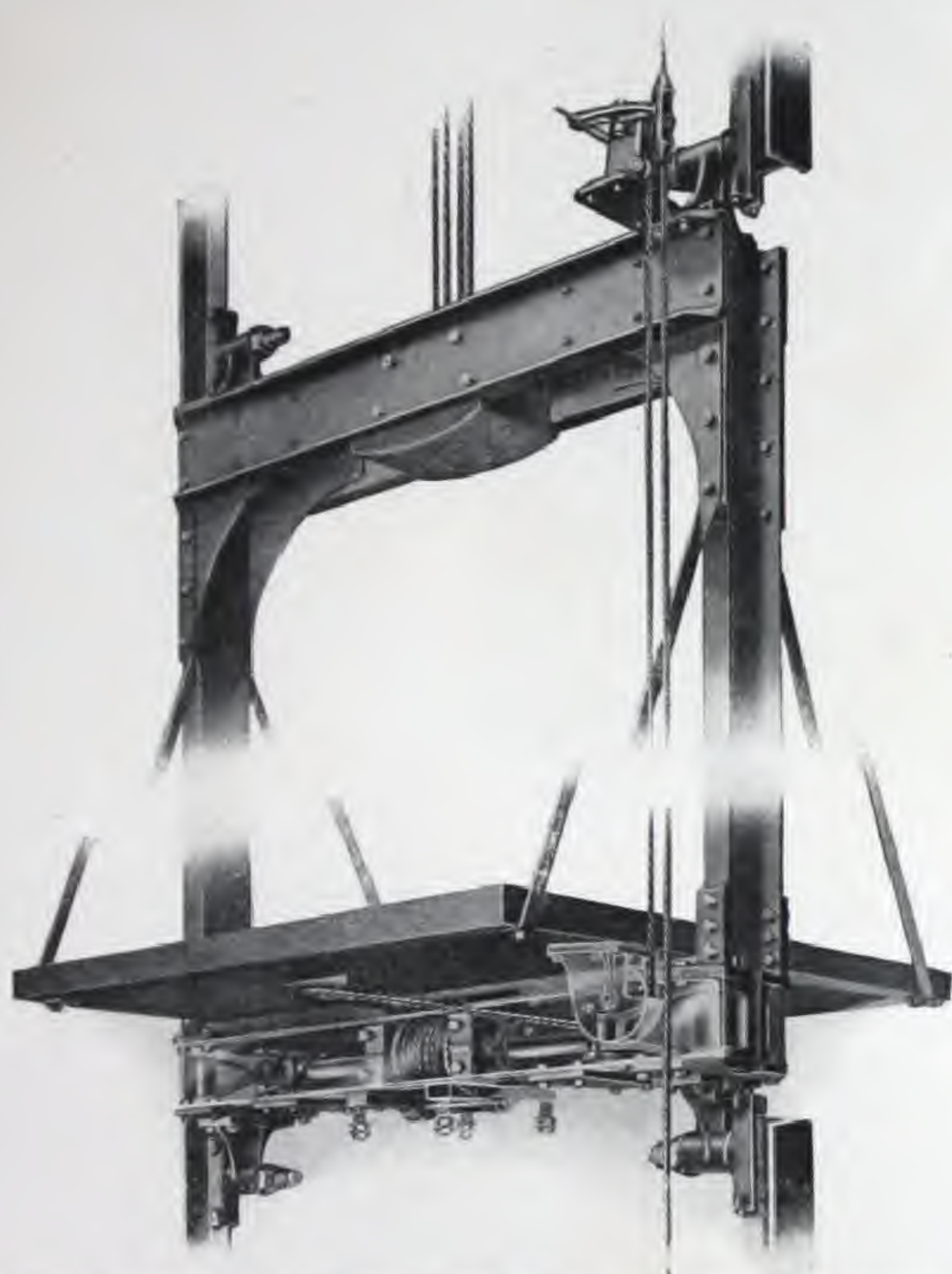
OTIS SINGLE SCREW GEARED TRACTION ELEVATOR, OVERHEAD TYPE, DIRECT CURRENT, SWITCH CONTROL.

OTIS-FENSOM ELEVATOR COMPANY, LIMITED

HEAD OFFICES:

OTIS-FENSOM BUILDING, 50 BAY STREET,
TORONTO, ONT.

OFFICES IN ALL PRINCIPAL CITIES OF CANADA.



OTIS PASSENGER PLATFORM, WITH RELEASING CARRIER AND WEDGE CLAMP SAFETY, THE LATTER MOUNTED UNDERNEATH THE CAR, WITH ITS CHANNEL IRON FRAME REMOVED TO SHOW CONSTRUCTION DETAILS.



OTIS PLATFORM WITH ROLL GRIP SAFETY FOR MEDIUM AND SLOW SPEED ELEVATORS.



PLAN VIEW OF WEDGE CLAMP SAFETY DEVICE, WITH PARTS REMOVED TO SHOW CONSTRUCTION.



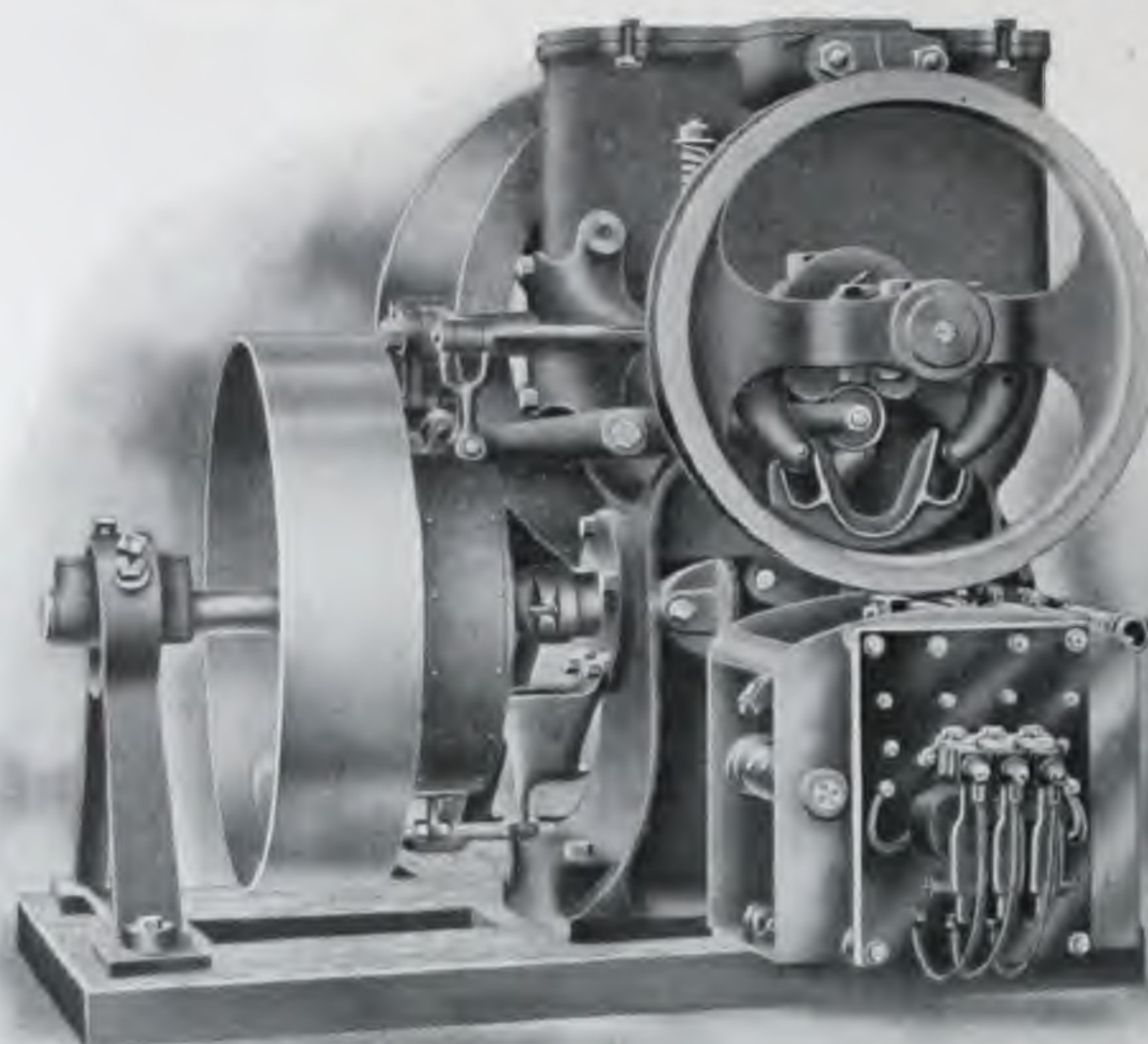
ENLARGED VIEW SHOWING ROLL GRIP SAFETY DEVICE.

OTIS-FENSOM ELEVATOR COMPANY, LIMITED

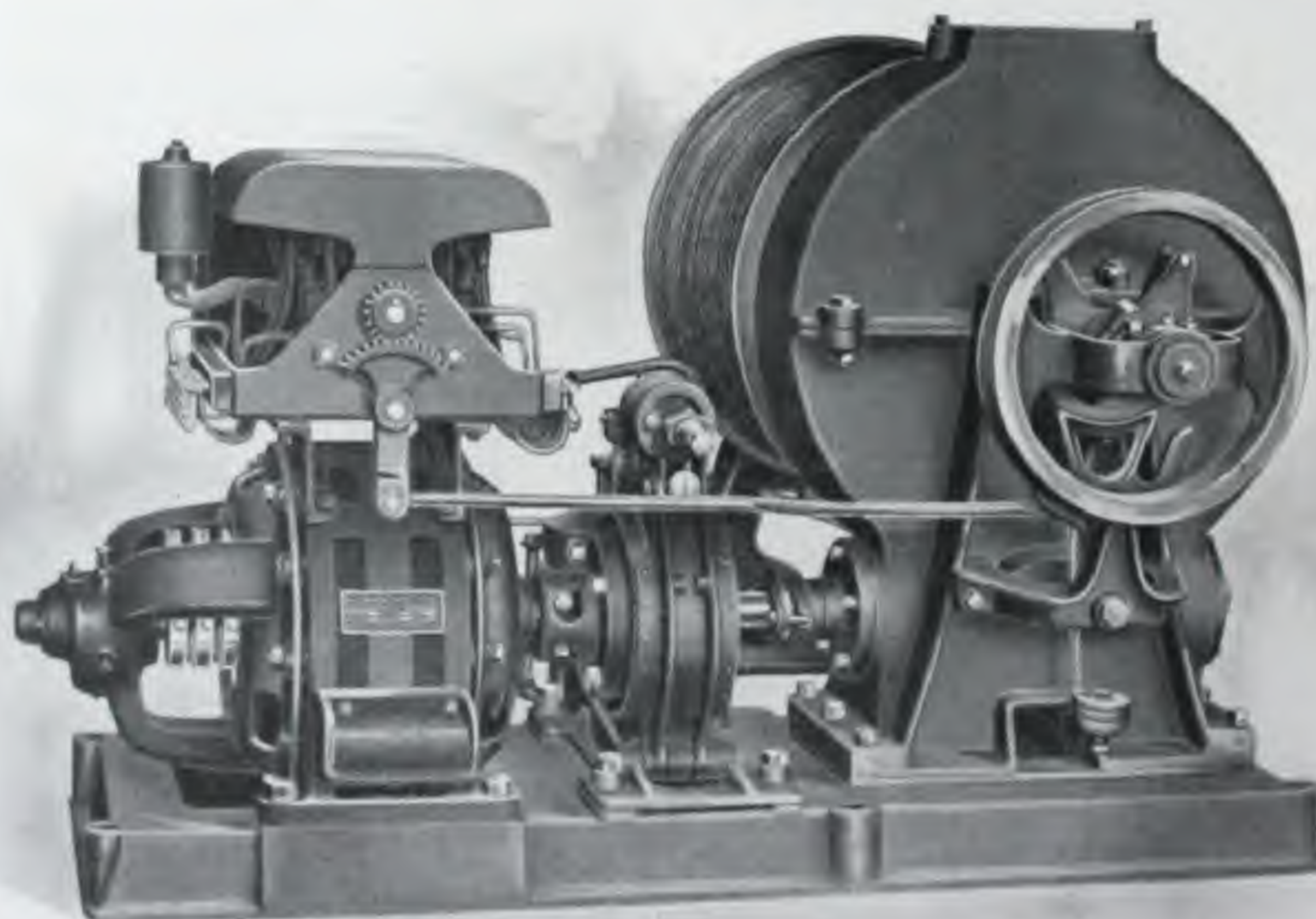
HEAD OFFICES:

OTIS-FENSOM BUILDING, 50 BAY STREET,
TORONTO, ONT.

OFFICES IN ALL PRINCIPAL CITIES OF CANADA



OTIS WORM GEARED, FLOOR TYPE, SINGLE BELTED, ELECTRIC FREIGHT ELEVATOR MACHINE. DIRECT CURRENT CONTROLLER IS SHOWN, BUT WILL BE SUBSTITUTED BY ALTERNATING WHERE REQUIRED.



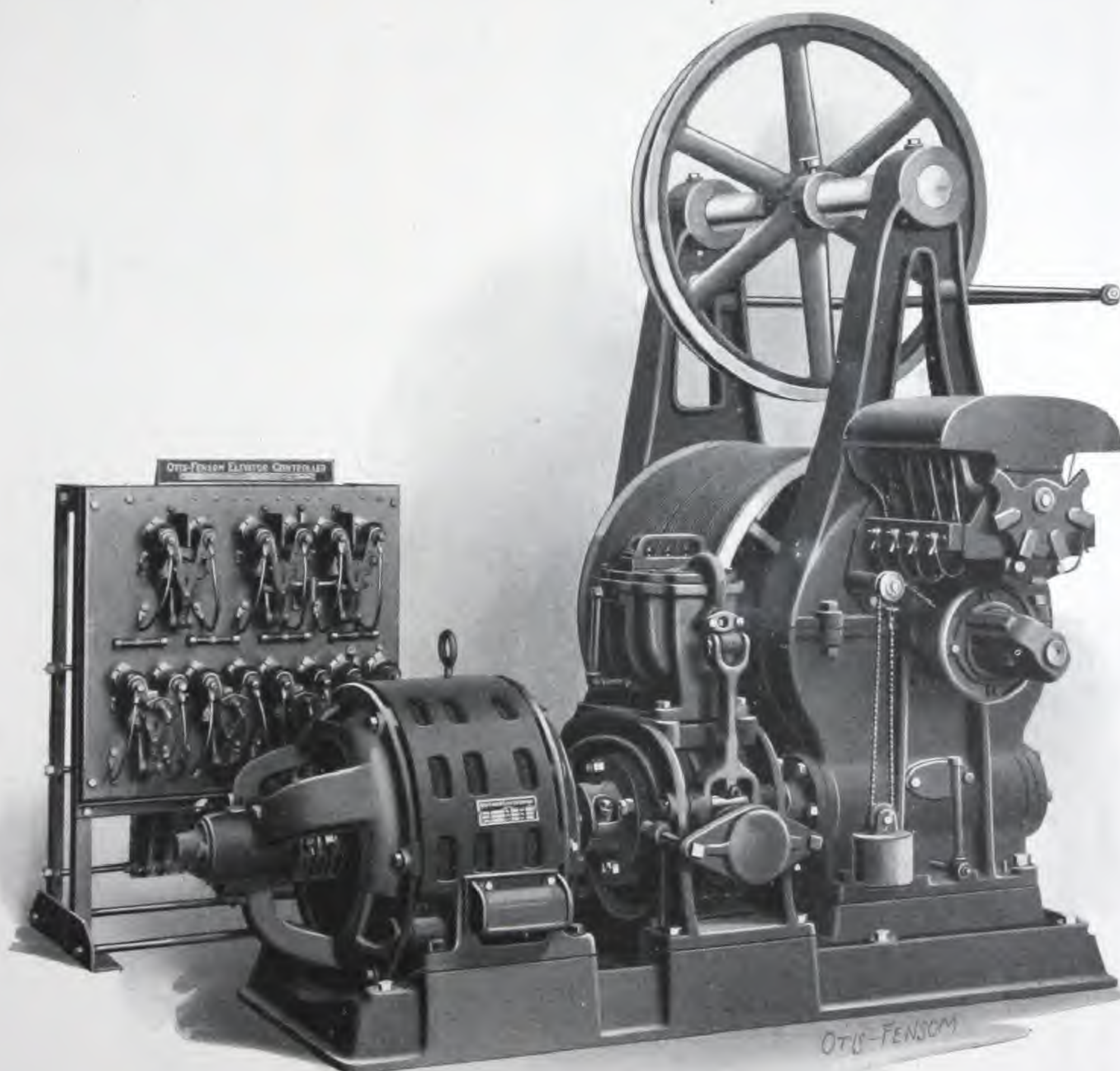
OTIS WORM GEARED, DIRECT CONNECTED, ELECTRIC FREIGHT ELEVATOR MACHINE, ALTERNATING CURRENT TYPE, EQUIPPED WITH MAGNET BRAKE. DIRECT CURRENT MOTOR, CONTROLLER AND BRAKE SUBSTITUTED WHERE REQUIRED.

OTIS-FENSOM ELEVATOR COMPANY, LIMITED

HEAD OFFICES:

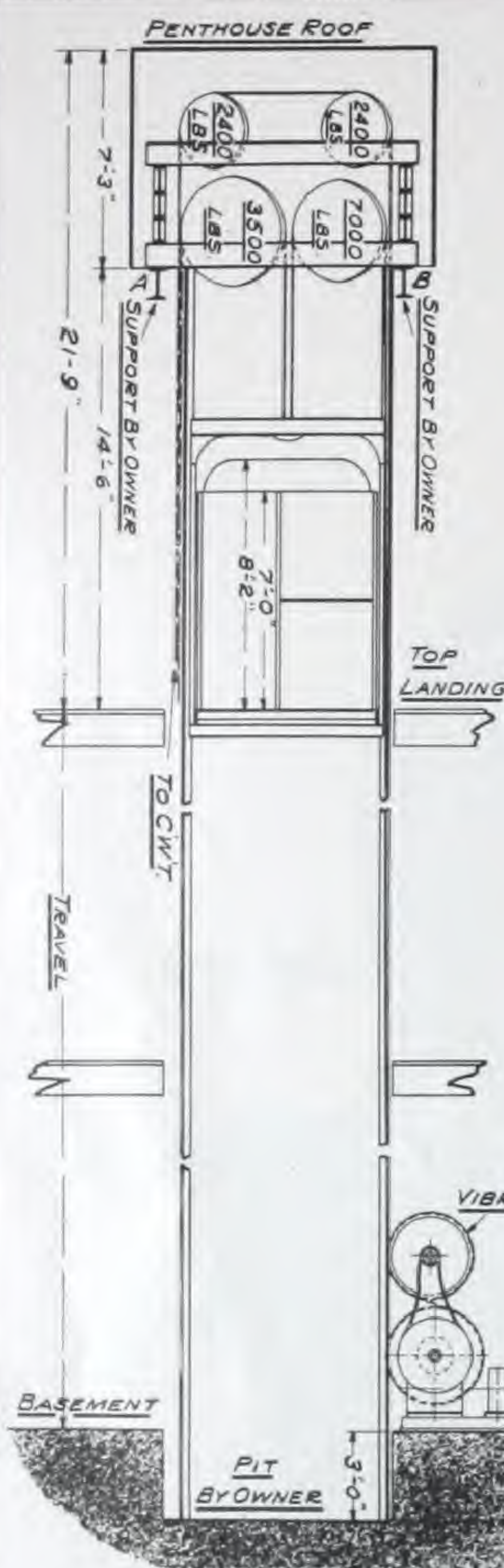
OTIS-FENSOM BUILDING, 50 BAY STREET,
TORONTO, ONT.

OFFICES IN ALL PRINCIPAL CITIES OF CANADA.



OTIS WORM GEARED DRUM TYPE, ALTERNATING CURRENT, ELECTRIC ELEVATOR MACHINE, SWITCH CONTROL.

THIS MACHINE IS ALSO MADE FOR DIRECT CURRENT WHERE REQUIRED.



MACHINE CAPACITY 1300 LBS. AT 200 FT PER MIN							MACHINE CAPACITY 2000 LBS. AT 250 FT PER MIN						
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"
5'-0" x 5'-0"	5'-0"	6'-6"	8'-6"	5'-0"	5'-6"	6'-6"	5'-0" x 5'-0"	5'-0"	6'-6"	8'-6"	5'-0"	5'-6"	6'-6"
							6'-0" x 5'-0"	6'-0"	7'-6"	9'-6"	5'-0"	5'-6"	6'-6"
							6'-0" x 6'-0"	6'-0"	7'-6"	9'-6"	6'-0"	6'-6"	7'-6"

DIAM. OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL
38"	19"	80 FT
38"	25"	130 FT

FOUNDATION
BY OWNER

NOTE—

WHEN FIGURING FOR SUPPORTS USE
8000 LBS. FIBRE STRESS FOR STEEL

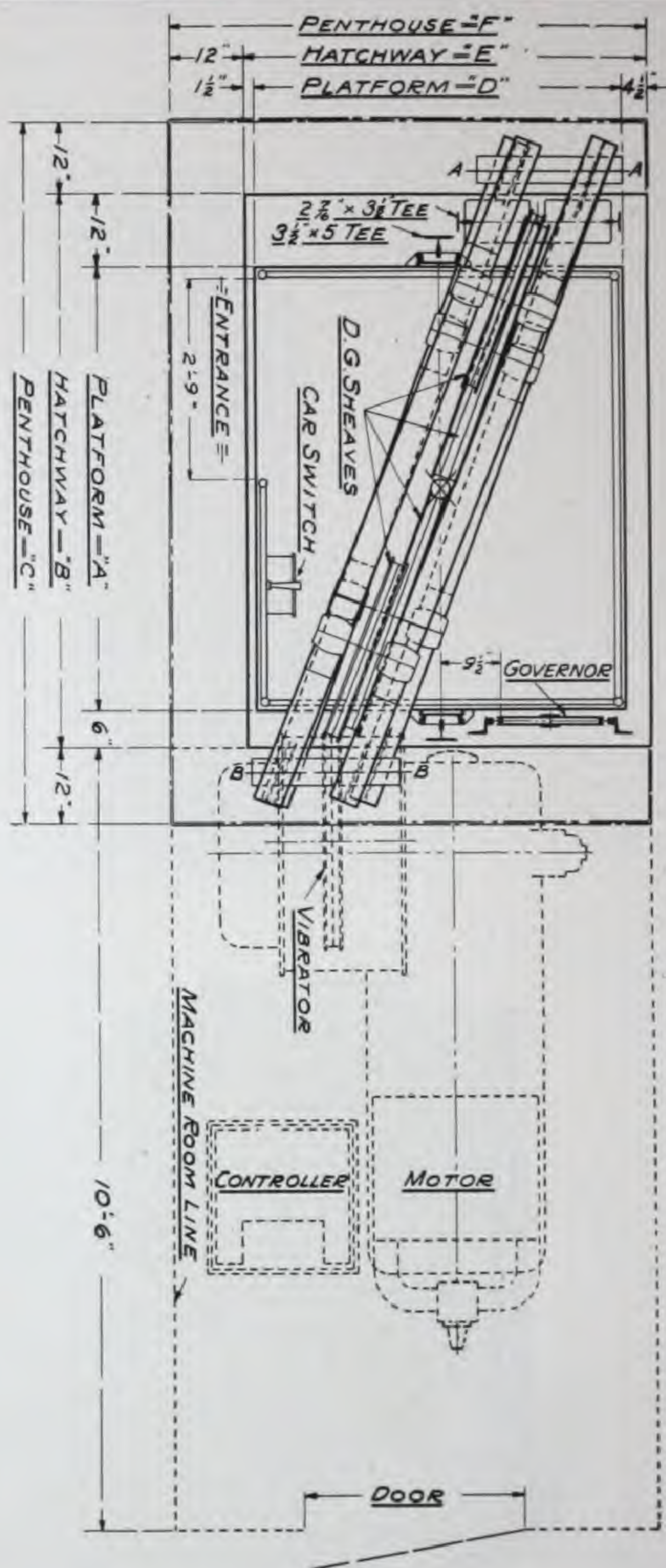
SUPPORTS MARKED AA-BB
BY OWNER

LAYOUT NO. HTB 200

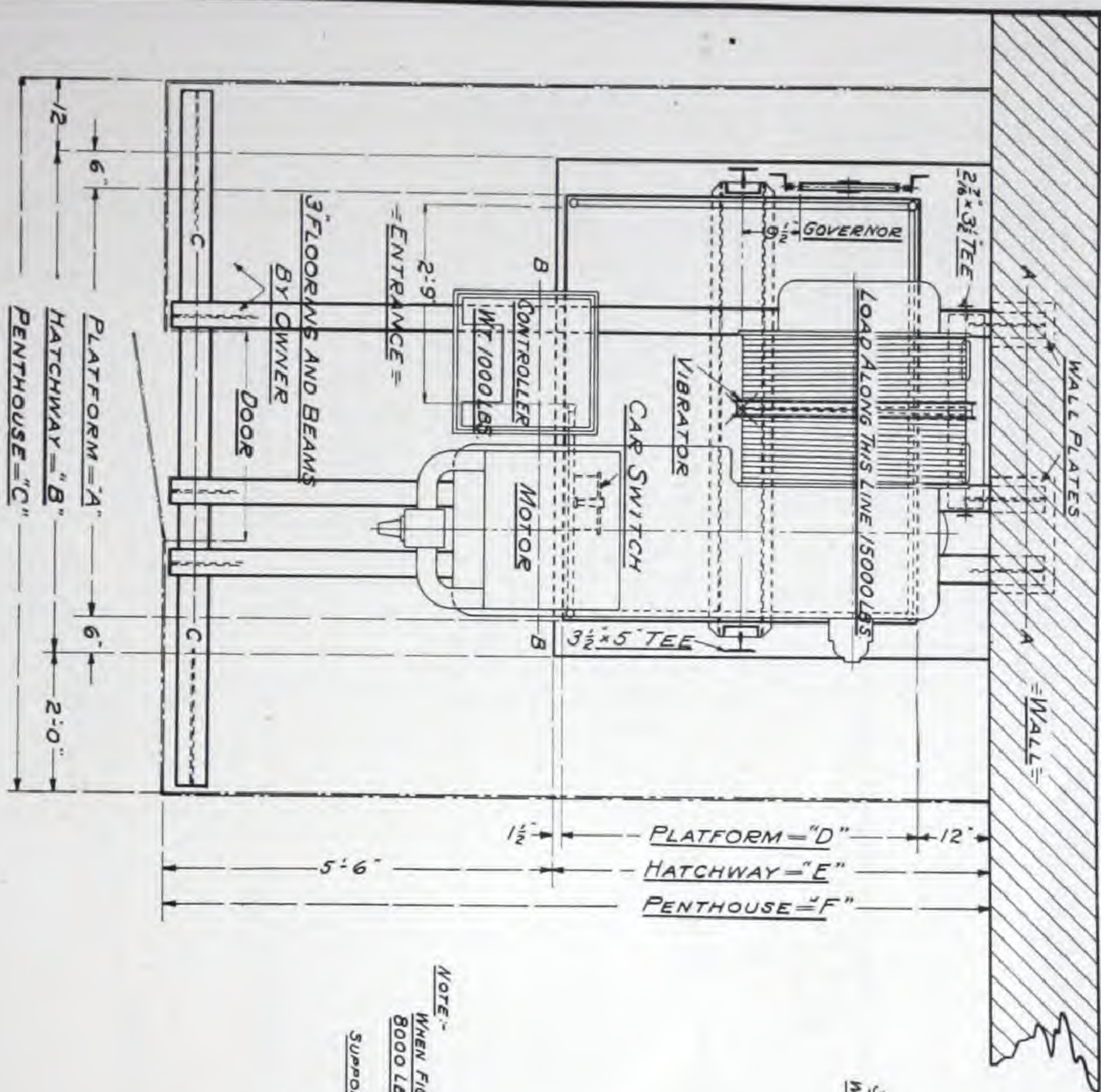
STANDARD DRUM TYPE PASSENGER ELEVATOR,

OTIS-FENSOM ELEVATOR COMPANY LIMITED.

TORONTO -- CANADA



No. HTB200

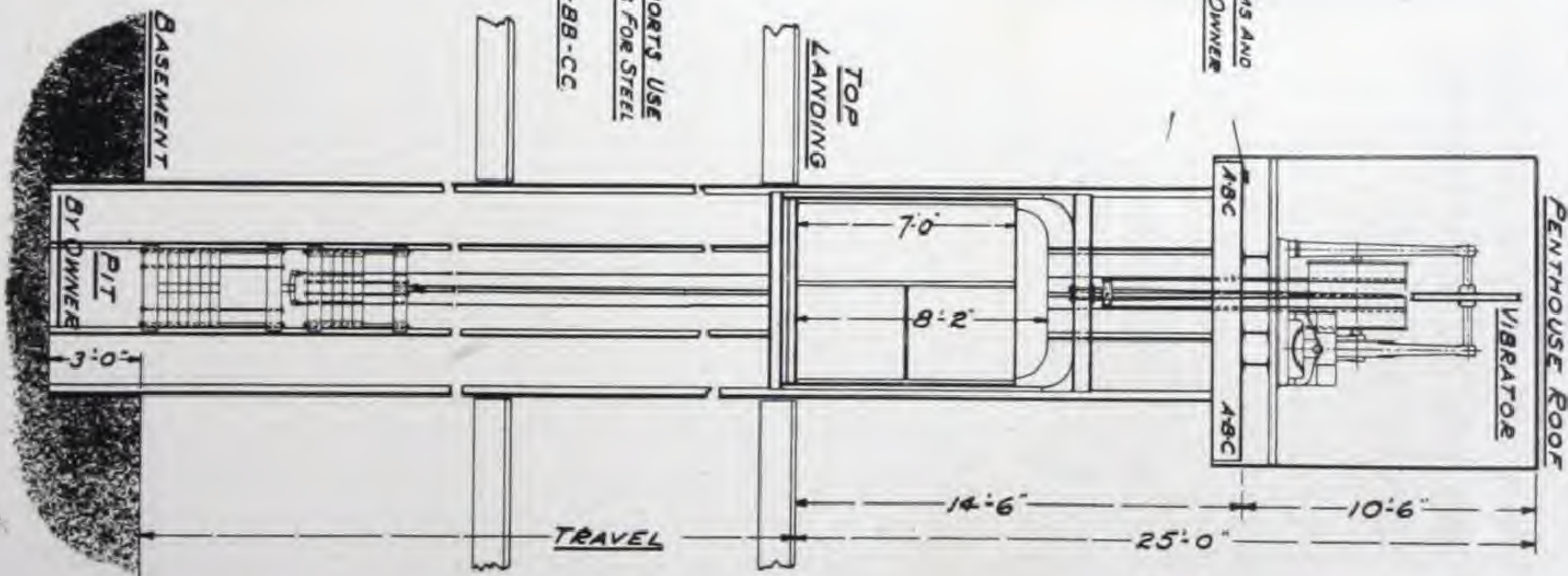


TYPE "A" 31/4" DIA. CURRENT DIRECT CONNECTED PASSENGER

MACHINE CAPACITY 1300 LBS. AT 200 FT. PER MIN.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE	"A"	"B"
5'-0" x 5'-0"	5'-0"	6'-0"	9'-0"	5'-0"	6'-1 1/2"	11'-7 1/2"	5'-0" x 5'-0"	5'-0"	6'-0"
MACHINE CAPACITY 2000 LBS. AT 250 FT. PER MIN.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE	"A"	"B"
5'-0" x 5'-0"	5'-0"	6'-0"	9'-0"	5'-0"	6'-1 1/2"	11'-7 1/2"	5'-0" x 5'-0"	5'-0"	6'-0"
MACHINE CAPACITY 3000 LBS. AT 300 FT. PER MIN.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE	"A"	"B"
5'-0" x 5'-0"	5'-0"	6'-0"	9'-0"	5'-0"	6'-1 1/2"	11'-7 1/2"	5'-0" x 5'-0"	5'-0"	6'-0"

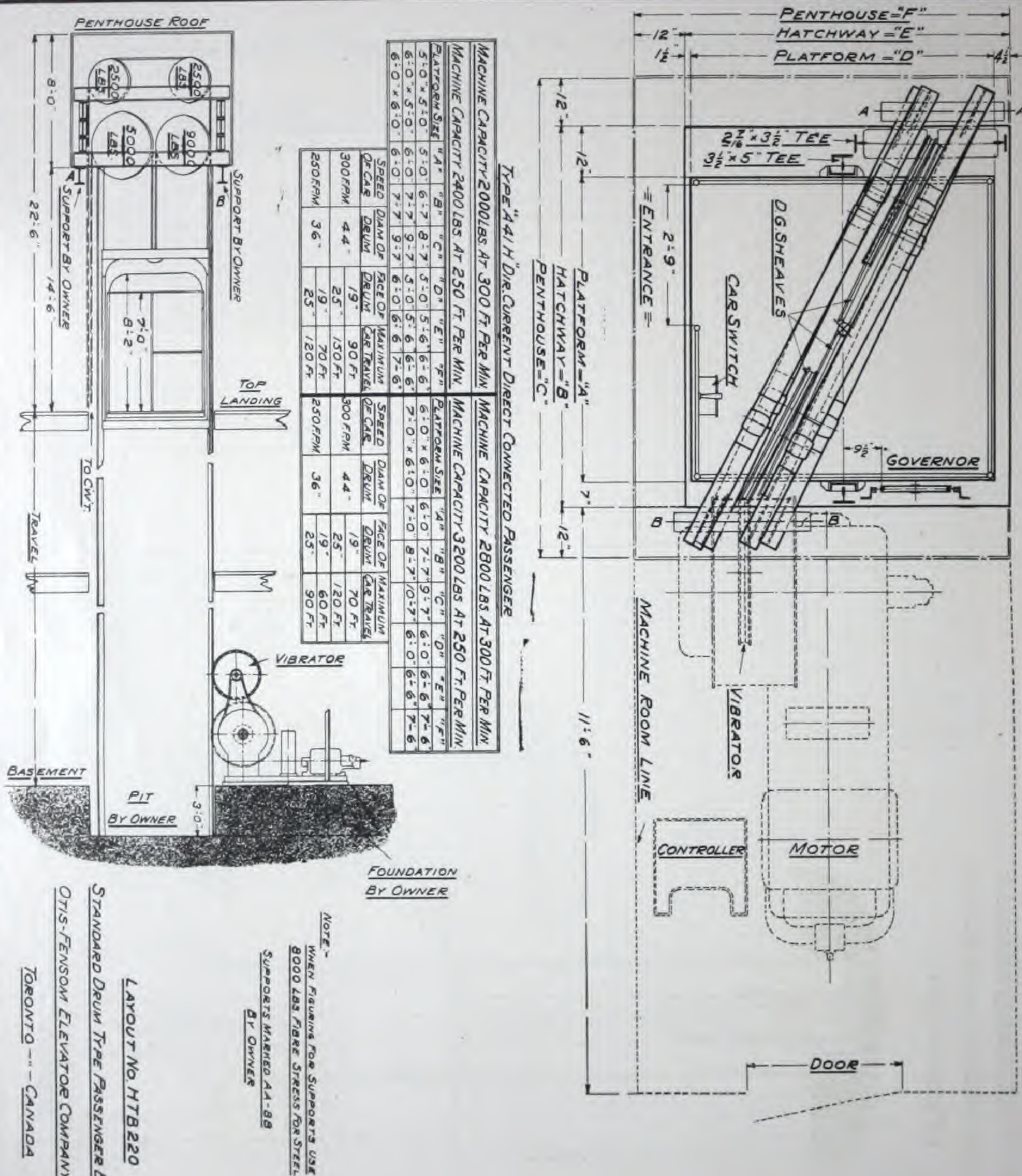
DIA. OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL
38"	19"	50 FT.
38"	25"	90 FT.

NOTE:
WHEN FIGURING FOR SUPPORTS USE
8000 LBS. FIBRE STRESS FOR STEEL
SUPPORTS MARKED AA-BB-CC
BY OWNER

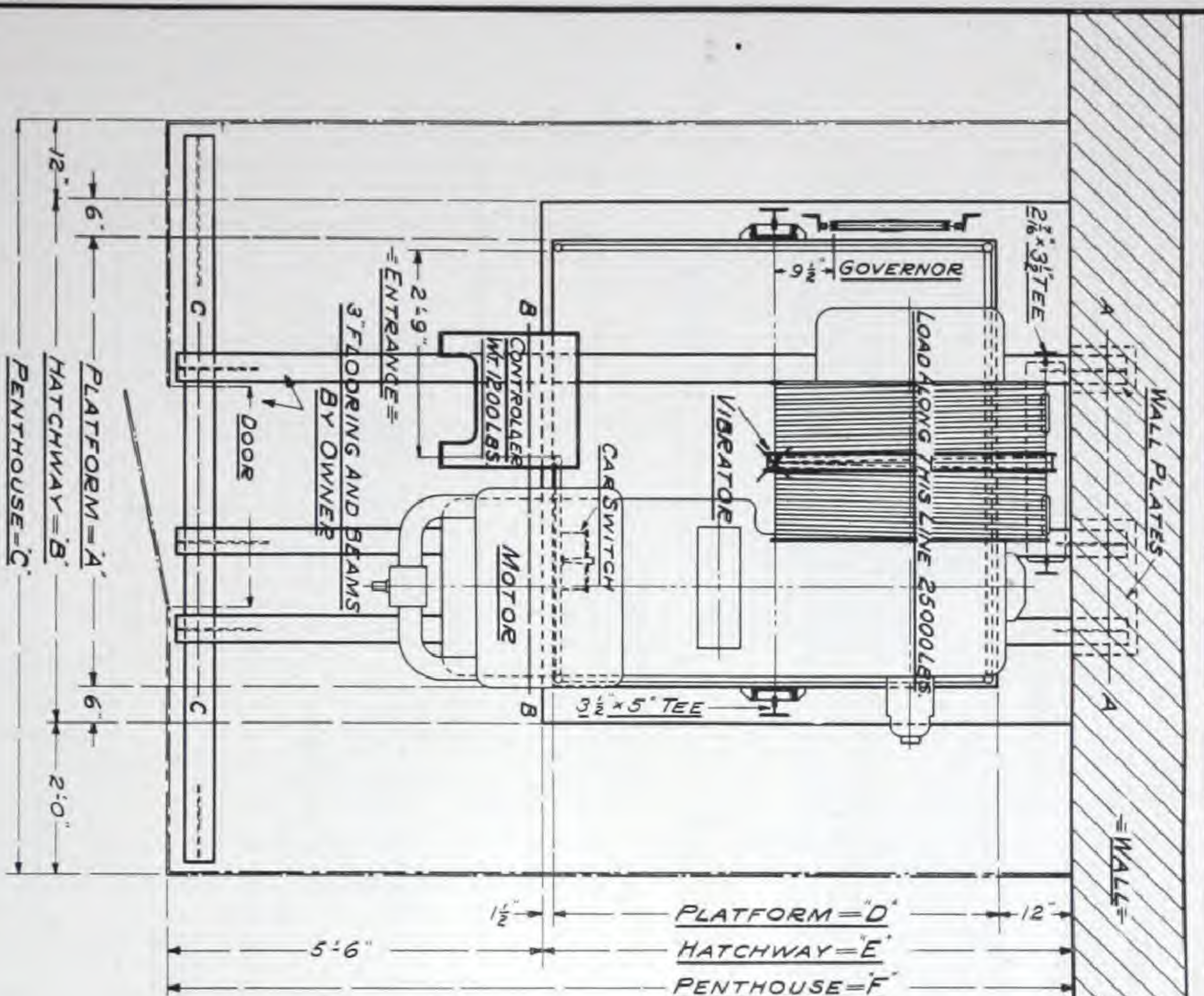


No. HTB 210

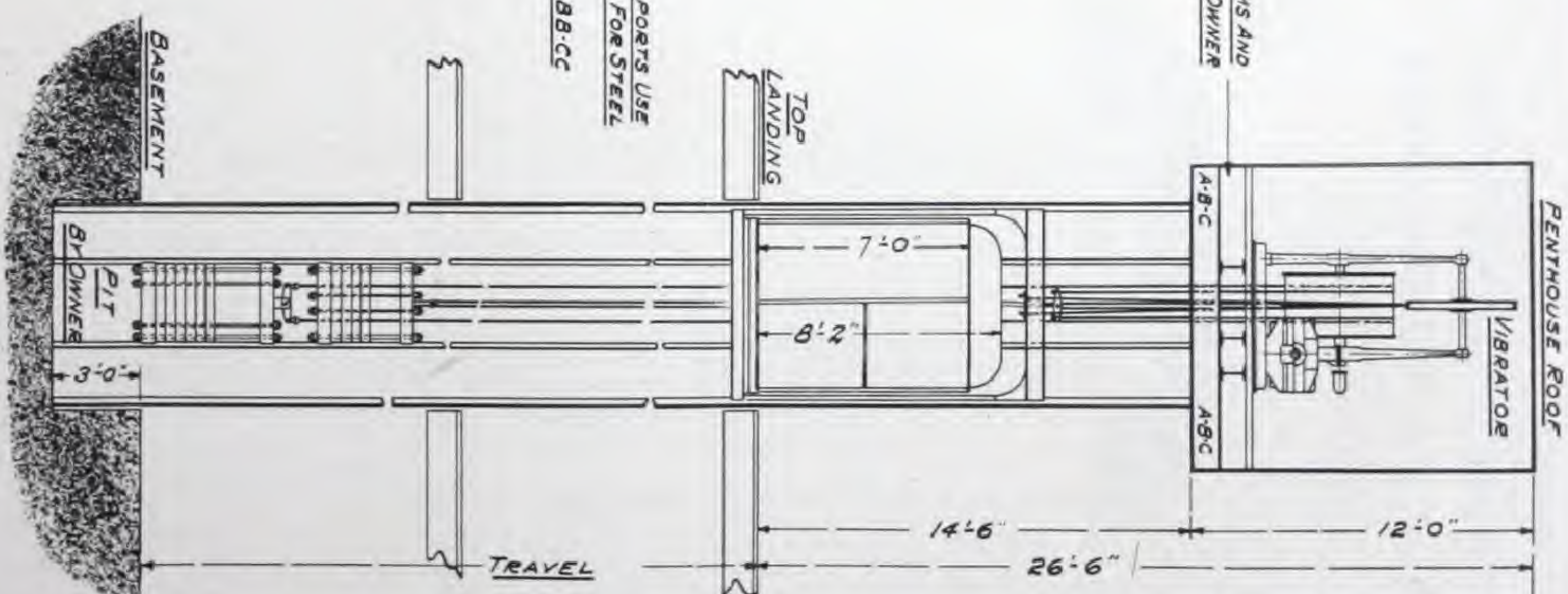
LAYOUT NO HTB 210
STANDARD DRUM TYPE PASSENGER ELEVATOR
OTIS-FENSOM ELEVATOR COMPANY LIMITED
TORONTO - CANADA



No. HTB220



NOTE:-
WHEN FIGURING FOR SUPPORTS USE
8000 LBS FIBRE STRESS FOR STEEL
SUPPORTS MARKED A-A-B-B-C-C
BY OWNER



No. HTB230

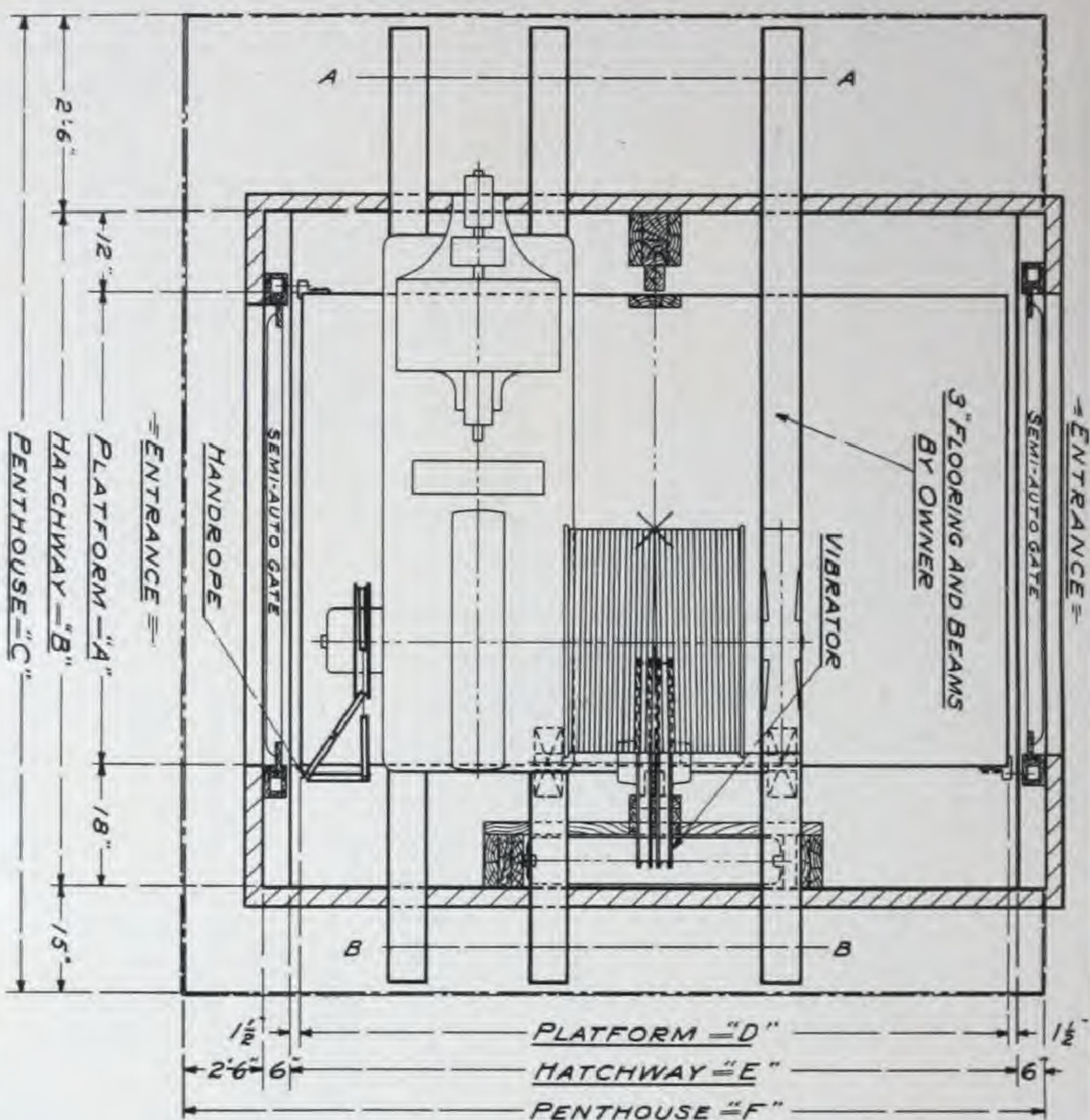
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TYPE 'A' 414" DIRECT CURRENT DIRECT CONNECTED PASSENGER

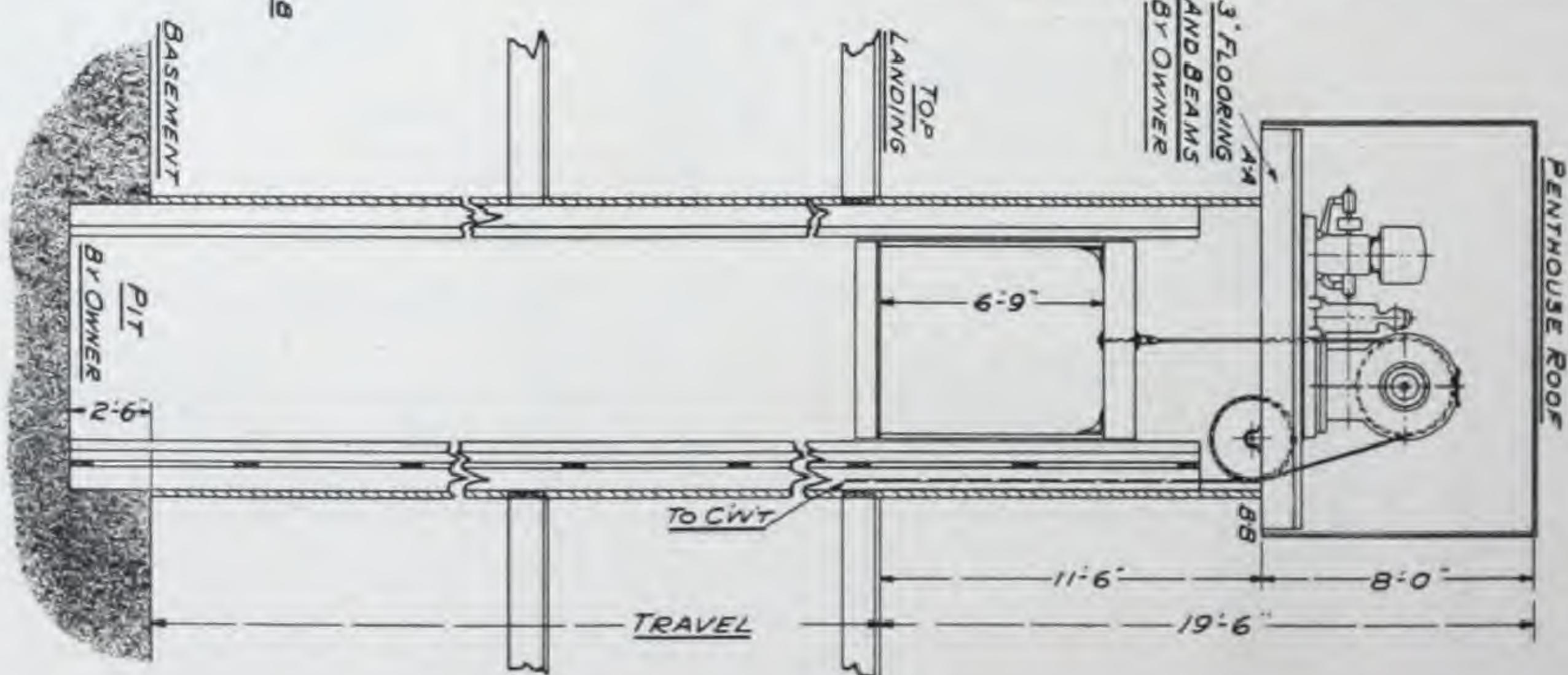
MACHINE CAPACITY 2000 LBS. AT 300 FT. PER MIN.							MACHINE CAPACITY 2800 LBS. AT 300 FT. PER MIN.								
MACHINE CAPACITY 2400 LBS. AT 250 FT. PER MIN.							MACHINE CAPACITY 3200 LBS. AT 250 FT. PER MIN.								
PLATFORM SIZE	A"	B"	C"	D"	E"	F"	PLATFORM SIZE	A"	B"	C"	D"	E"	F"		
5'-0" x 5'-0"	5'-0"	6'-0"	9'-0"	5'-0"	6'-1 1/2"	11'-7 1/2"	6'-0" x 6'-0"	6'-0"	7'-0"	10'-0"	6'-0"	7'-1 1/2"	12'-7 1/2"		
6'-0" x 5'-0"	6'-0"	7'-0"	10'-0"	5'-0"	6'-1 1/2"	11'-7 1/2"	7'-0" x 6'-0"	7'-0"	8'-0"	11'-0"	6'-0"	7'-1 1/2"	12'-7 1/2"		
6'-0" x 6'-0"	6'-0"	7'-0"	10'-0"	6'-0"	7'-1 1/2"	12'-7 1/2"									
SPEED OF CAR	DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL	SPEED OF CAR	DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL	SPEED OF CAR	DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL	SPEED OF CAR	DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL
300 FPM	4 1/2"	19"	50 FT.	300 FPM	4 1/2"	19"	50 FT.	300 FPM	4 1/2"	19"	50 FT.	300 FPM	4 1/2"	19"	50 FT.
250 FPM	3 1/2"	19"	40 FT.	250 FPM	3 1/2"	19"	40 FT.	250 FPM	3 1/2"	19"	40 FT.	250 FPM	3 1/2"	19"	40 FT.

LAYOUT NO HTB230

STANDARD DRUM TYPE PASSENGER ELEVATOR
OTIS-FENSOM ELEVATOR COMPANY LIMITED
TORONTO - 11 - CANADA



NOTE -
SUPPORTS MARKED AA-BB
BY OWNER



TYPE A30A "DIRECT CURRENT DIRECT CONNECTED FREIGHT													
MACHINE CAPACITY 3000 AND 4000 LBS							MACHINE CAPACITY 5000 AND 6000 LBS						
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"
5'-0" x 6'-0"	5'-0"	7'-6"	11'-3"	6'-0"	6'-3"	9'-9"	6'-0" x 7'-0"	6'-0"	8'-6"	12'-3"	7'-0"	7'-3"	10'-9"
6'-0" x 7'-0"	6'-0"	8'-6"	12'-3"	7'-0"	7'-3"	10'-9"	6'-0" x 9'-0"	6'-0"	8'-6"	12'-3"	9'-0"	9'-3"	12'-9"
6'-0" x 8'-0"	6'-0"	8'-6"	12'-3"	8'-0"	8'-3"	11'-9"	7'-0" x 10'-0"	7'-0"	9'-6"	13'-3"	10'-0"	10'-3"	13'-9"
SPEED OF CAR	DIAM OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL 1/8 CABLES										
100 FPM	34"	15"	35'-0"										
		22"	70'-0"										
		26"	90'-0"										
		15"	25'-0"										
75 FPM	30"	22"	60'-0"										
		26"	80'-0"										

MACHINE CAPACITY 3000 AND 4000 LBS							MACHINE CAPACITY 5000 AND 6000 LBS						
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"
5'-0" x 6'-0"	5'-0"	7'-6"	11'-3"	6'-0"	6'-3"	9'-9"	6'-0" x 7'-0"	6'-0"	8'-6"	12'-3"	7'-0"	7'-3"	10'-9"
6'-0" x 7'-0"	6'-0"	8'-6"	12'-3"	7'-0"	7'-3"	10'-9"	6'-0" x 9'-0"	6'-0"	8'-6"	12'-3"	9'-0"	9'-3"	12'-9"
6'-0" x 8'-0"	6'-0"	8'-6"	12'-3"	8'-0"	8'-3"	11'-9"	7'-0" x 10'-0"	7'-0"	9'-6"	13'-3"	10'-0"	10'-3"	13'-9"
SPEED OF CAR	DIAM OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL 1/8 CABLES										
100 FPM	34"	15"	35'-0"										
		22"	70'-0"										
		26"	90'-0"										
		15"	25'-0"										
75 FPM	30"	22"	60'-0"										
		26"	80'-0"										

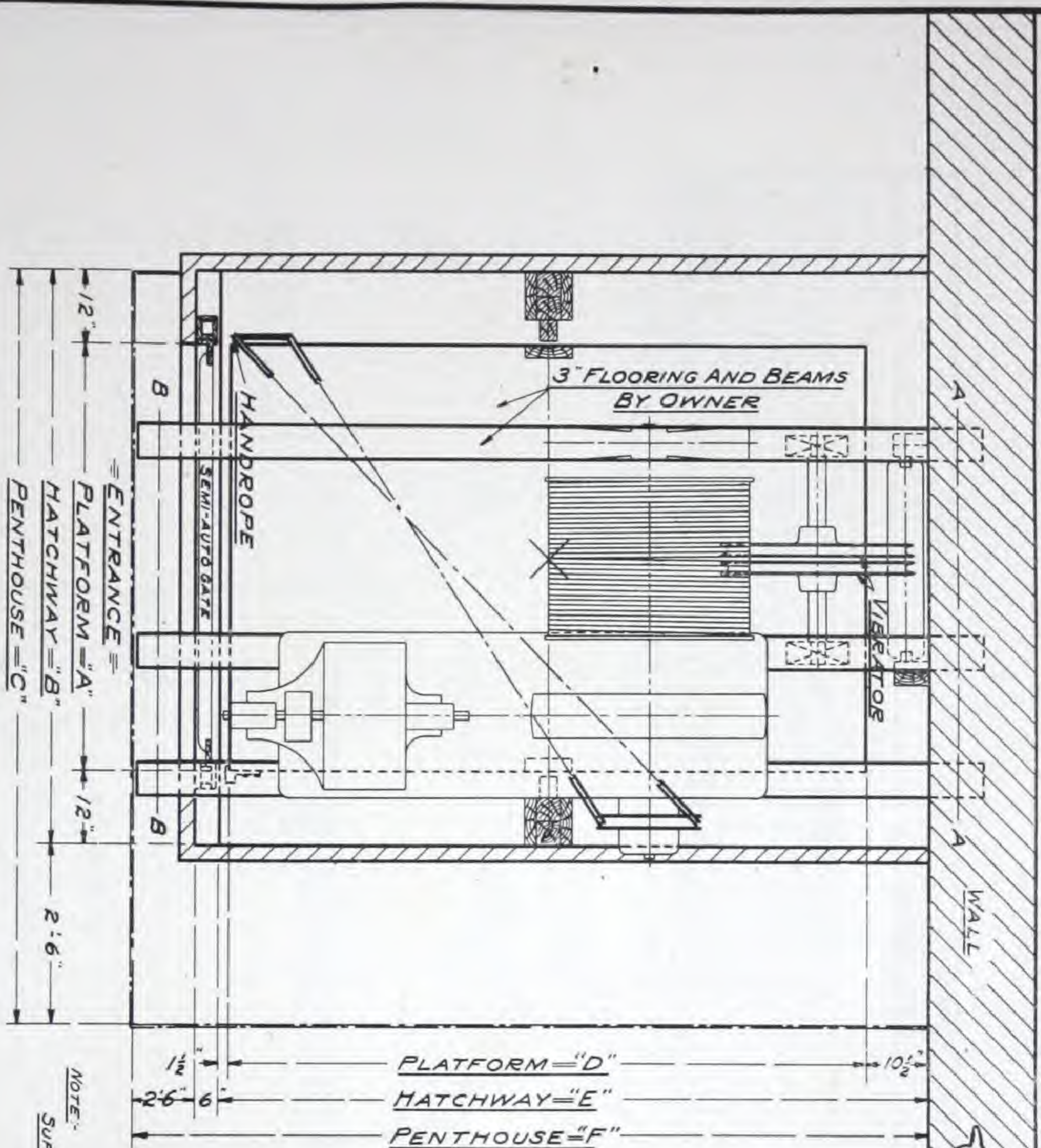
LAYOUT NO HTB110

STANDARD DRUM TYPE FREIGHT ELEVATOR

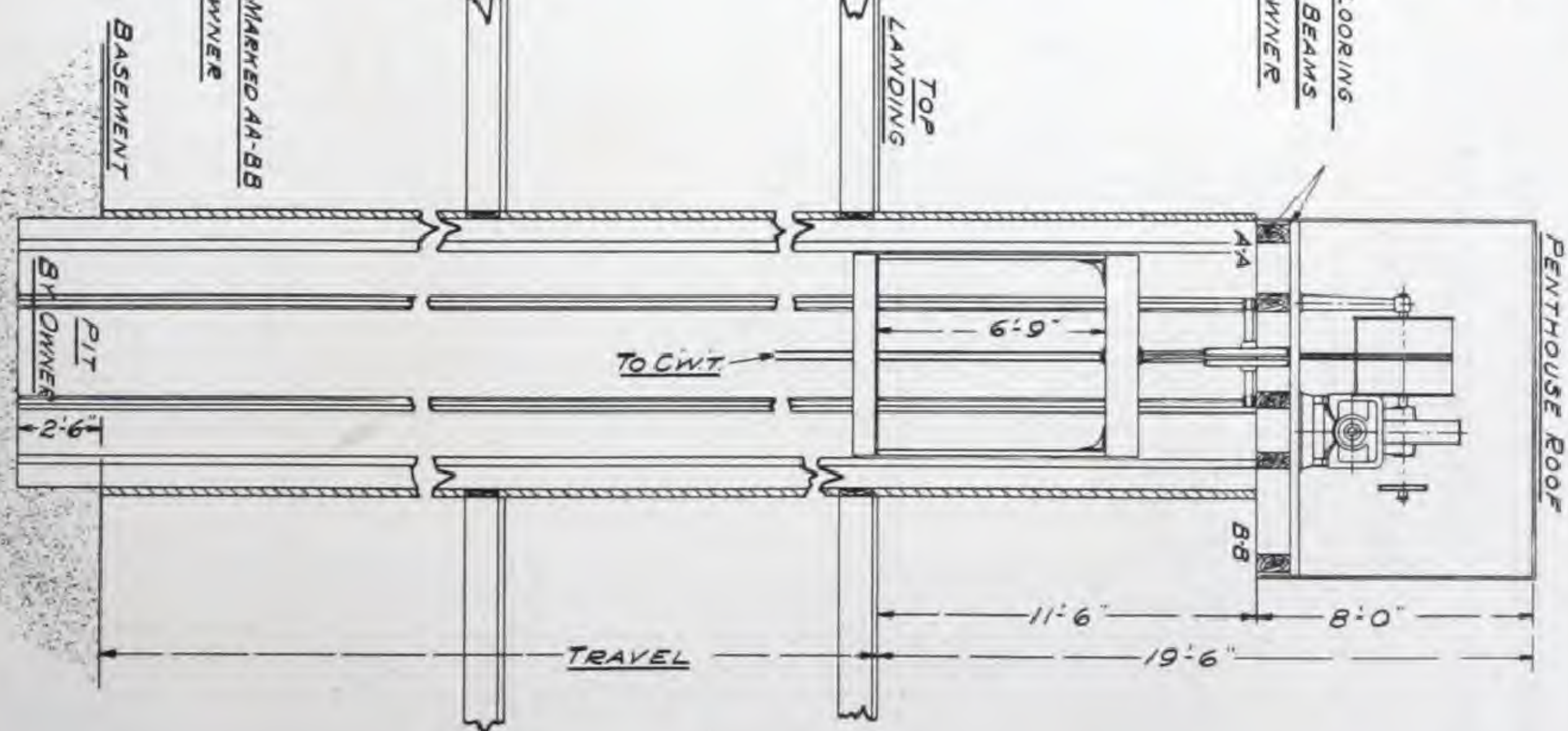
OTIS-FENSOM ELEVATOR COMPANY LIMITED

TORONTO - CANADA

No. HTB110



NOTE:
SUPPORTS MARKED AA-BB
BY OWNER



TYPE "A304" DIRECT CURRENT FREIGHT ELEVATOR

MACHINE CAPACITY 3000 AND 4000 LBS.										MACHINE CAPACITY 5000 AND 6000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"	PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
5'-0" x 6'-0"	5'-0"	7'-0"	9'-6"	6'-0"	7'-0"	10'-0"	6'-0"	7'-0"	10'-0"	6'-0" x 7'-0"	6'-0"	8'-0"	10'-6"	7'-0"	8'-0"	11'-0"	6'-0"	7'-0"	10'-0"
6'-0" x 7'-0"	6'-0"	8'-0"	10'-6"	7'-0"	8'-0"	11'-0"	6'-0"	7'-0"	10'-0"	6'-0" x 9'-0"	6'-0"	8'-0"	10'-6"	9'-0"	10'-0"	13'-0"	6'-0"	7'-0"	10'-0"
6'-0" x 8'-0"	6'-0"	8'-0"	10'-6"	8'-0"	9'-0"	12'-0"	6'-0"	7'-0"	10'-0"	7'-0" x 10'-0"	7'-0"	8'-0"	11'-6"	10'-0"	11'-0"	14'-0"	6'-0"	7'-0"	10'-0"
SPEED OF CAR	DIA. OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	SPEED OF CAR	DIA. OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL	MAXIMUM CAR TRAVEL
100 F.P.M.	34"	15"	35'-0"	35'-0"	35'-0"	35'-0"	35'-0"	35'-0"	35'-0"	75 F.P.M.	30"	15"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"
75 F.P.M.	30"	22"	25'-0"	25'-0"	25'-0"	25'-0"	25'-0"	25'-0"	25'-0"	50 F.P.M.	30"	26"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"	15'-0"

LAYOUT NO. HTB130

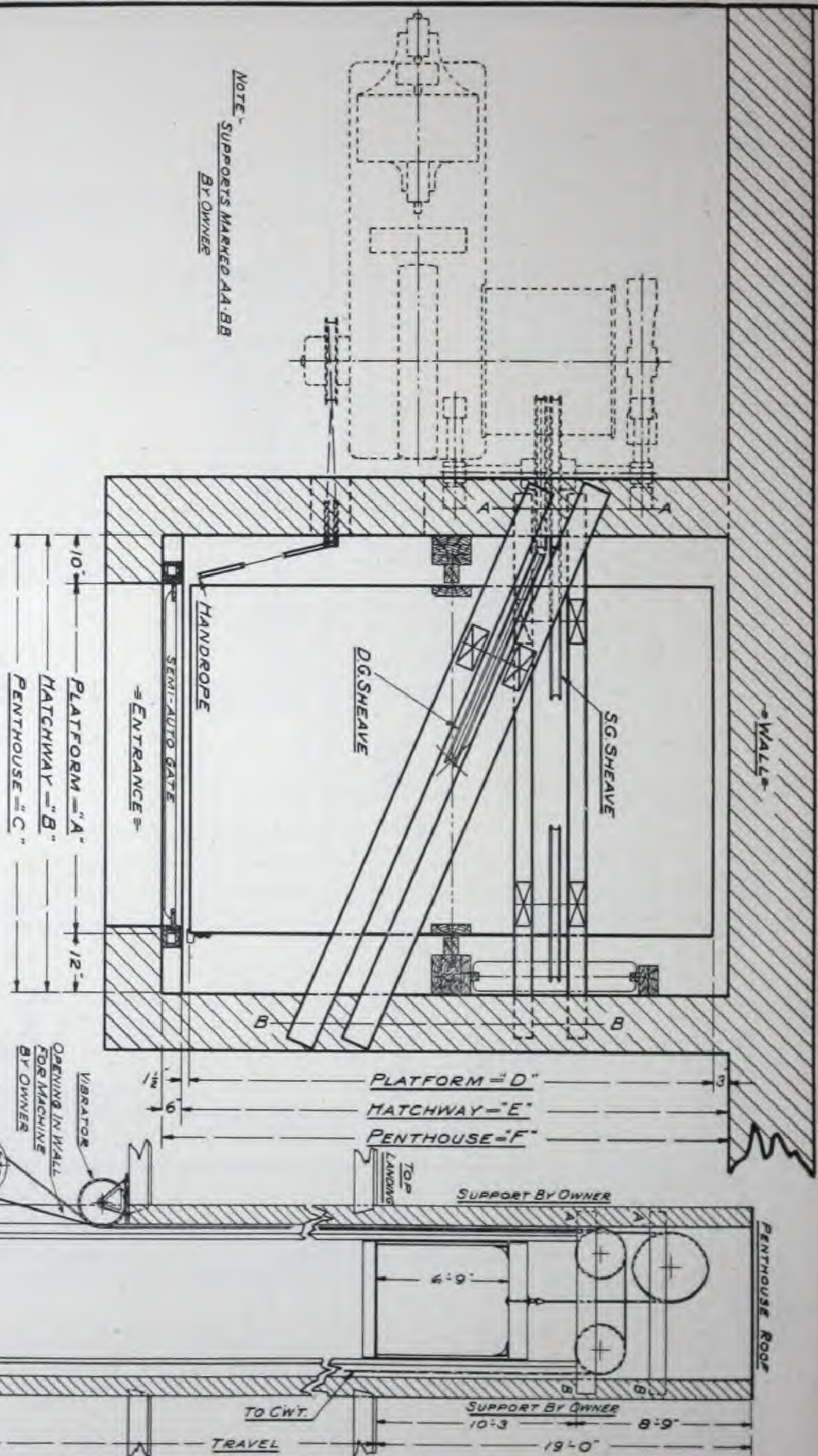
STANDARD DRUM TYPE FREIGHT ELEVATOR

OTIS FENSOM ELEVATOR COMPANY LIMITED

TORONTO—CANADA

No. HTB130

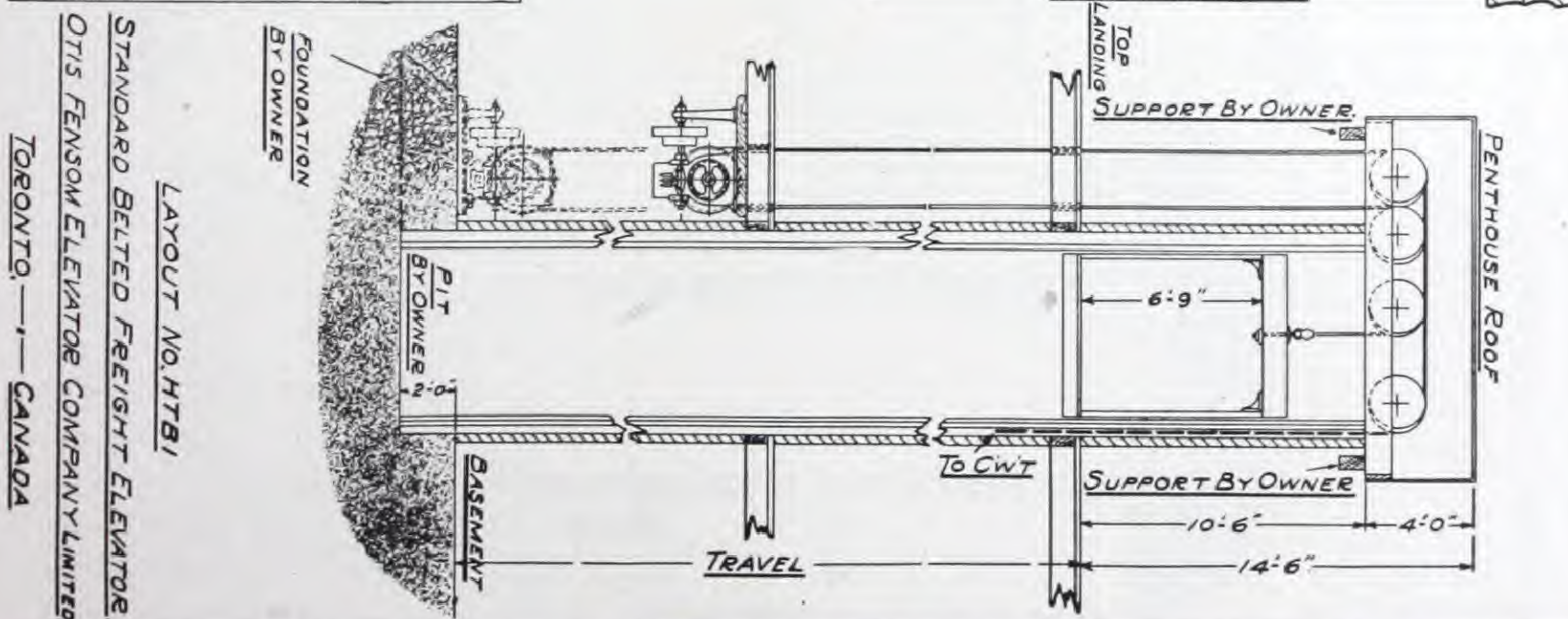
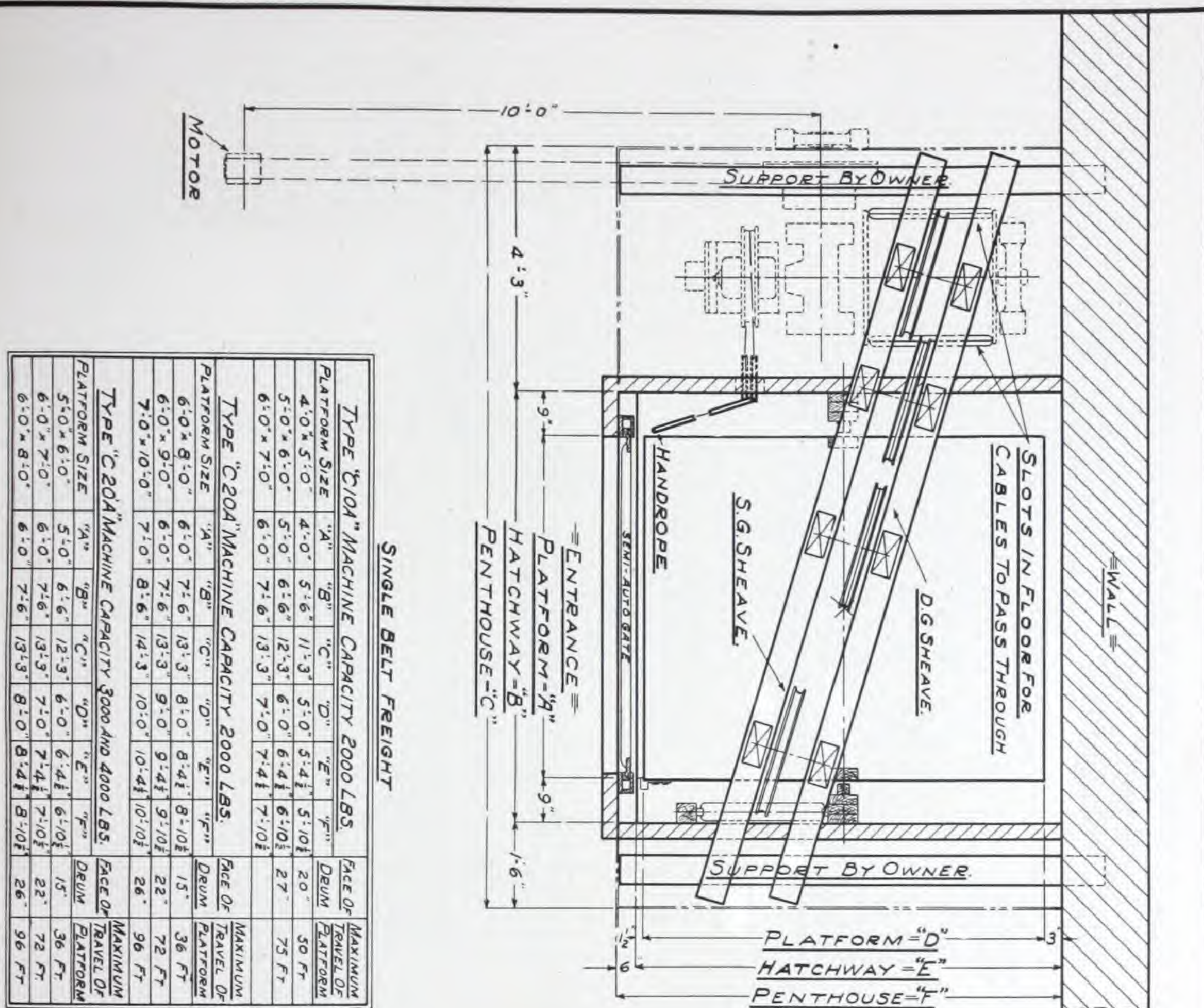
MACHINE CAPACITY 3000 AND 4000 LBS.										MACHINE CAPACITY 5000 AND 6000 LBS.									
PLATFORM SIZE		"A"	"B"	"C"	"D"	"E"	"F"	PLATFORM SIZE		"A"	"B"	"C"	"D"	"E"	"F"				
5'-0" x 6'-0"	5'-0"	6'-10"	6'-10"	6'-10"	6'-4"	6'-10"	7'-10"	6'-0" x 7'-0"	6'-0"	7'-10"	7'-10"	7'-10"	7'-4"	7'-10"	7'-10"				
6'-0" x 7'-0"	6'-0"	7'-10"	7'-10"	7'-10"	7'-4"	7'-10"	7'-10"	6'-0" x 9'-0"	6'-0"	7'-10"	7'-10"	9'-0"	9'-4"	9'-10"	9'-10"				
6'-0" x 8'-0"	6'-0"	7'-10"	7'-10"	8'-0"	8'-4"	8'-10"	8'-10"	7'-0" x 10'-0"	7'-0"	8'-10"	8'-10"	10'-0"	10'-4"	10'-10"	10'-10"				
SPEED OF CAR	DIAM OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL CABLES					SPEED OF CAR	DIAM OF DRUM	FACE OF DRUM	MAXIMUM CAR TRAVEL CABLES								
100 F.P.M.	34"	15"	40'-0"					75 F.P.M.	30"	15"	20'-0"								
		22"	80'-0"							22"	60'-0"								
		26"	100'-0"							26"	80'-0"								
		13"	30'-0"							15"	20'-0"								
		22"	70'-0"							22"	60'-0"								
		26"	90'-0"							26"	80'-0"								
75 F.P.M.	30"	26"	90'-0"					50 F.P.M.	30"	26"	80'-0"								



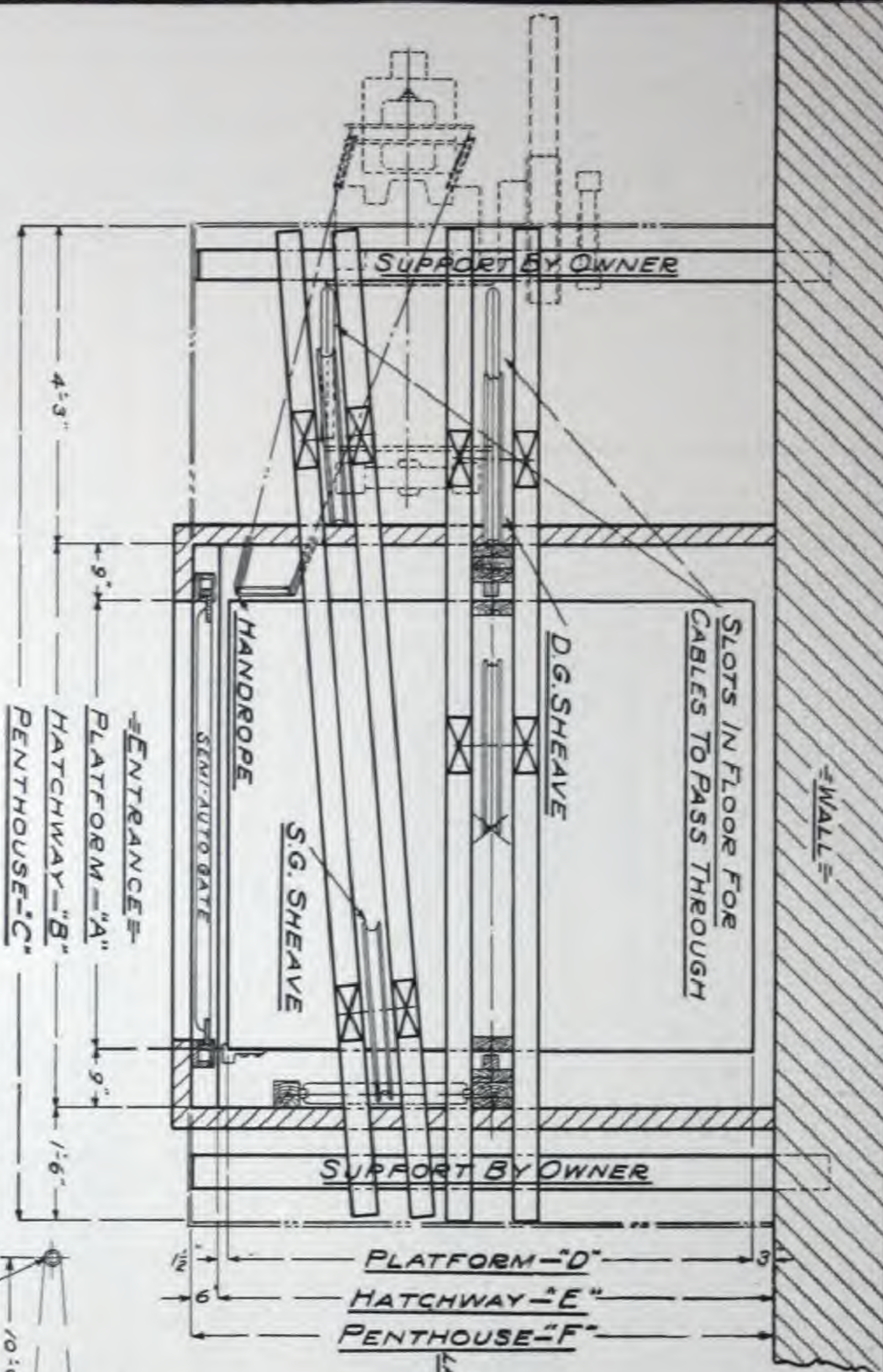
STANDARD DRUM TYPE FREIGHT ELEVATOR
OTIS-FENSOM ELEVATOR COMPANY LIMITED

TORONTO - CANADA

No. HTB150

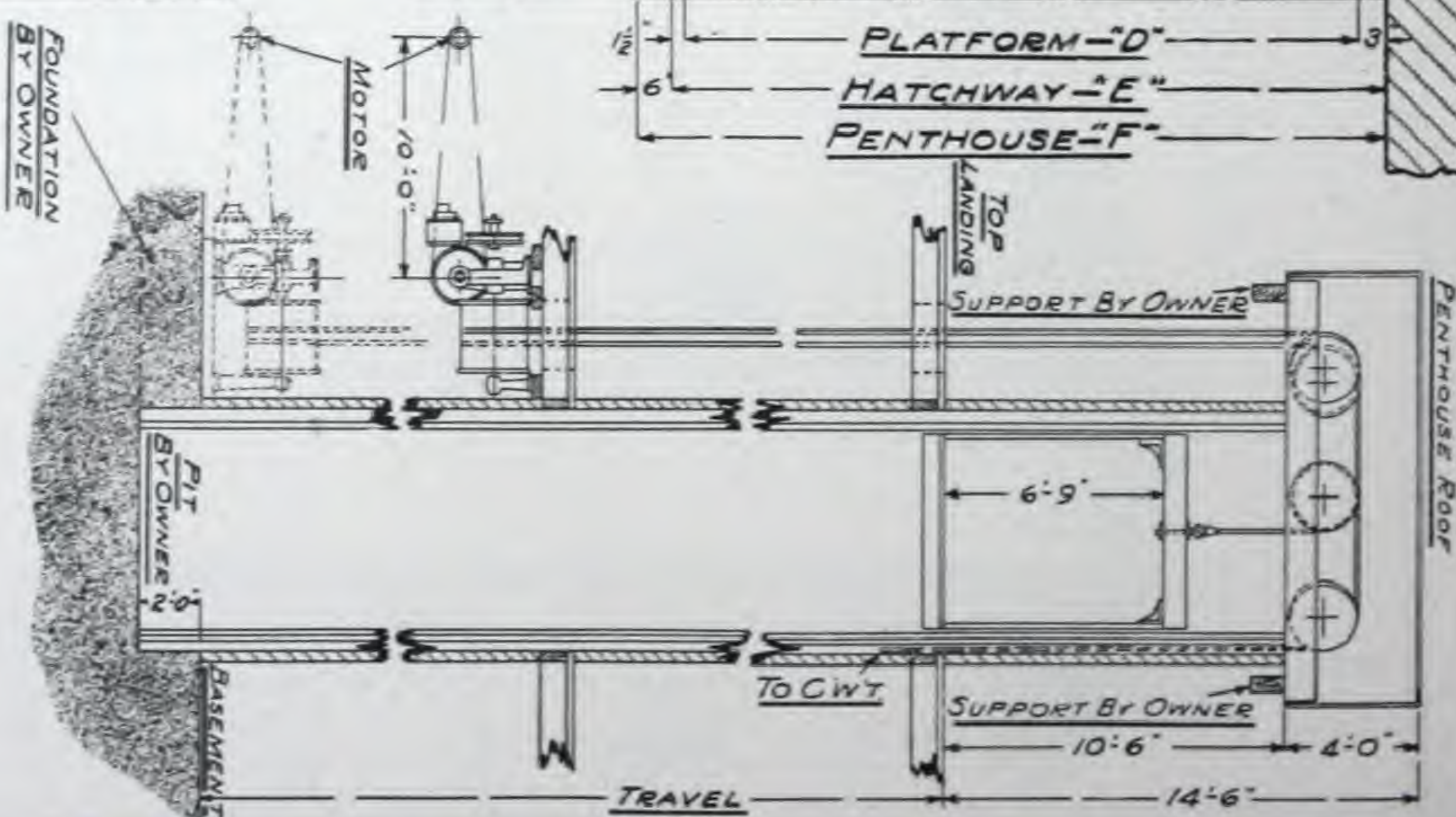


No. HTB1



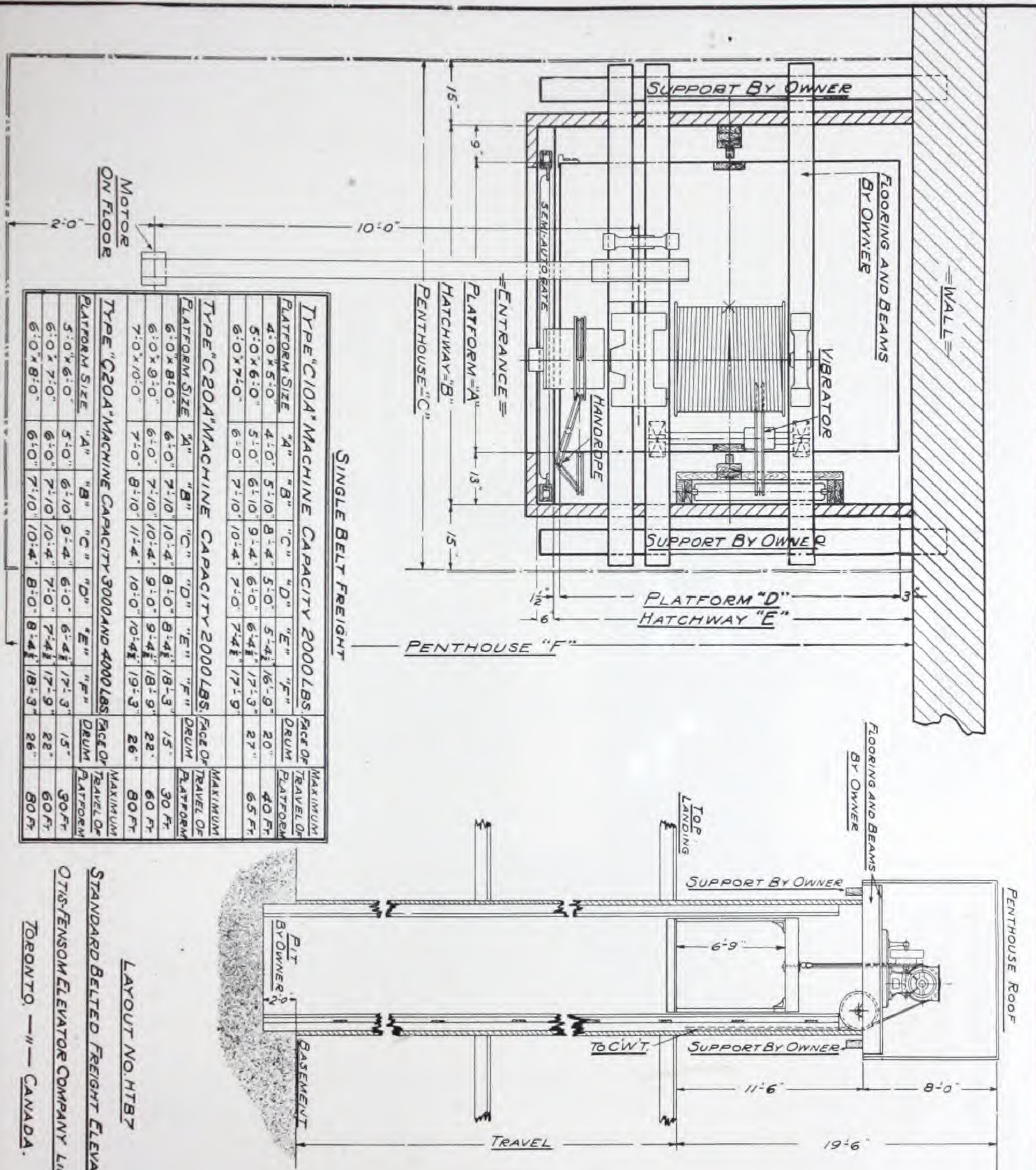
SINGLE BELT FREIGHT

TYPE "C10A" MACHINE CAPACITY 2000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	FACE OF DRUM	MAXIMUM TRAVEL OF PLATFORM	
4'-0" x 5'-0"	4'-0"	5'-6"	11'-3"	5'-0"	5'-4"	5'-10"	20"	50 FT.	
5'-0" x 6'-0"	5'-0"	6'-6"	12'-3"	6'-0"	6'-4"	6'-10"	27"	75 FT.	
6'-0" x 7'-0"	6'-0"	7'-6"	13'-3"	7'-0"	7'-4"	7'-10"			
TYPE "C20A" MACHINE CAPACITY 2000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	FACE OF DRUM	MAXIMUM TRAVEL OF PLATFORM	
6'-0" x 8'-0"	6'-0"	7'-6"	13'-3"	8'-0"	8'-4"	8'-10"	15"	36 FT.	
6'-0" x 9'-0"	6'-0"	7'-6"	13'-3"	9'-0"	9'-4"	9'-10"	22"	72 FT.	
7'-0" x 10'-0"	7'-0"	8'-6"	14'-3"	10'-0"	10'-4"	10'-10"	26"	96 FT.	
TYPE "C20A" MACHINE CAPACITY 3000 AND 4000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	FACE OF DRUM	MAXIMUM TRAVEL OF PLATFORM	
5'-0" x 6'-0"	5'-0"	6'-6"	12'-3"	6'-0"	6'-4"	6'-10"	15"	36 FT.	
6'-0" x 7'-0"	6'-0"	7'-6"	13'-3"	7'-0"	7'-4"	7'-10"	22"	72 FT.	
6'-0" x 8'-0"	6'-0"	7'-6"	13'-3"	8'-0"	8'-4"	8'-10"	26"	96 FT.	



No. HTB3

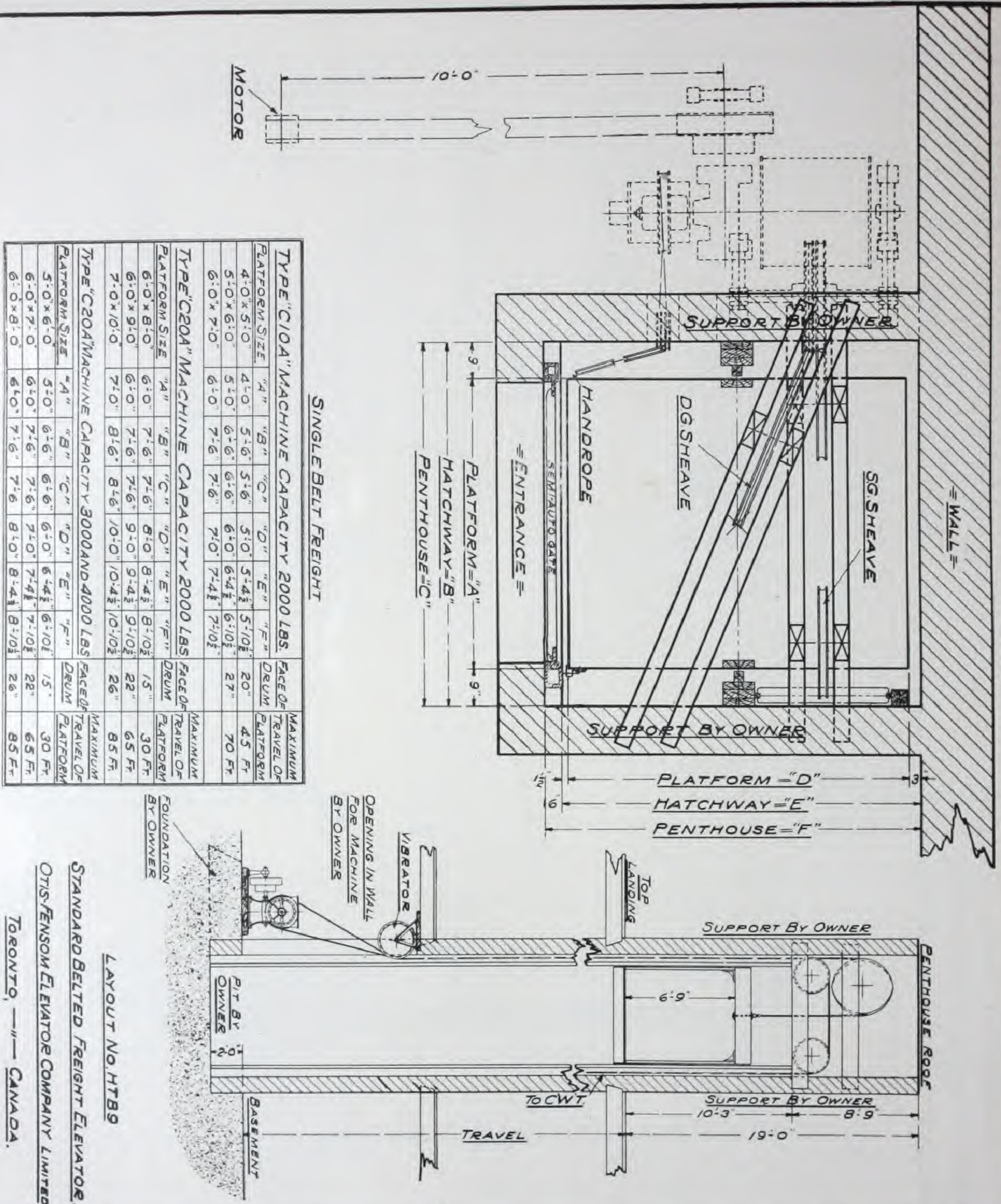
STANDARD BELTED FREIGHT ELEVATOR
 OTIS-FENSOM ELEVATOR COMPANY LIMITED
 TORONTO, — — CANADA



TYPE "C10A" MACHINE CAPACITY 2000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	FACE OF DRUM	MAXIMUM TRAVEL OF PLATFORM	
4'-0" x 5'-0"	4'-0"	5'-10"	8'-4"	5'-0"	5'-4"	16'-9"	20"	40 FT.	
5'-0" x 6'-0"	5'-0"	6'-10"	9'-4"	6'-0"	6'-4"	17'-3"	27"	65 FT.	
6'-0" x 7'-0"	6'-0"	7'-10"	10'-4"	7'-0"	7'-4"	17'-9"			
TYPE "C20A" MACHINE CAPACITY 2000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	FACE OF DRUM	MAXIMUM TRAVEL OF PLATFORM	
6'-0" x 8'-0"	6'-0"	7'-10"	10'-4"	8'-0"	8'-4"	18'-3"	15"	30 FT.	
6'-0" x 9'-0"	6'-0"	7'-10"	10'-4"	9'-0"	9'-4"	18'-9"	22"	60 FT.	
7'-0" x 10'-0"	7'-0"	8'-10"	11'-4"	10'-0"	10'-4"	19'-3"	26"	80 FT.	
TYPE "C20A" MACHINE CAPACITY 3000 AND 4000 LBS.									
PLATFORM SIZE	"A"	"B"	"C"	"D"	"E"	"F"	FACE OF DRUM	MAXIMUM TRAVEL OF PLATFORM	
5'-0" x 6'-0"	5'-0"	6'-10"	9'-4"	6'-0"	6'-4"	17'-3"	15"	30 FT.	
6'-0" x 7'-0"	6'-0"	7'-10"	10'-4"	7'-0"	7'-4"	17'-9"	22"	60 FT.	
6'-0" x 8'-0"	6'-0"	7'-10"	10'-4"	8'-0"	8'-4"	18'-3"	26"	80 FT.	

LAYOUT NO. HTB7
STANDARD BELTED FREIGHT ELEVATOR.
OTIS-FENSOM ELEVATOR COMPANY LIMITED.
TORONTO, —"— CANADA.

No. HTB7



STANDARD BELTED FREIGHT ELEVATOR.
OTIS-FENSOM ELEVATOR COMPANY LIMITED
TORONTO, —"— CANADA.

LAYOUT NO. HTB9

No. HTB 9

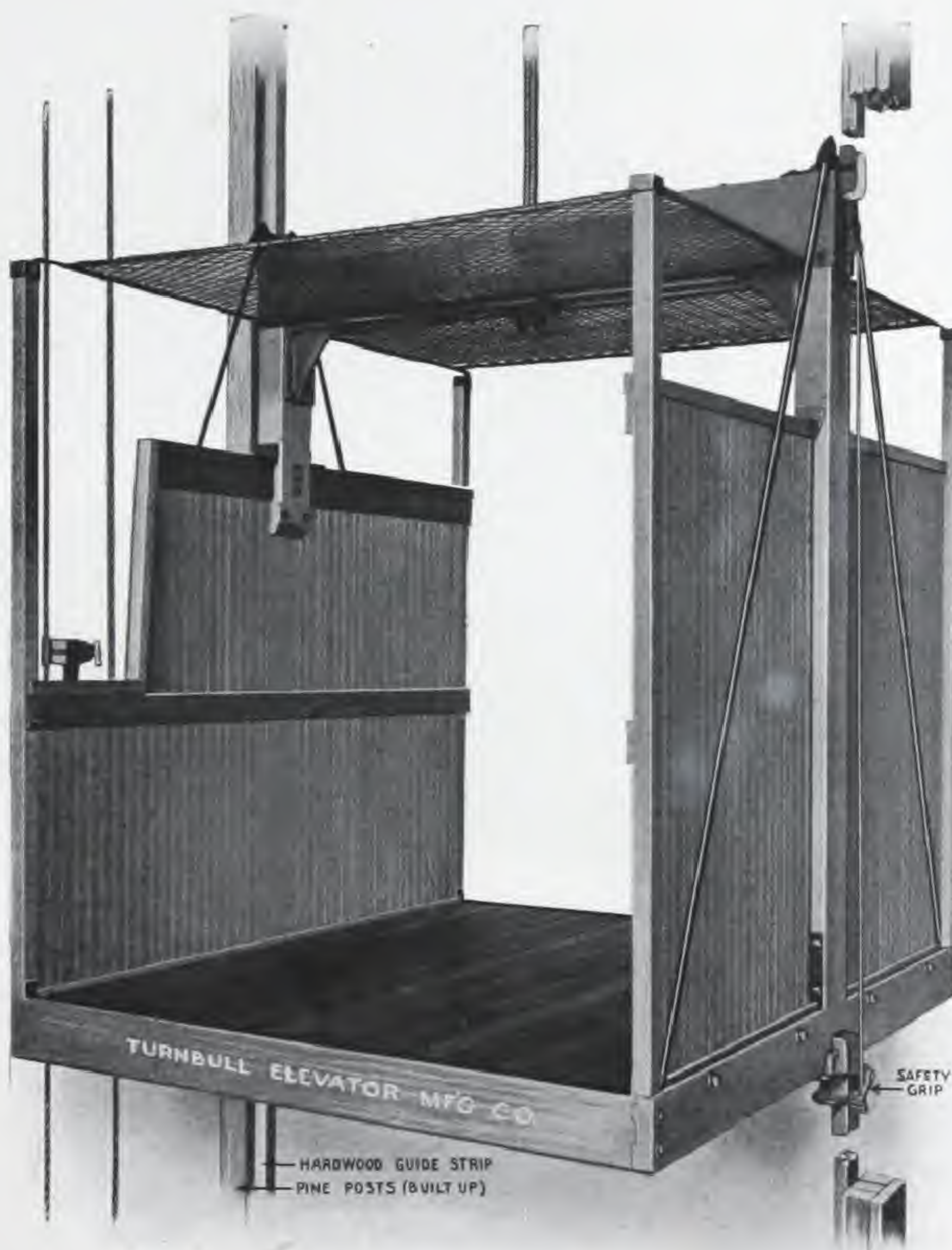
TURNBULL ELEVATOR CO., LIMITED

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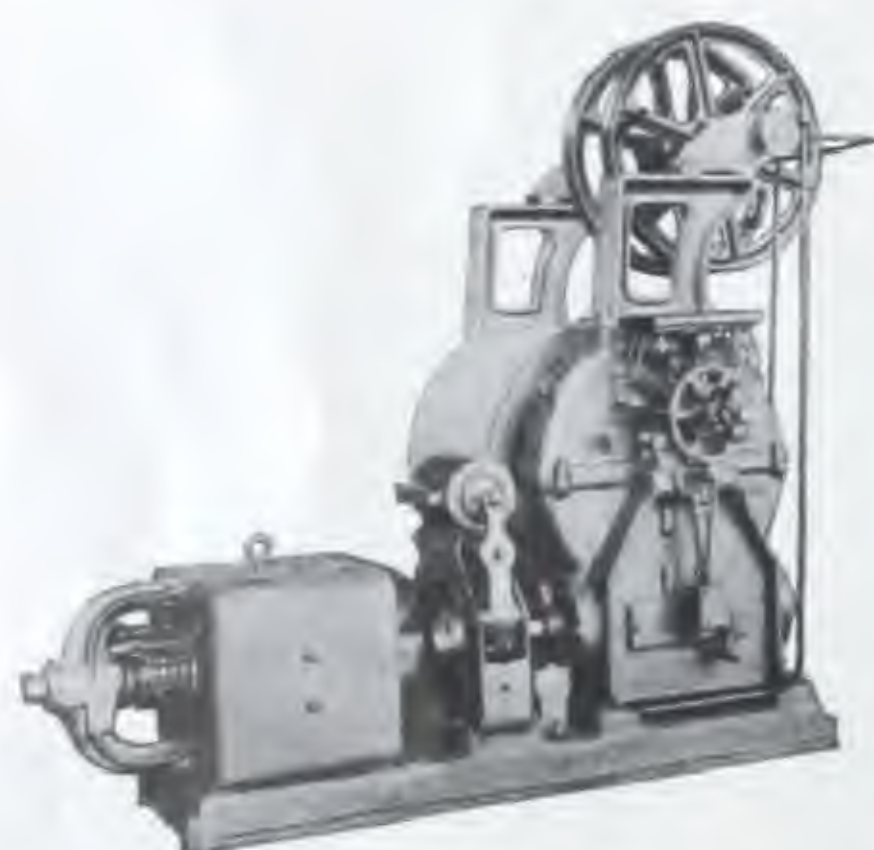
JERSEY CITY, N.J.
MONTREAL, QUEBEC.

TORONTO OFFICE:

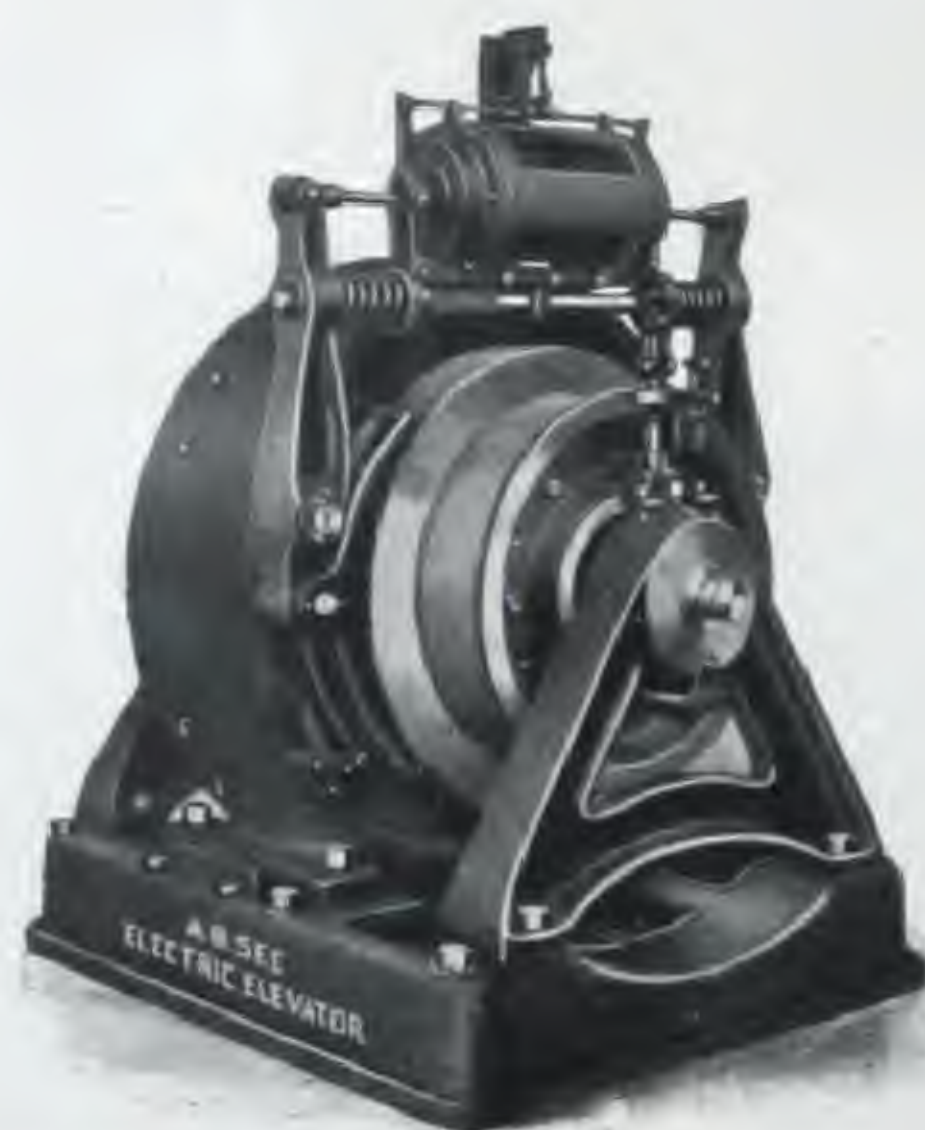
SUN LIFE BUILDING
TELEPHONE, MAIN 6327

OFFICES:—NEW YORK, PHILADELPHIA, BOSTON, WASHINGTON, BALTIMORE,
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Drum Type Machine.



High Speed Gearless Traction Machine.



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Royal Bank of Canada.....	Montreal, Que.....	H. C. Stone, Esq.
Henry Morgan & Co.....	Montreal, Que.....	H. C. Stone, Esq.
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St. Maurice Lumber Co.....	Three Rivers, Que.....	International Paper Company.
Transportation Building.....	Ottawa, Ont.....	Albert Ewart, Esq.
Standard Bank.....	Ottawa, Ont.....	Albert Ewart, Esq.
Jackson Building.....	Ottawa, Ont.....	Albert Ewart, Esq.
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Methodist Book Room.....	Toronto, Ont.....	Messrs. Burke, Horwood & White.
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Fisher Body Co.....	Ford City, Ont.....	Albert Kahn, Esq.

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QUEBEC OFFICE: 203 St. John Street. W. J. BANKS, Agent.

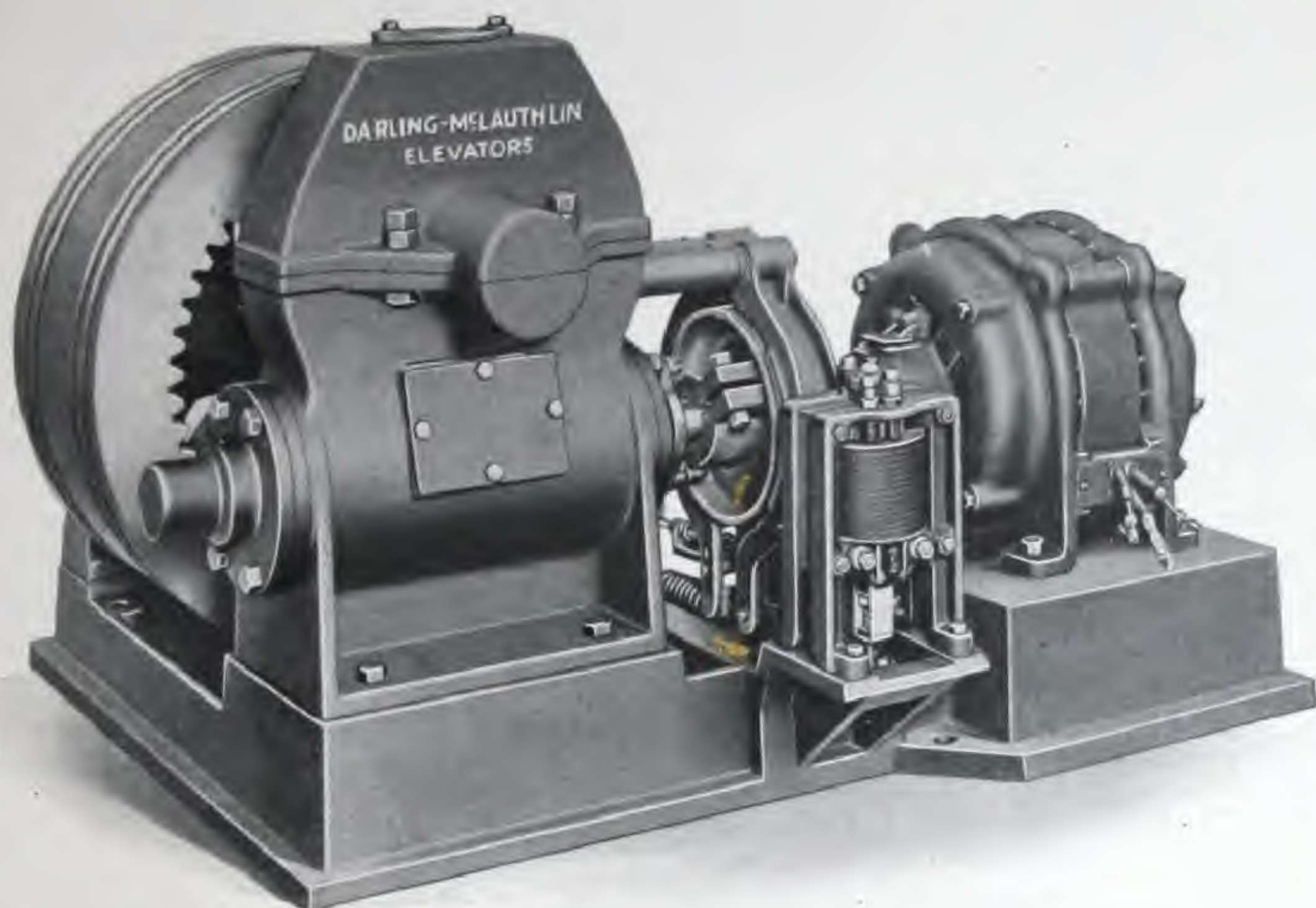
WINNIPEG OFFICE:

104 Princess Street.
CHARLES A. SARGENT, Manager.

CALGARY OFFICE:

605 Second Street West.
S. S. CLARKE, Agent.

VANCOUVER OFFICE:

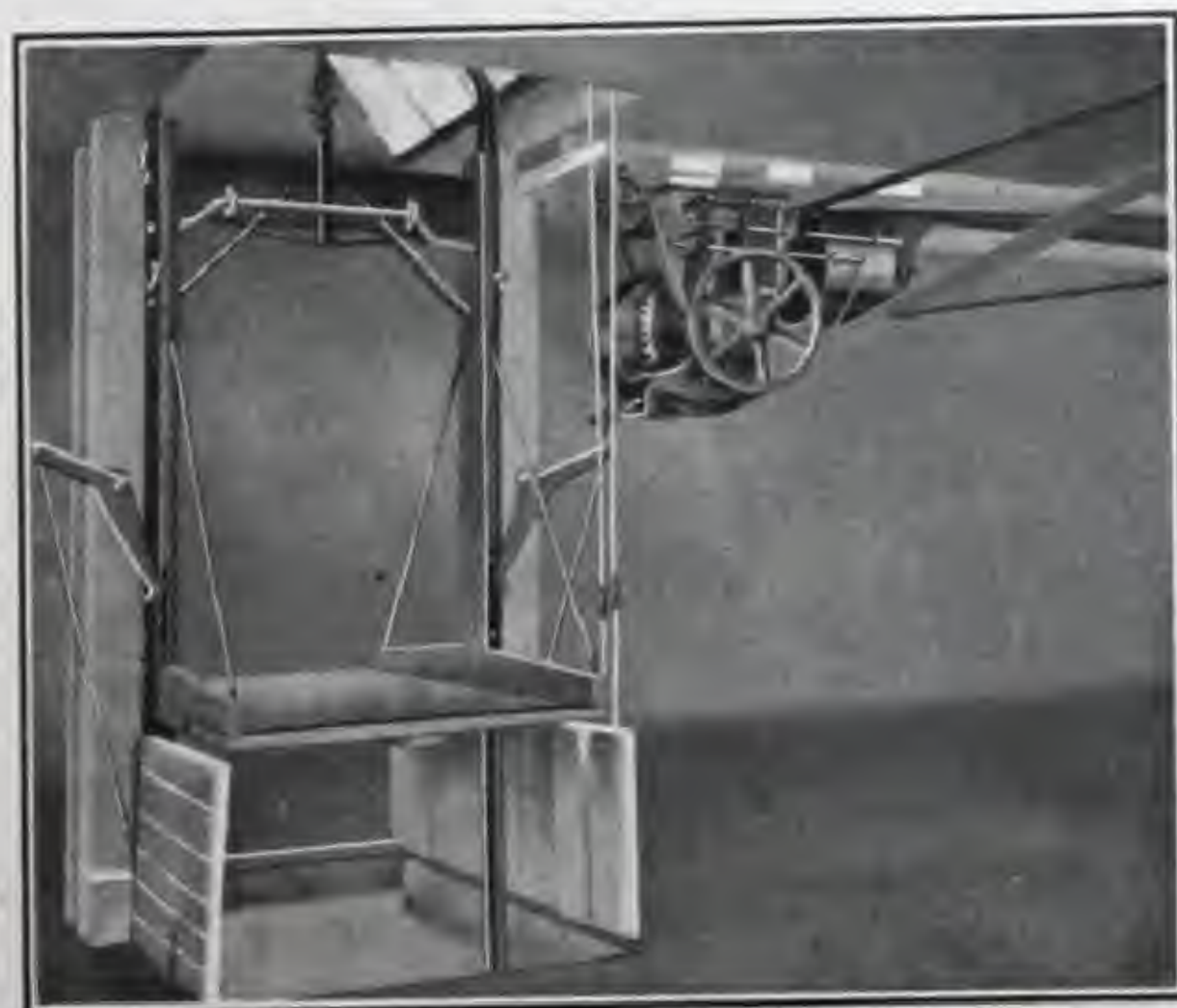
1144 Homer Street.
FRANK DARLING & CO. LTD., Agents.HALIFAX OFFICE:
3 Simson Bldg.
J. A. THOMPSON, Manager.OTTAWA OFFICE:
71½ Sparks Street.
CHARLES V. CLARK, Manager.TORONTO OFFICE:
77 York Street.
H. J. CHURCH, Manager.

No. AA—DIRECT CONNECTED TYPE INTERNAL GEARED ELECTRIC ELEVATOR MACHINE.

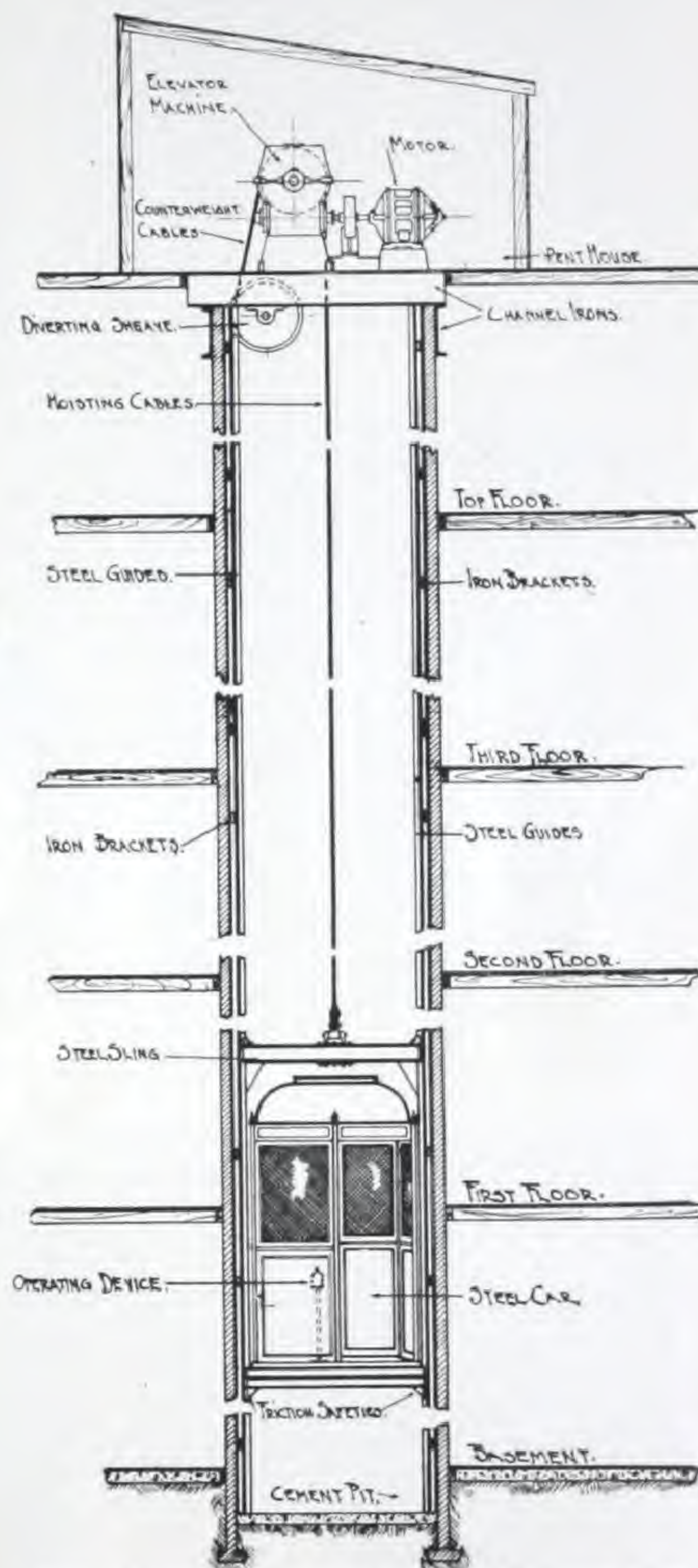
FREIGHT
ELEVATORS.

We manufacture Freight Elevators up to any given capacity.

Our designs include all types of Electric, Hydraulic, Belt Driven and Hand Power Elevators. A catalogue devoted entirely to this branch of our business can be obtained upon application to any of our branch offices. We also manufacture the Direct Connected Drum and Traction Type Machines from the designs of the G. T. McLauthlin Company of Boston.



CEILING TYPE BELT-DRIVEN ELEVATOR MACHINE (Typical).

DUMB
WAITERS
AND
ASH HOIST
MACHINES.

TYPICAL LAYOUT OF STANDARD PASSENGER ELEVATOR WITH CAR SWITCH CONTROL.

Our elevator department is also equipped for handling all types of Dumb Waiters and Ash Hoist Machines.

We will be glad to quote on any work of this nature. Ask for our catalogue.

See also our advertisement on Steam Specialties, page 232 and the Mason Safety Tread, page 134.



GILLIS & GEOGHEGAN

MANUFACTURERS OF
G & G TELESCOPIC HOIST,
SHERBROOKE, QUEBEC, CANADA.

AGENTS:

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B. & S. H. THOMPSON & CO., LTD., TORONTO: Agent for Ontario.
R. C. GRANT, NEW GLASGOW, N.S.—Sub-agent for B. & S. H. Thompson & Co., for Maritime Provinces.

PATENT DATES.
Dominion of Canada.

April 19, 1912.
May 14, 1912.
December 9, 1913.
April 7, 1914.
Re-issued
November 14, 1916.
April 27, 1915.
June 22, 1915.
August 3, 1915.
May 9, 1916.
July 25, 1916.
September 5, 1916.
October 10, 1916.
November 21, 1916.
June 1, 1920.
August 31, 1920.

Other Patents Pending.

PRODUCTS.

We manufacture one and two man equipment for handling ashes, rubbish and other materials between floors, consisting of Hoist, in following models, together with G & G Flush Watertight Sidewalk Doors, G & G Automatic Door Opening and Closing Device, G & G Spring Guard Gate, G & G Swing Bail Ash Cans, G & G Ash Can Truck, G & G Operator's Ladder, and G & G Electric Warning Bell.

- MODEL E. HOIST OPERATED BY ELECTRIC MOTOR, with Automatic Stop and Gravity Lowering device.
MODEL D. OVERHEAD CRANE HOIST WITH ELECTRIC MOTOR IN CELLAR.
MODEL C. HOIST OPERATED BY ELECTRIC MOTOR IN CELLAR.
MODEL B. OVERHEAD CRANE HAND POWER HOIST, with Automatic Gear Shifting Brake Device and Silencer.
MODEL A. HAND POWER HOIST, with Automatic Gear Shifting Brake Device and Silencer.

USES.

G & G Telescopic Hoists with Complete Equipment are designed for lifting and lowering loads up to 500 lbs. In industrial plants, and for ash removal in residences, schools, institutions, etc., G & G Hoist Equipment complies with all municipal ordinances.

MODEL "E"
TELESCOPIC
HOIST WITH
ELECTRIC MOTOR
(ONE-MAN MODEL).

The G & G Model "E" Telescopic Hoist with Complete Equipment operates electrically, and affords a simple, safe and economical method for hoisting and lowering between cellar and sidewalk, or between floors, such loads as ashes, rubbish, bags, bales, barrels, coal, garbage, ice, trays, etc. Fig. 1 shows Hoist equipment as installed for ash removal. When not in use no part of Hoist shows above sidewalk. A few turns of telescoping handle raises hoisting head to proper position over hoistway (Figs. 2 and 3). Operator then ascends to sidewalk level by the iron ladder, and proceeds to raise the cans. Hoisting head revolves on ball bearings, depositing can, without lifting, on sidewalk. Hoist is equipped with automatic upper limit, and LOWERS BY GRAVITY—thus consuming only HALF the usual amount of current, and permitting very rapid lowering speed. Electric control lever has three positions and automatically returns to "neutral" when pressure is released. At one extreme, load is raised by electric power, at the other extreme load is lowered by gravity, and in centre position load is brought to an instant stop.

ADVANTAGES.

One man unaided, can operate Hoist (see Fig. 2).

Hoist raises 500 lb. load at speed of 60 feet per minute.

The Hoist equipment is compact and very easy to erect.

We furnish all necessary clamps and bolts, and blue print showing erection in detail. The sidewalk doors and spring guard gates make open hoistway absolutely safe for operator and pedestrian alike.

CONSTRUCTION.

The strongest and most durable materials are used. Hoisting head is a steel casting. Steel cable is non-rotating. All gears are machine cut. Every Hoist is subjected to thorough working test before shipment. All Hoists are painted before shipment.

MOTOR.

Hoist has a $1\frac{1}{2}$ h.p. A.C. or D.C. totally enclosed motor with brake, automatic upper limit, and single speed controller. Current is only consumed when hoisting. The apparatus is dust and moisture proof, lubrication being effected throughout by means of grease forced through compression cups.

CAPACITY.

No part has a factor of safety of less than eight based on the ultimate strength of the material when the maximum load of 500 lbs. is raised.

MODEL "D"
OVERHEAD CRANE
HOIST WITH
ELECTRIC MOTOR
(TWO-MAN MODEL).

G & G Telescopic Overhead Crane Hoist, Model "D," with Complete Equipment operates electrically and (Figs. 3 and 4) is for use in large buildings where the grade level approach permits wagons to drive up alongside of the hoistway leading to cellar or boiler room. When not in use, no part of Hoist shows above sidewalk.

Model "D" raises a maximum load of 300 lbs. at an actual speed of 60 feet per minute. The can shown in Fig. 3 weighs about 175 lbs. when filled with ashes. Also constructed for maximum working capacity of 500 lbs.



FIG. 1. MODEL E.

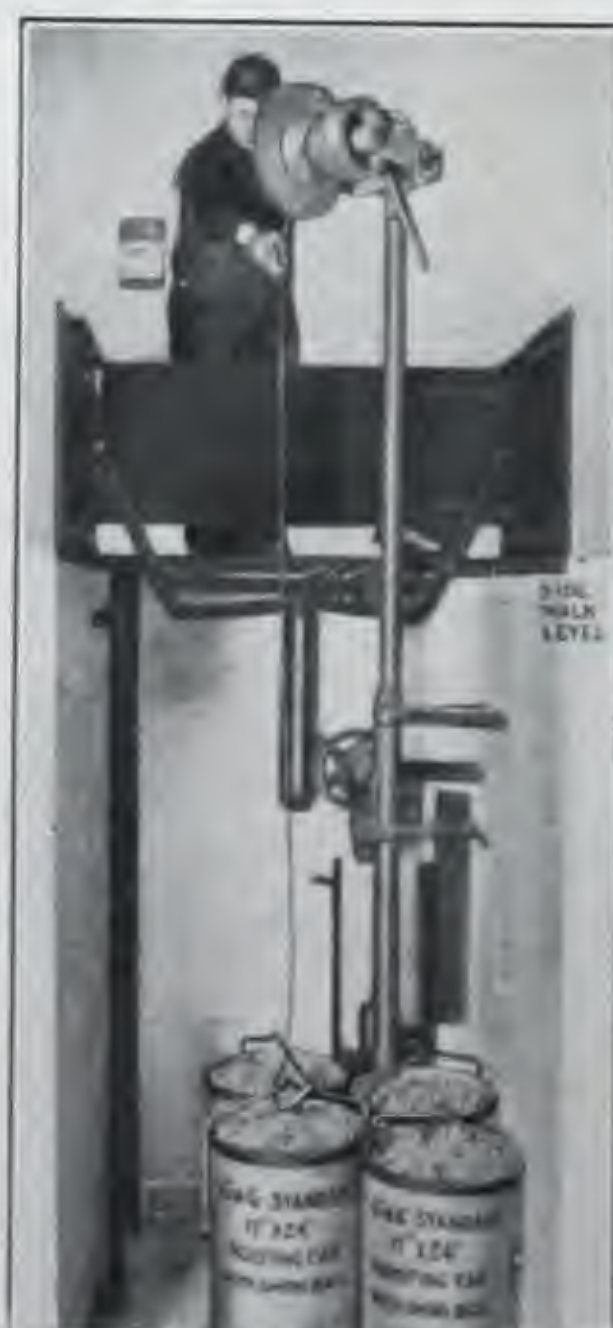
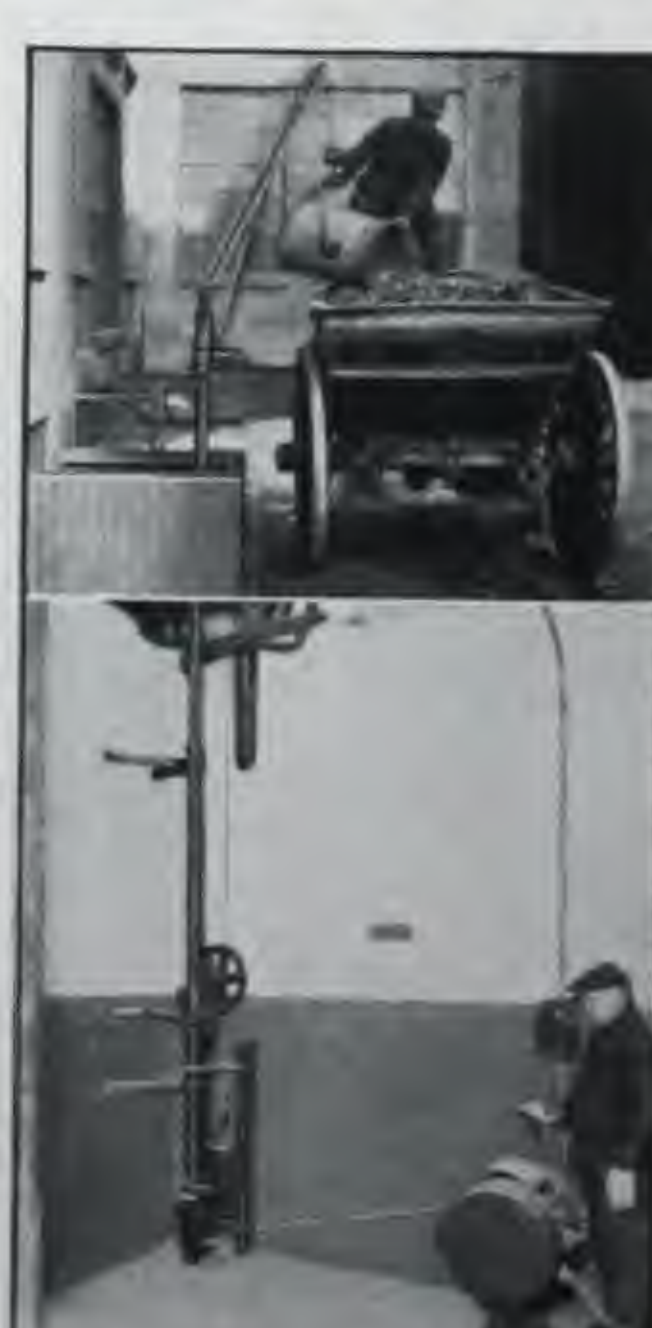


FIG. 2. MODEL A.



FIGS. 3 AND 4. MODEL D.

FIG. 5. MODEL B: EMPTYING CAN INTO WAGON.
HOISTING HEAD REVOLVES ON BALL-BEARINGS.

Fig. 2 shows how one man, unaided, can "hook" and raise four or five G & G Swing Bail Cans without leaving sidewalk. We recommend that area be made 4 x 4 ft. in size. A 4 x 4 ft. hoistway area is the best size for all G & G Standard Hoists.

MOTOR.

Hoist has a $1\frac{1}{2}$ h.p. (series wound for D.C., squirrel cage for A.C.) totally enclosed motor with mechanical load brake, automatic upper and lower limit, and single speed controller giving one hoisting and one lowering speed. Cable is non-rotating. The apparatus is dust and moisture proof, lubrication being effected throughout by means of grease forced through compression cups.

MODEL "C"
HOIST WITH
ELECTRIC MOTOR
(TWO-MAN MODEL).

G & G Telescopic Hoist, Model "C," with Complete Equipment operates electrically and is used in large buildings where a considerable number of cans or other loads must be handled daily. Raises a maximum load of 500 lbs. to grade level at an actual speed of 60 feet per minute. When not in use the Hoist telescopes and no part shows above sidewalk.

MOTOR.

Located in cellar, and identical with motor described for Model "D" Hoist.

MODEL "B"
OVERHEAD CRANE
MANUAL HOIST
(ONE-MAN MODEL).

Illustration (Fig. 5) shows the G & G Telescopic Overhead Crane Hoist with Complete Equipment, as installed for Ash Removal. This Hoist equipment is so arranged that the operator, standing at grade level, may raise cans from cellar and empty them directly into wagon or truck without rehandling at grade level. This Hoist has the telescopic feature, so that no part shows above pavement when not in use.

CAPACITY.

Raises maximum load of 300 lbs. at a speed of 30 feet per minute. A pressure of not more than $12\frac{1}{2}$ lbs. is required on hoisting handle to raise filled ash cans. The can shown in Fig. 5 weighs about 175 lbs. when full of ashes. Also constructed for maximum working capacity of 500 lbs.

MODEL "A"
MANUAL HOIST
(ONE-MAN MODEL).

G & G Telescopic Hoist, Model "A," with Complete Equipment is installed in buildings where it is desired to use manual power for raising and lowering loads. One man, unaided, can operate Hoist (see Fig. 6), and loads up to 500 lbs. are easily raised at a speed of 30 feet per minute. A pressure of not more than $12\frac{1}{2}$ lbs. is required on hoisting handle to raise filled ash cans. Hoisting Head revolves on ball bearings, depositing can, without lifting, on sidewalk. For lowering, a powerful band brake is provided. Hoist is equipped with Automatic Gear Shifting Brake Device. Hoisting handle does not revolve when load is lowered. The patented "Silencer" makes Hoist extremely quiet in operation.

G & G COMPLETE
EQUIPMENT FOR
ALL MODELS.

The Sidewalk Doors and Spring Guard Gates are operated *automatically* when Hoist is placed in or out of service. The doors *lock* automatically when fully open or entirely closed. Automatic electric warning bell operates when doors are being opened or closed. The iron ladder affords a direct passage between cellar and grade or between floors. The swing bail cans enable operator to "hook" cans from grade without descending to cellar. The ash can truck makes for quick transportation of cans in cellar and avoids damage to floor and can caused by dragging and rolling cans. All parts carefully inspected and tested before shipment.

This equipment is especially designed for use with the G & G Hoist. When specifying Hoist, include the words "With Complete Equipment" in order to secure maximum working efficiency.

Write for practical formula showing how to determine which model to specify.



FIG. 7. Close-up view of hoisting head of Model E Hoist, showing hand-lever which controls raising and lowering operations of the hoist.



FIG. 6. MODEL A. REVOLVING HOISTING HEAD WITH CAN.



FIG. 8. MODEL B. NON-TELESCOPIC HOIST AS USED IN A CHEMICAL PLANT.



View of Sidewalk Doors closed and automatically locked.



Sidewalk doors automatically open; alarm bell rings.



Operator ascending iron ladder to sidewalk.



"Hooking" a G & G Standard Hoisting Can with Swing Bail.



Raising filled can without leaving sidewalk.



Swinging hoisting head to deposit can on sidewalk, pushes gate open.



Can deposited on sidewalk without lifting.



Four filled cans raised without leaving sidewalk.



Lowering empty cans. Hoisting handle does not revolve.



Operator descending iron ladder to cellar level.



As hoisting head is lowered, doors automatically close.



Sidewalk doors closed and automatically locked.



Hoist in area, compact, out of the way.

FIG. 9. OPERATING THE G & G TELESCOPIC HOIST, IN CONNECTION WITH THE G & G FLUSH WATERTIGHT SIDEWALK DOORS, EQUIPPED WITH THE G & G AUTOMATIC SIDEWALK DOOR OPENING AND CLOSING DEVICE AND SPRING GUARD GATE. SIDEWALK DOORS ARE SELF-LOCKING, WHETHER OPEN OR CLOSED.

Note that one man, unaided, performs entire operation.

THE HERBERT MORRIS CRANE AND HOIST COMPANY, LIMITED

ASSOCIATED WITH HERBERT MORRIS INCORPORATED, BUFFALO, N.Y.

HEAD OFFICE AND WORKS:
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The pictures given below are reproduced on a small scale from our new Book 76. They are intended to remind you of a few of the applications of Morris standard products to the problems incident to modern industrial conditions.

You have probably made use of Morris cranes in the past, and therefore know the value of our specialised experience, our quantity production on interchangeable lines and our comprehensive stocks. If so, we shall be pleased to co-operate with you again whenever you think we can be of service to you . . . and if *not* . . . call and see us, telephone for one of our sales engineers to come to see you, or write for a copy of Book 76: you will like us when you know us.

If you are interested particularly in any of the devices illustrated below and would like to receive a quotation, please refer to the number of the picture and give us the heaviest weight to be lifted, as well as a few dimensions of the space available. Full information will then be sent to you promptly, and without any obligation whatsoever.



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B. 404. TELESCOPIC ASH-HOIST.



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B. 407. POST-TYPE JIB-CRANE.

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CATALOGUE.

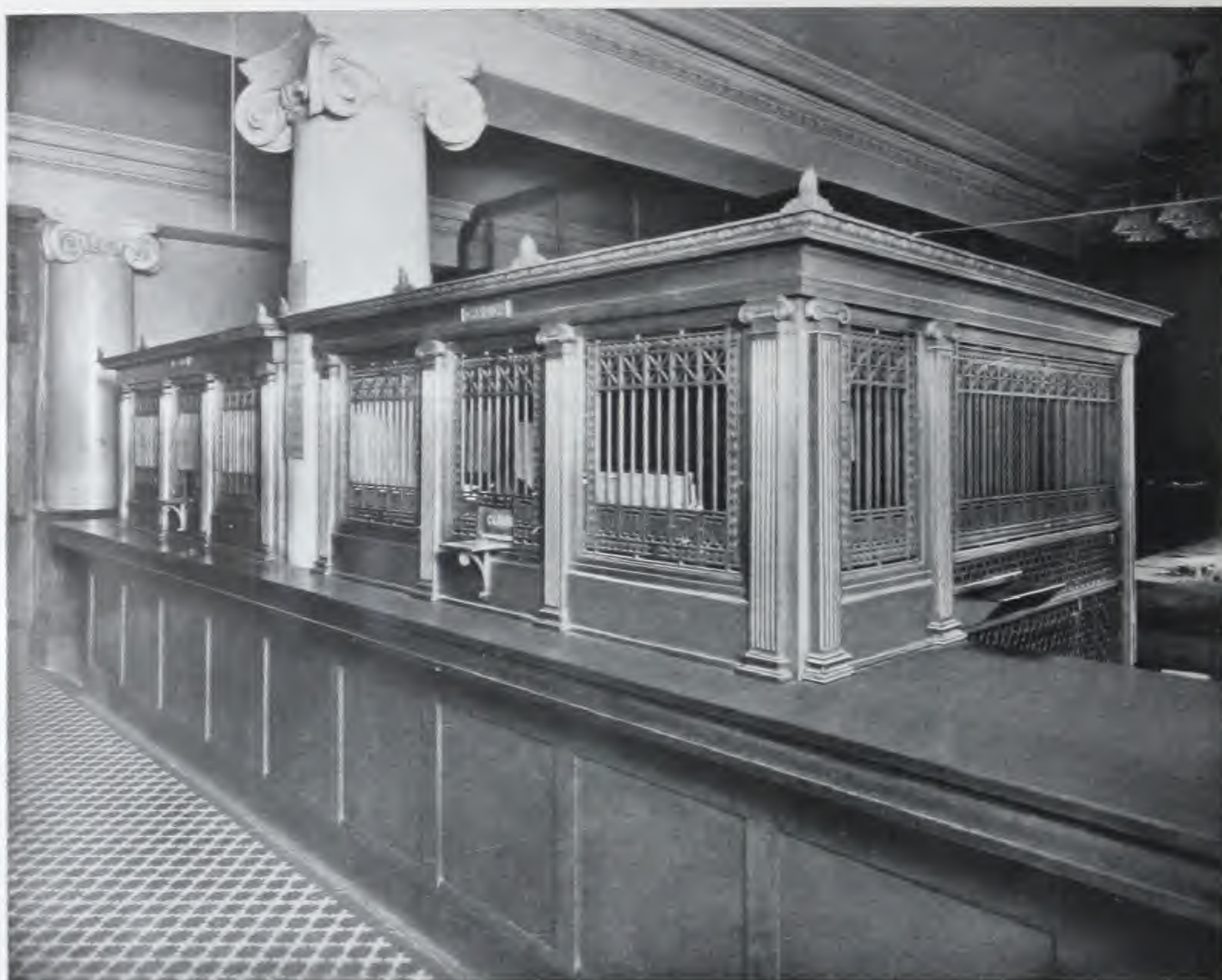
Architects, please send for our illustrated catalogue, which gives an idea of the style and scope of work we have actually executed.

See also our advertisement on page 272.

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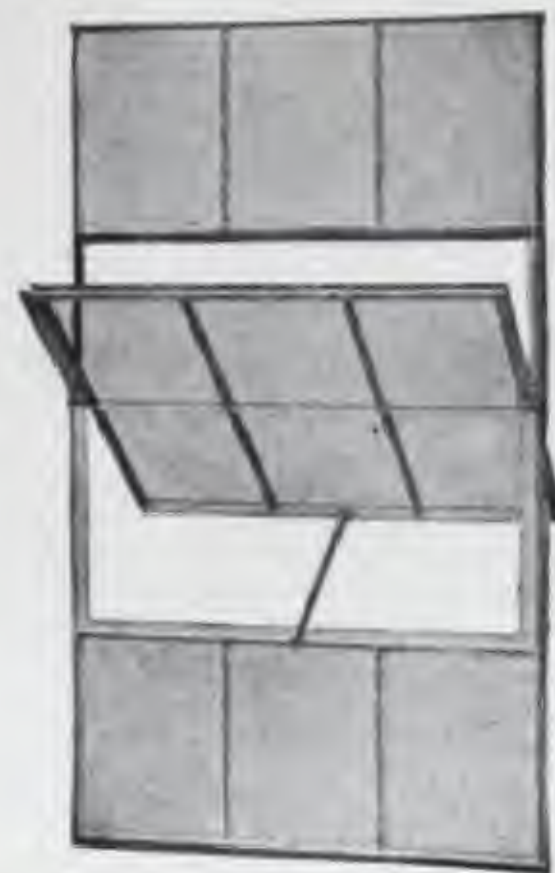
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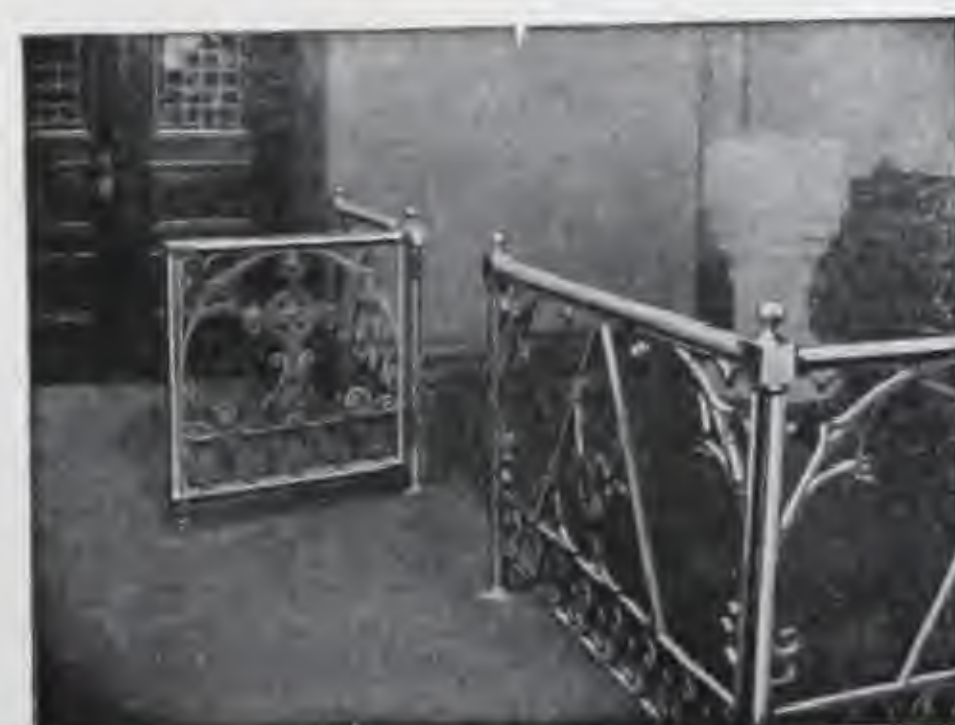
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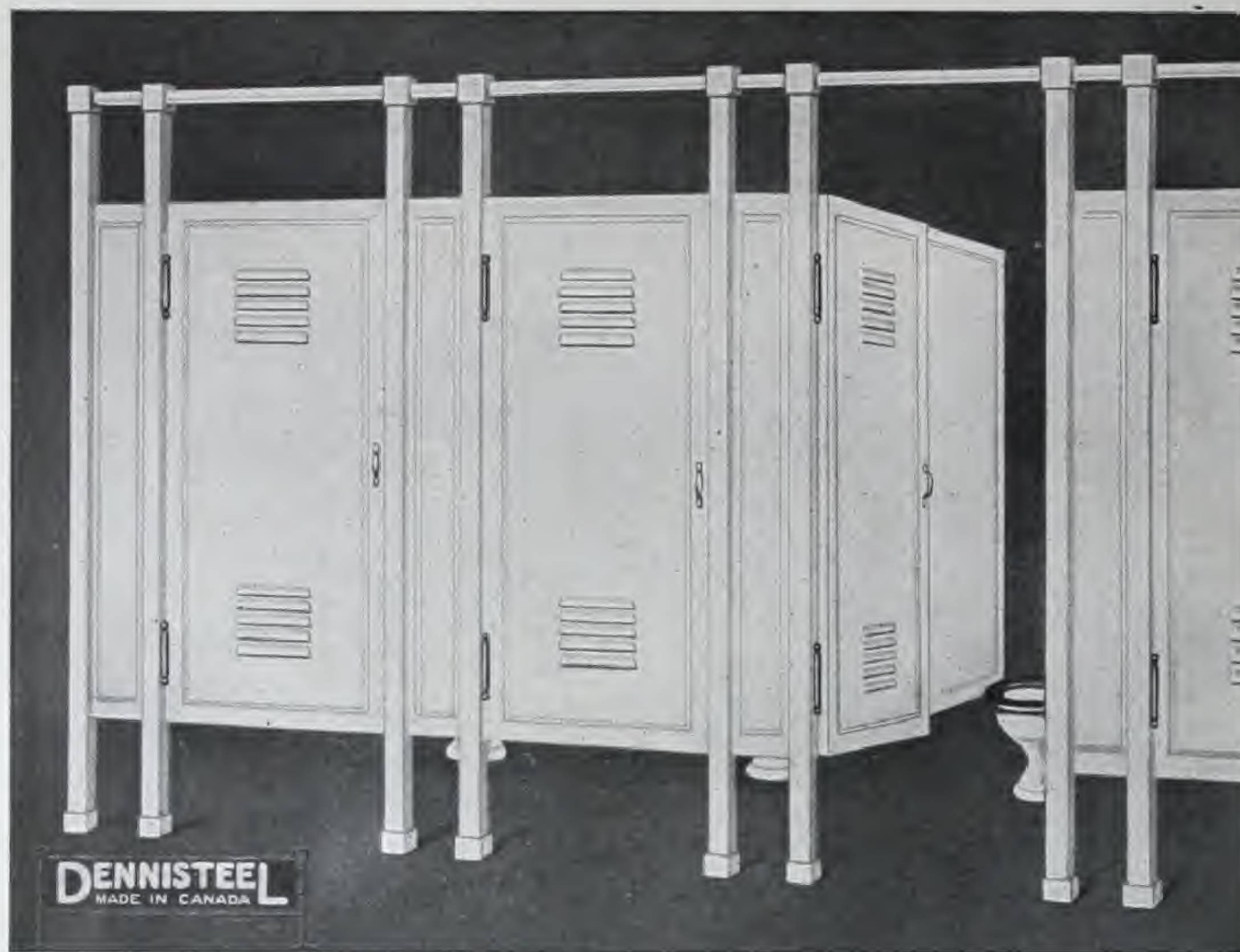
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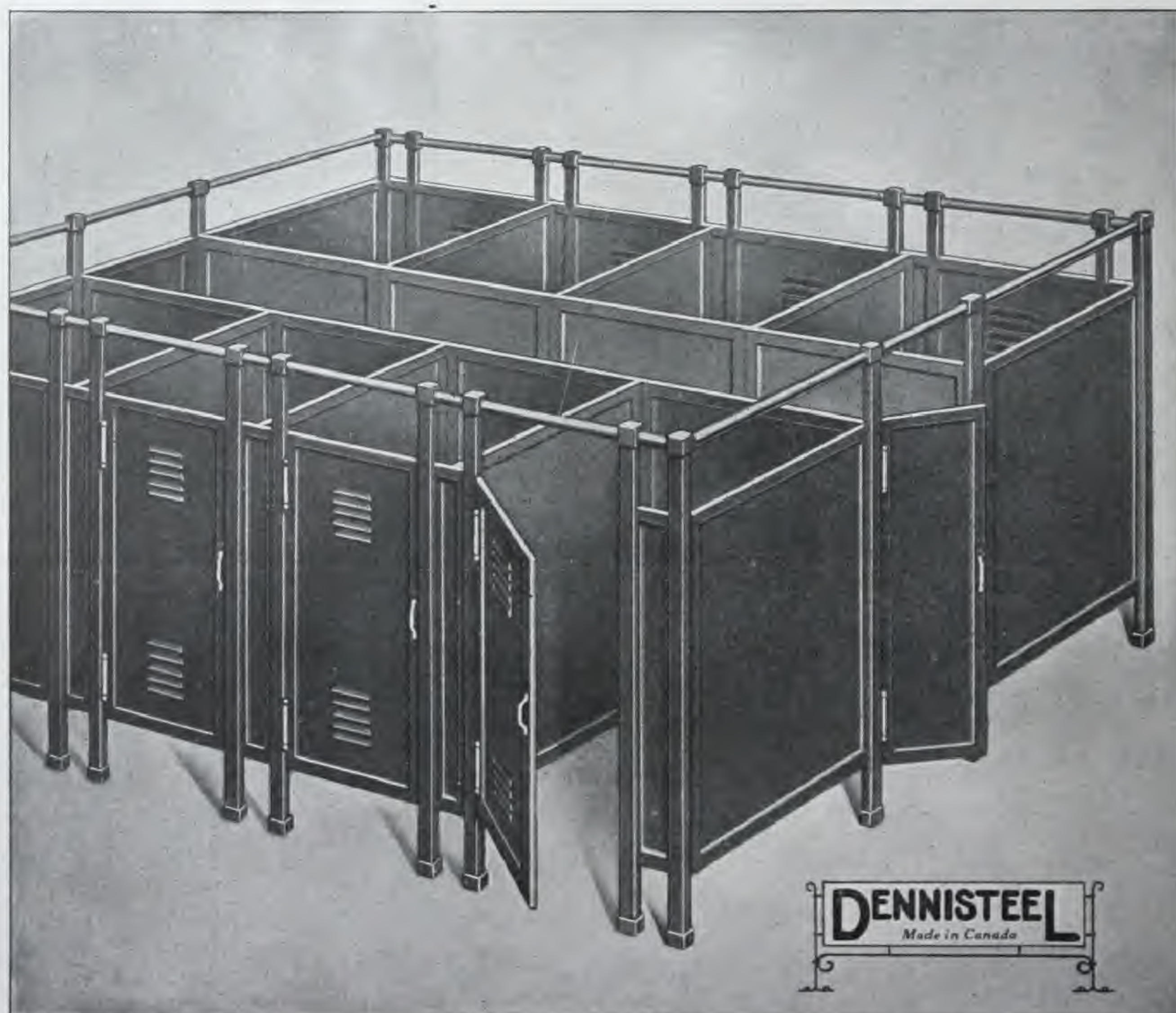
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OVERHEAD VIEW, SHOWING UTILITY CORRIDOR.

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Adjustable shelves are completely finished at shop with baked black rubber japan. Fixed metal parts are preferably finished after erection with air drying enamel; baked enamel is unsuitable, as it cannot be renewed in place. Maximum distribution of light is obtained by using open work construction where possible and finishing fixed parts in a light shade, preferably French gray.

STANDARD STACK
DIMENSIONS.

Shelf widths—For books, 8, 9, 10 and 12 in.; newspapers, 18 and 22 in. Shelf lengths—3 ft. usual—varied to suit conditions. Tier heights—7 ft. and 7 ft. 6 in. Aisle widths—Main, 2 ft. 6 in. to 5 ft.; minor, about 28 in. minimum; 30 to 36 in. average.



F. W. SIMON, Architect.

NEW PARLIAMENT BUILDINGS,
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View showing three tier Snead "Standard" bookstack in library, equipped with solid panelled ends and "open bar" adjustable shelves. The second deck floor is of steel plate construction covered with cork carpet. The electric conduits are concealed in steel mouldings forming the ceiling panels.

The storeroom and newspaper stack rooms in basement are also equipped with Snead "Standard" stacks.

TYPICAL
INSTALLATIONS.

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Hamilton Public Library, Ontario.
Moose Jaw Public Library, Saskatchewan.
Fort William Public Library, Fort William, Ont.
Bibliothèque St. Sulpice, Montreal, Quebec.
Knox College Library, Toronto, Ontario.
Calgary Court House Law Library, Alberta.

British Columbia Legislative Library, Victoria, B.C.
Alberta Legislative Library, Edmonton, Alberta.
Montreal Public Library, Montreal, Quebec.
Ottawa Public Library, Ontario.
Calgary Public Library, Alberta.
Regina Public Library, Regina, Saskatchewan.
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McGill University Medical Library, Montreal, Que.
Victoria College Library, Toronto, Ontario.
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We are the pioneers in the manufacture of Library Bookstacks. Our experienced stack designers are at the service of architects planning stack installations. Technical information relative to prices, capacities, stack dimensions, weights, etc., furnished free on request. Catalogue of 271 pages, giving plans and illustrations of library buildings, forwarded free of charge in connection with definite inquiries.

STANDARD STACK
WEIGHTS.

Uprights and shelves, 7 to 10 lbs. per cu. ft. of range. Books, 20 to 25 lbs. per cu. ft. of range. Deck framing, 5 lbs. per sq. ft. Deck flooring, $\frac{3}{4}$ in. glass, 10 lbs. per sq. ft. Deck flooring, $1\frac{1}{4}$ in. marble, 18 lbs. per sq. ft.

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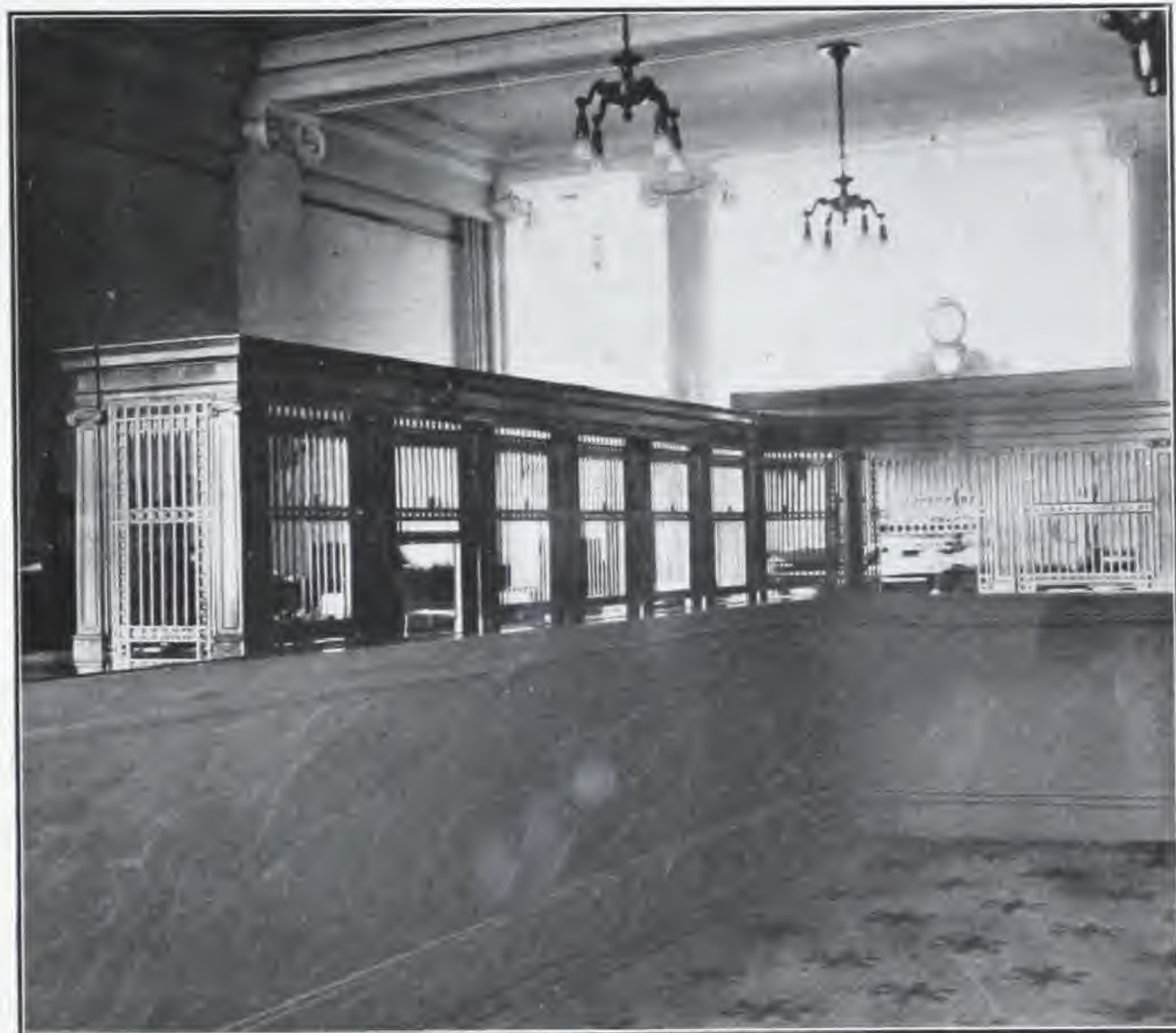
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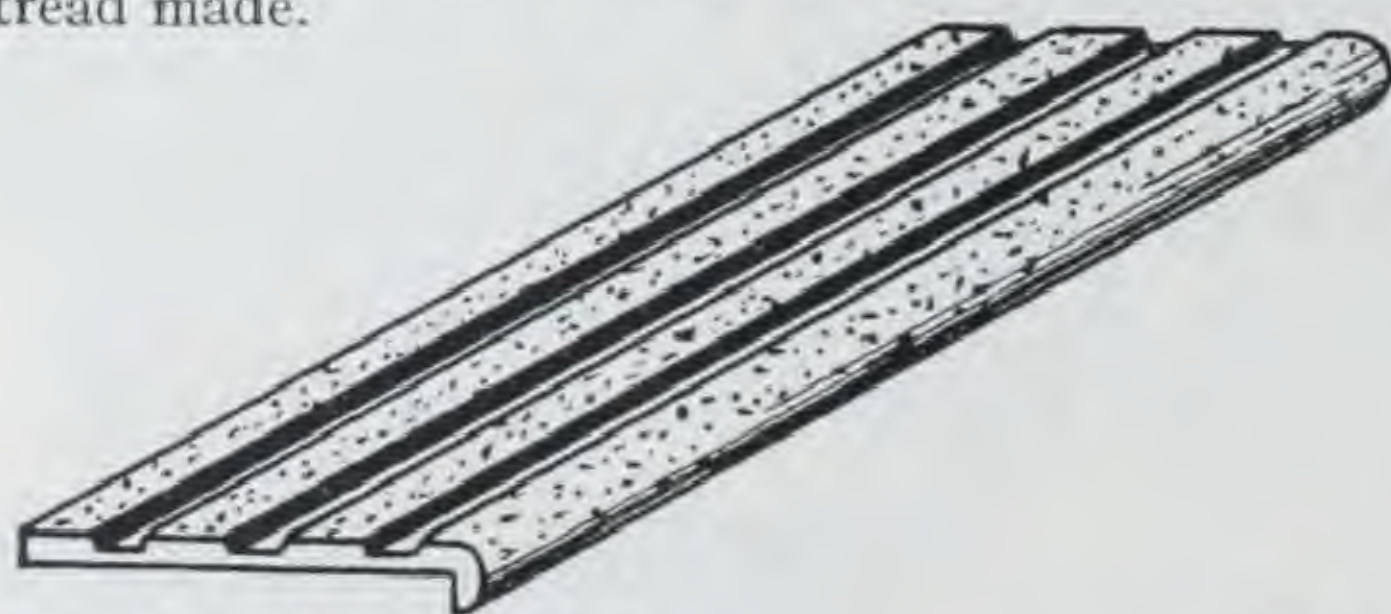
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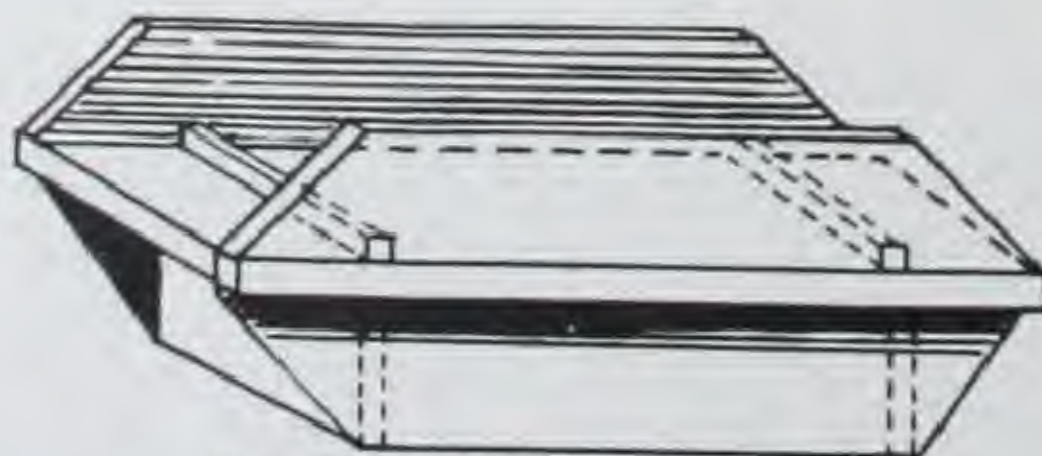
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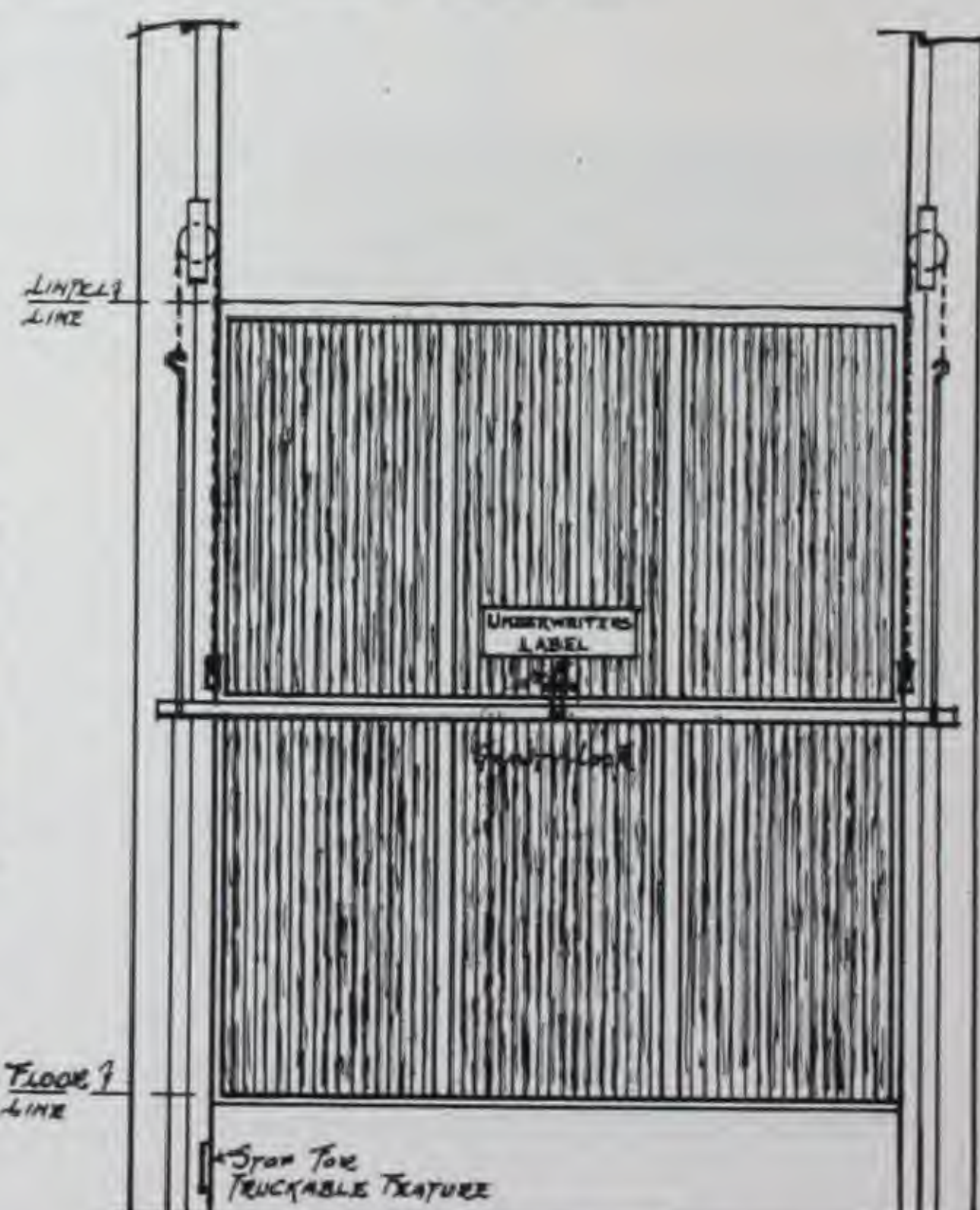
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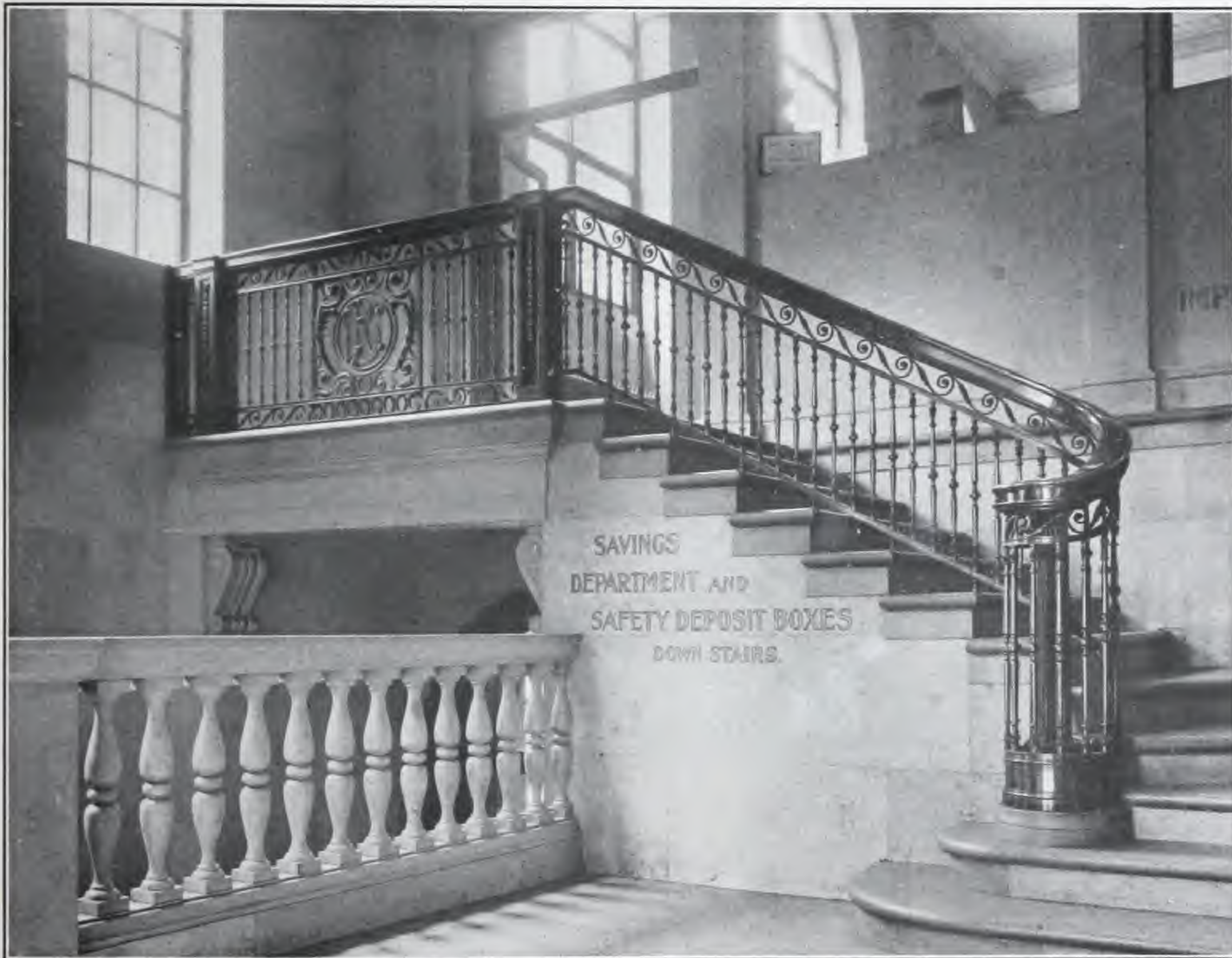
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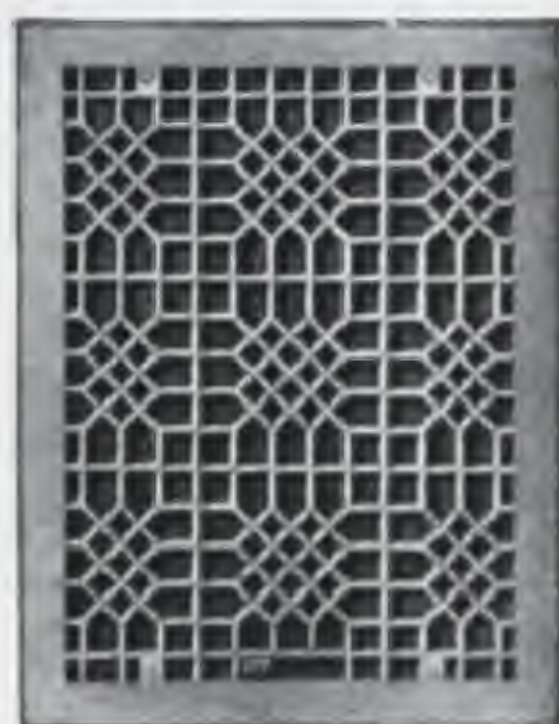
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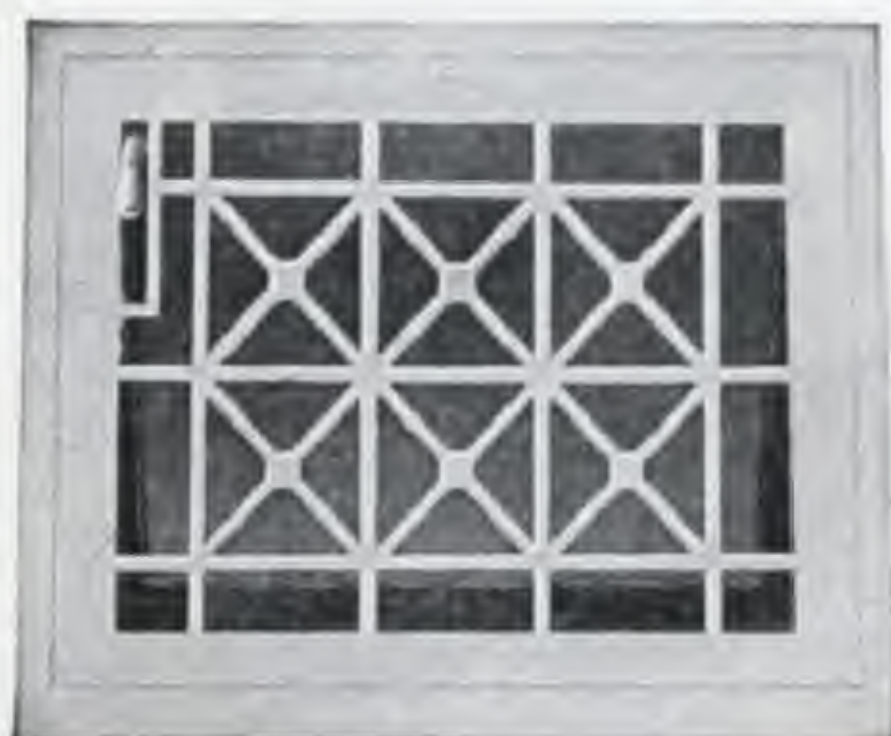
CAST IRON—PLAIN LATTICE.

SEMI-STEEL—INDIAN LATTICE.
Also made in Plain Lattice.

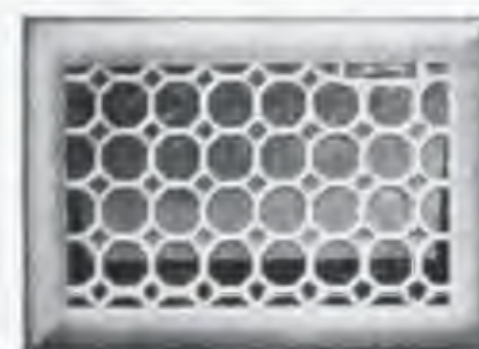
ALL-STEEL—PLAIN LATTICE

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SIDE WALL REGISTER.

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Our Side Wall Registers can be set either way.THE "QUICK SET."
Note large capacity. 12 x 14 size is especially adapted to deep flues.

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We make a specialty of designs suited to all orders of decoration, including Louis XIV., Louis XV., Colonial, Gothic, Moorish, Old English, Elizabethan, etc. A few of these, suitable for registers or grilles, are shown. We have over four hundred designs, covering all styles from the severely simple Plain Lattice to the most ornate Renaissance.

GRILLES AND
SCREENS.
CAST GRILLES.

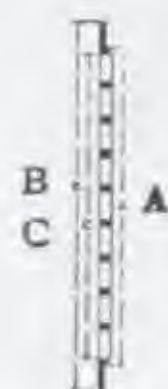
Grilles and Screens of all sizes, to cover steam coils or for ventilation, are made in any finish, of cast-iron, bronze, or brass metal, stamped steel, stamped brass, or woven wire.

Bronze or Cast-Iron Grilles have rims which vary in width according to size, the thickness of the rim being less than that of the fretwork. In the section shown below, A is the body size or size of opening to be covered; B is the extreme outside measure, and C the daylight opening. Unless otherwise stated, we assume that sizes given on orders are body sizes "A." Plain Lattice cast Grilles are made in almost all sizes (body sizes) of even inches. The mesh is $\frac{1}{8}$ of an inch square and the bars approximately $\frac{1}{4}$ of an inch. Various methods of fastening these Grilles and providing means of access to steam valves or for cleaning purposes are shown. Any of the special design Grilles can be similarly arranged. Estimates for providing hinges and catches or the special frames shown will be sent on application.

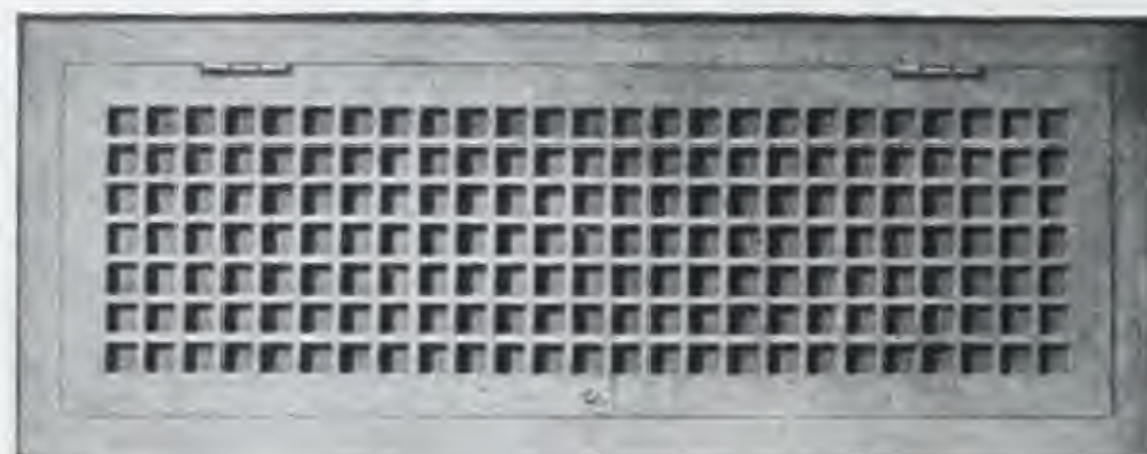
STEEL GRILLES.

While not as substantial in appearance or as lasting as cast-iron, Steel Grilles are cheaper and have their uses under certain conditions. They are made of sheet steel perforated in $\frac{1}{8}$ " or $\frac{1}{2}$ " mesh. The $\frac{1}{8}$ " mesh is standard and is always supplied unless otherwise specified, but we also make $\frac{1}{2}$ " mesh in both square and diagonal lattice.

CAST GRILLES.

STANDARD $\frac{1}{8}$ -IN. MESH GRILLE.

GRILLE HINGED TO WOODWORK.



GRILLE HINGED TO ANGLE FRAME.



GRILLE WITH DOOR IN FRETWORK.

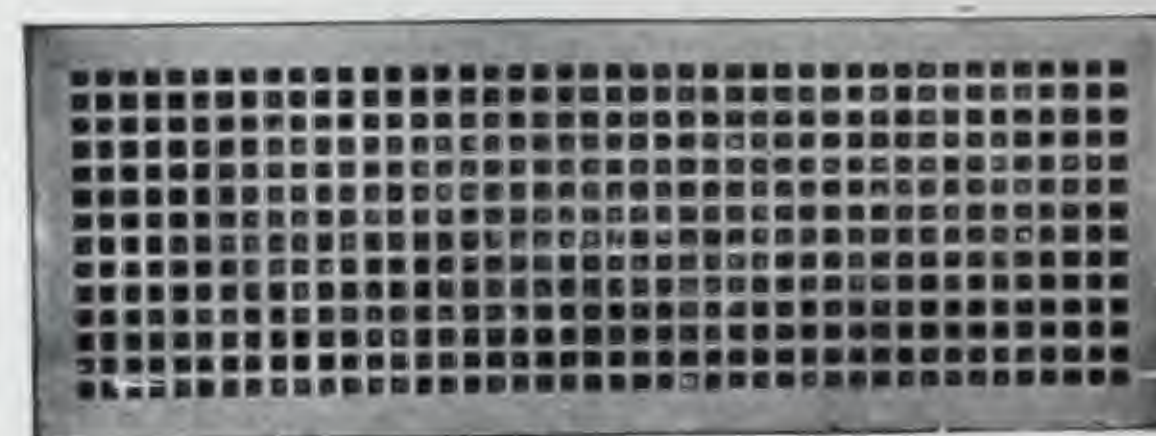
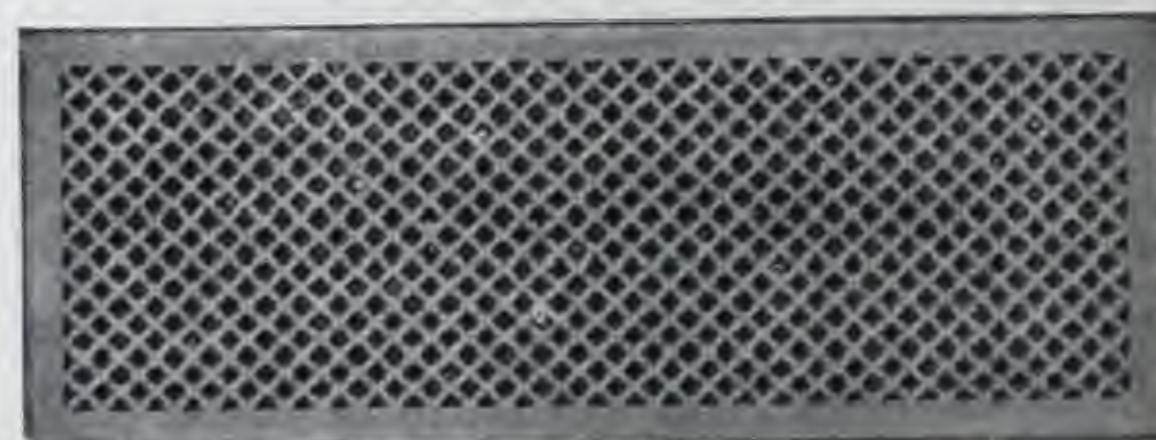


GRILLE ATTACHED TO IRON WALL FRAME.



GRILLE HELD IN PLACE BY WOOD MOULDING.

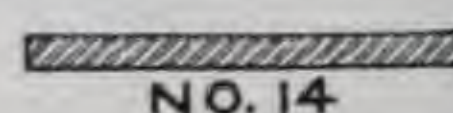
STEEL GRILLES.

STANDARD $\frac{1}{8}$ -IN. SQUARE MESH. $\frac{1}{8}$ -IN. SQUARE MESH. $\frac{1}{8}$ -IN. DIAGONAL MESH.

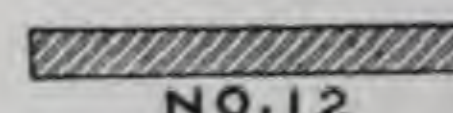
WIDTH IN DAYLIGHT OPENING "C."

$\frac{1}{8}$ -inch Square Mesh.	Number of Squares.	$\frac{1}{8}$ -inch Square Mesh.	Number of Squares.	$\frac{1}{8}$ -inch Diagonal Mesh.	Number of Squares.
1 $\frac{1}{2}$ "	2	1 $\frac{1}{2}$ "	3	2"	2
3"	3	2 $\frac{1}{2}$ "	4	2 $\frac{1}{2}$ "	3 $\frac{1}{2}$
4"	4	3 $\frac{1}{2}$ "	6	3"	4
5 $\frac{1}{2}$ "	5	5"	8	5"	5 $\frac{1}{2}$
6"	6	6"	9	5 $\frac{1}{2}$ "	6
7 $\frac{1}{2}$ "	7	7 $\frac{1}{2}$ "	11	7"	7 $\frac{1}{2}$
8 $\frac{1}{2}$ "	8	8"	12	8"	8 $\frac{1}{2}$
9 $\frac{1}{2}$ "	9	8 $\frac{1}{2}$ "	13	9"	9 $\frac{1}{2}$
10"	10	10"	15	10"	10 $\frac{1}{2}$
11"	11	11"	17	11"	11 $\frac{1}{2}$
12"	12			12"	12 $\frac{1}{2}$

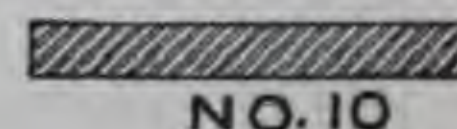
Extreme size "B" as desired. Unless otherwise ordered, rims will vary from $\frac{1}{4}$ inch to 1 inch, all around, according to size of grille. Estimates for heavier gauge or wider sizes furnished on application.



NO. 14



NO. 12



NO. 10

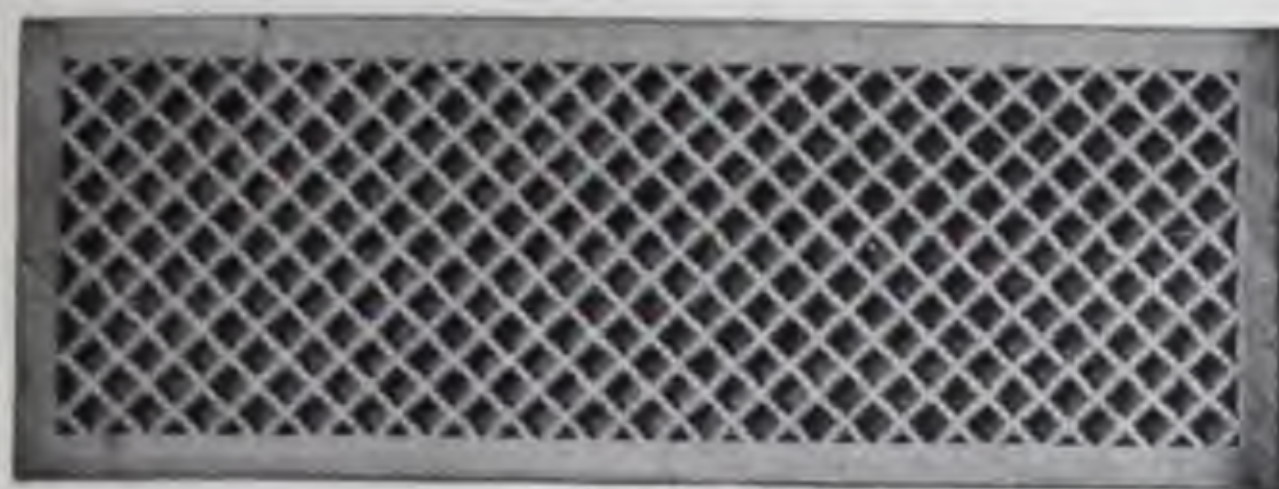


NO. 8

GAUGES.

Showing thickness of gauge of sheet steel, U.S. Standard, from which steel grilles are punched.

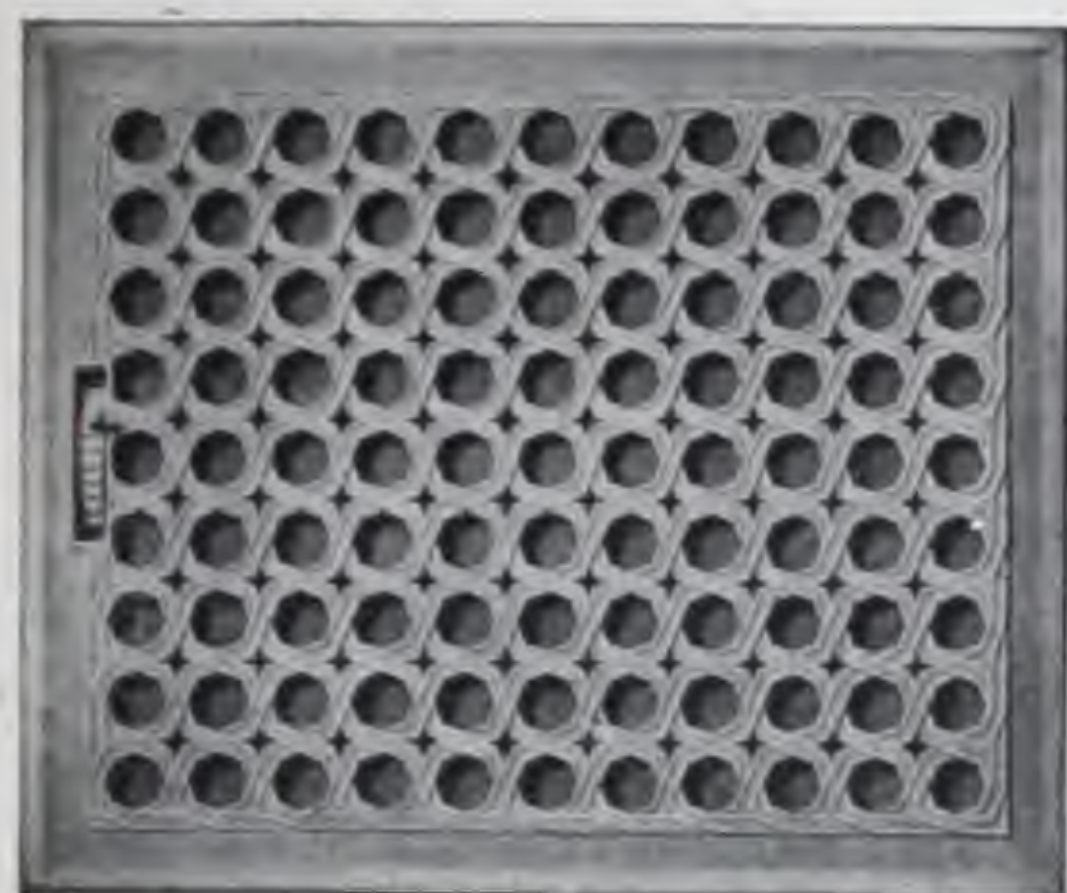
TUTTLE & BAILEY MFG. CO. OF CANADA, LTD.



T. & B. 56.



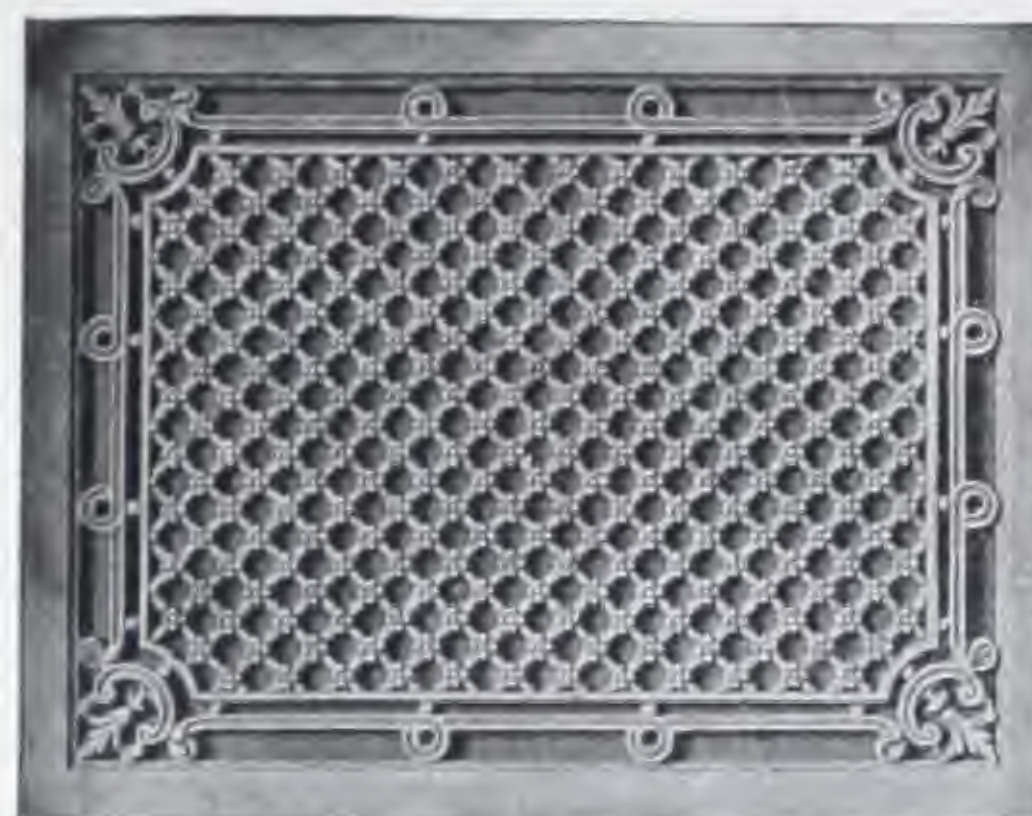
T. & B. 59.



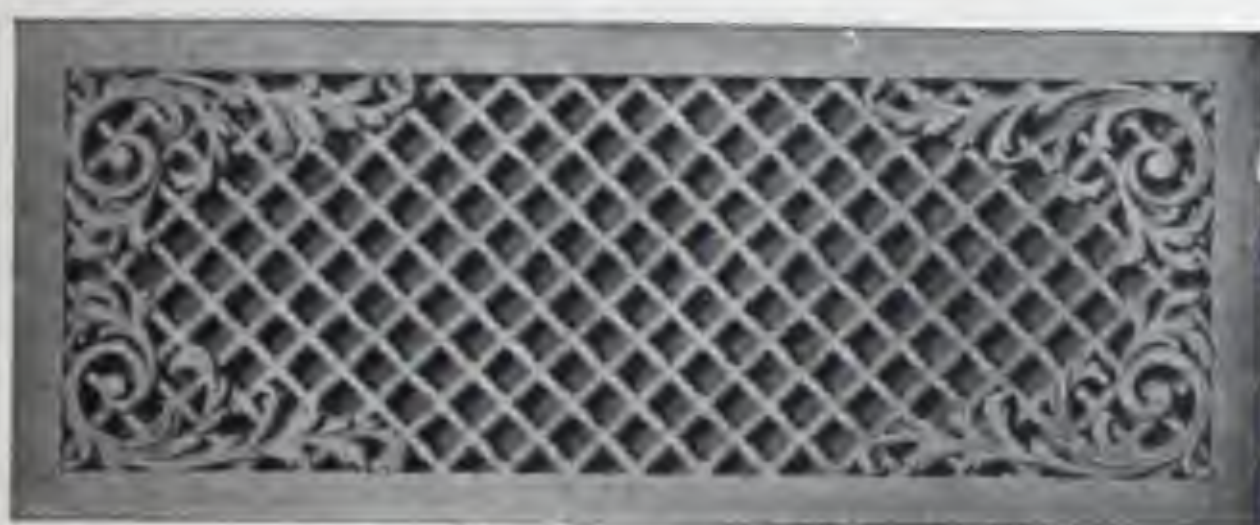
T. & B. 82.



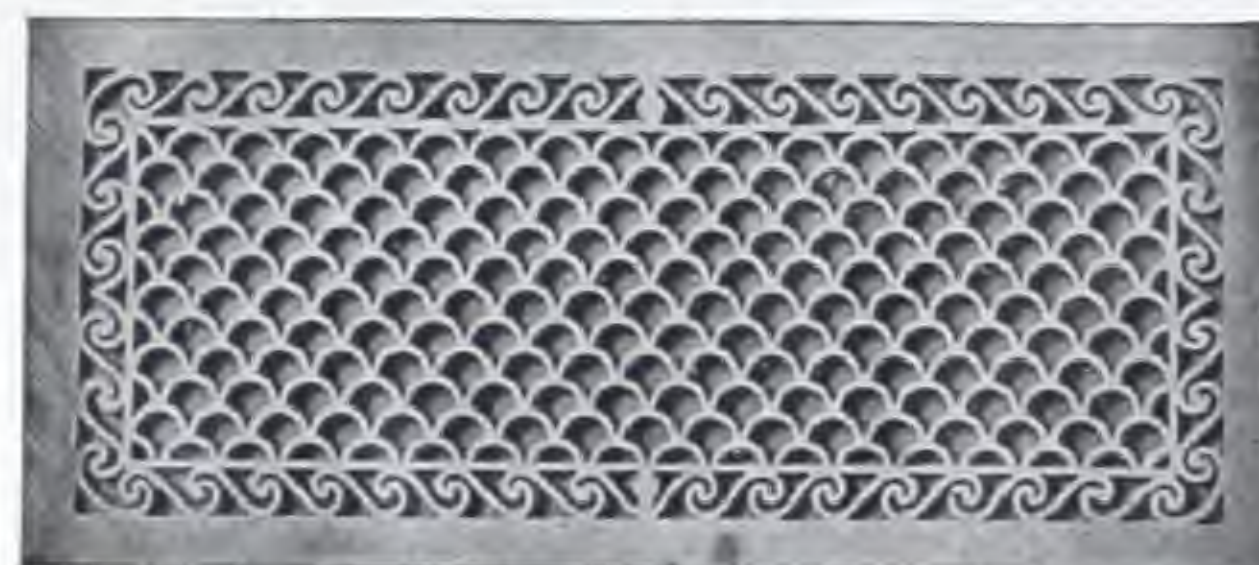
T. & B. 85.



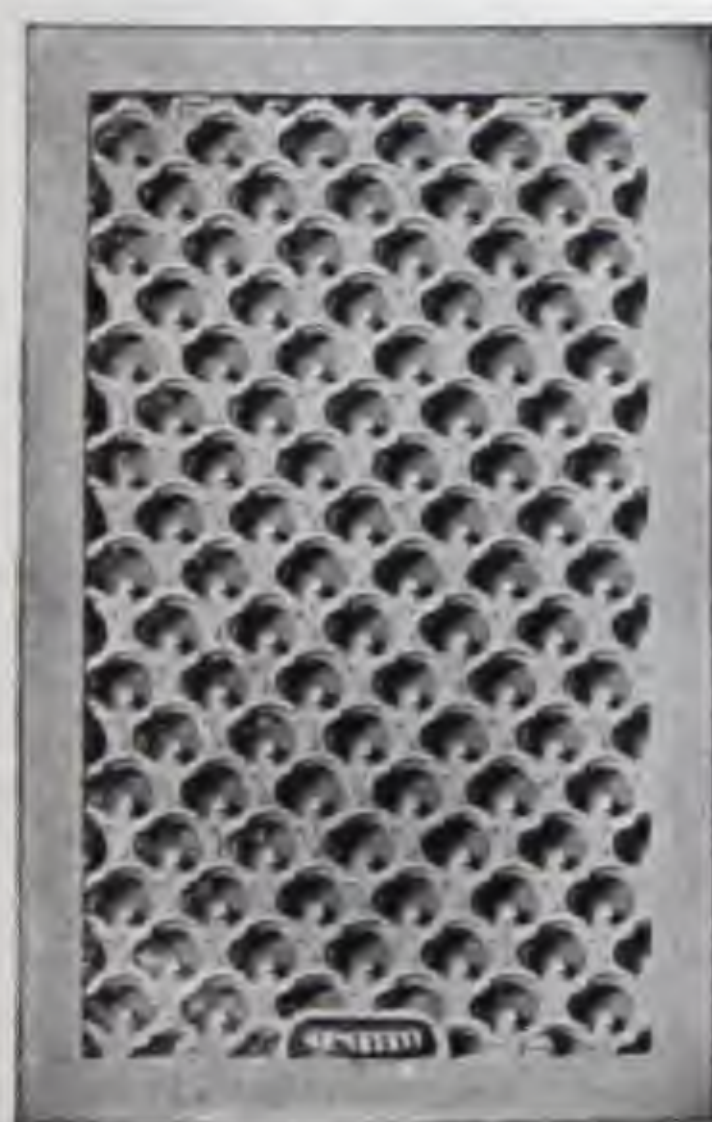
T. & B. 83.



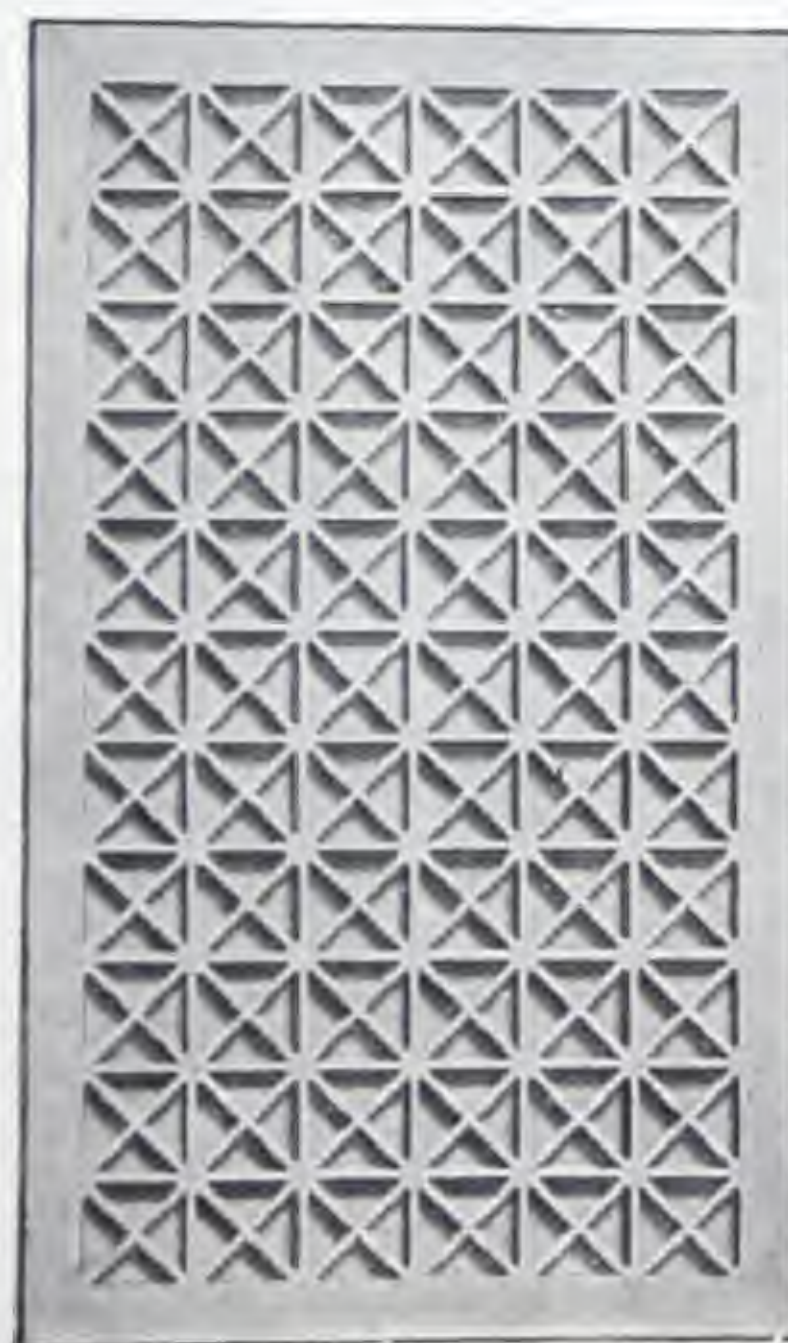
T. & B. 12.



T. & B. 118.



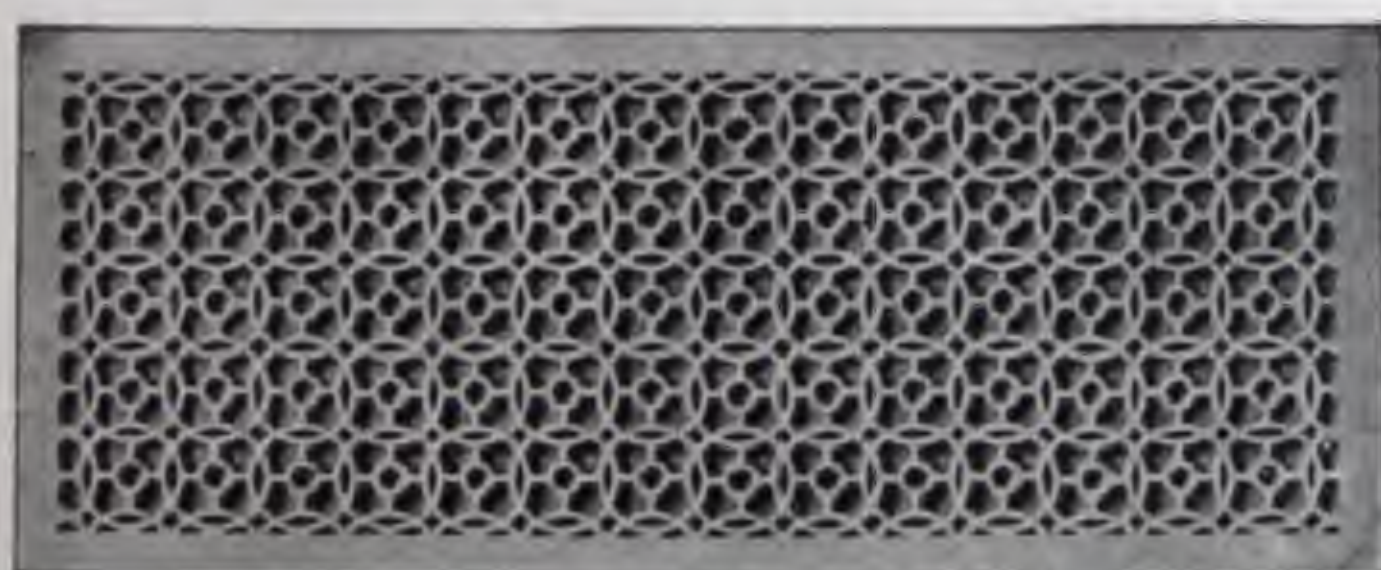
T. & B. 30.



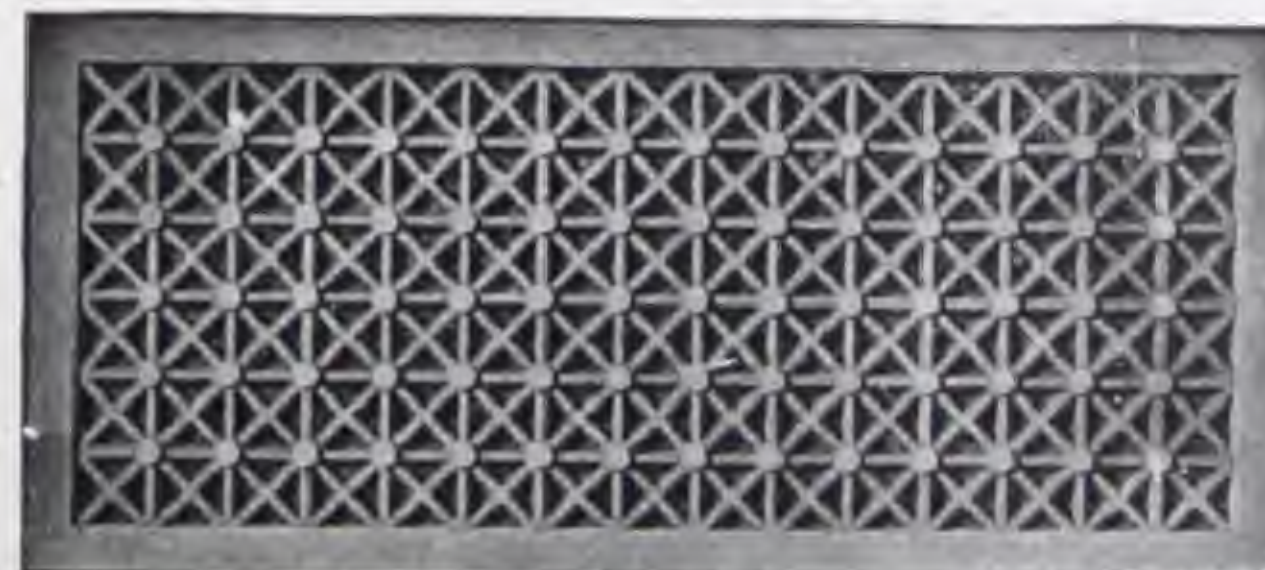
T. & B. 381.



T. & B. 80.



T. & B. 26.



T. & B. 22.

A FEW EXAMPLES OF REGISTERS, GRILLES AND SCREENS SELECTED FROM OVER 400 SPECIAL DESIGNS.
Made to order only, with an additional charge over the cost of stock goods.

HALIFAX OFFICE:
3 Simson Bldg.
J. A. THOMPSON, Manager.

OTTAWA OFFICE:
71 1/2 Sparks Street.
CHARLES V. CLARK, Manager.

TORONTO OFFICE:
77 York Street.
H. J. CHURCH, Manager.

DARLING BROTHERS LIMITED

ENGINEERS, MANUFACTURERS AND FOUNDERS.

Head Office and Works:
120 PRINCE STREET, MONTREAL, P.Q.

QUEBEC OFFICE: 203 St. John Street. W. J. BANKS, Agent.

WINNIPEG OFFICE:
104 Princess Street.
CHARLES A. SARGENT, Manager.

CALGARY OFFICE:
605 Second Street West.
S. S. CLARKE, Agent.

VANCOUVER OFFICE:
1144 Homer Street.
FRANK DARLING & CO. LTD., Agents.

MASON SAFETY TREADS WITH STEEL BASE.

STANDARD WIDTHS—ACTUAL SIZE.

Composed of a base of rolled, unperforated steel with dovetailed grooves filled with lead or carborundum.

MASON
SAFETY
TREADS
WITH STEEL
BASE.



Fig. 1. Cross Section, Steel, 7 ribs, 6 inches wide.



Fig. 2. Cross Sections, steel, 5 ribs, 4 1/4 inches wide.



Fig. 3. Cross Section, steel, 5 ribs, 4 inches wide.



Fig. 3A. Cross Section, steel, 4 ribs, 3 3/4 inches wide.

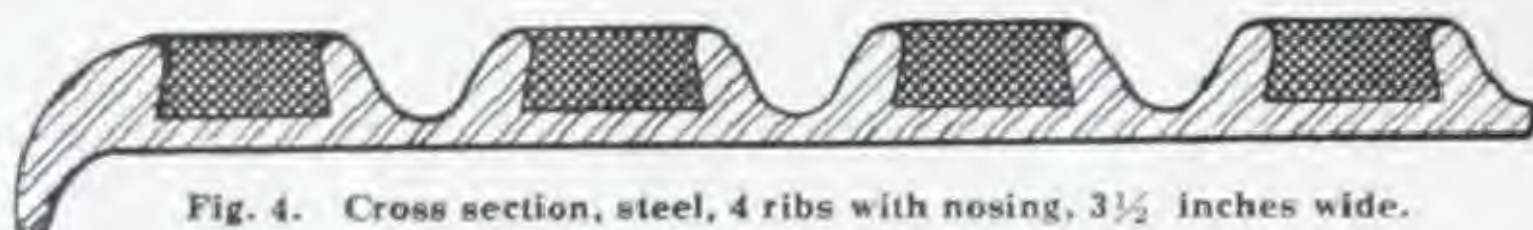


Fig. 4. Cross section, steel, 4 ribs with nosing, 3 1/2 inches wide.



Fig. 5. Cross section, steel, 3 ribs with nosing, 3 inches wide, straight back; especially made for granolithic work.



Fig. 6. Cross Section, steel, 3 ribs, 2 1/2 inches wide.

NOTE.—Mason Safety Treads of almost any desired width may be made from our standard widths as indicated above. The 3-inch nosing piece is intended for use with cork carpet, or for concrete and cement work, as it has a square back edge.

MASON SAFETY TREADS WITH BRASS BASE.

STANDARD WIDTHS—ACTUAL SIZE.

Base composed of hard brass (Delta Metal) with dovetailed grooves filled with lead or carborundum.

MASON
SAFETY
TREADS
WITH BRASS
BASE.



FIG. 7. CROSS SECTION.

Brass (Delta Metal) Base, 8 Ribs, 6" wide



FIG. 8. CROSS SECTION

Brass (Delta Metal) Base, 5 Ribs, 4" Wide

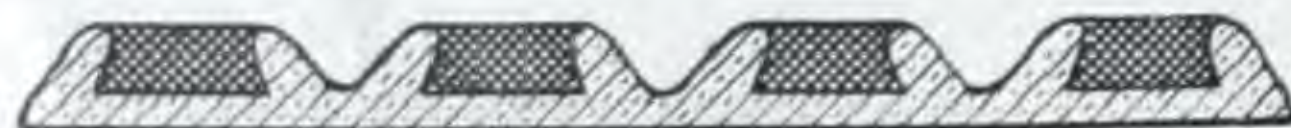


FIG. 9. CROSS SECTION
Brass (Delta Metal) Base, 4 Ribs, 3" Wide

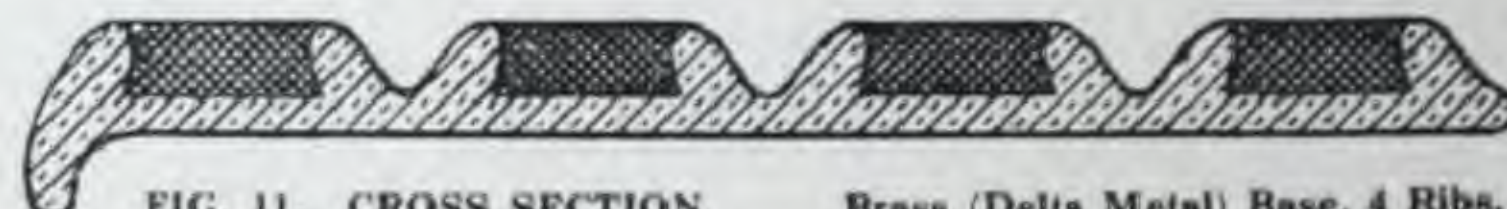


FIG. 10. CROSS SECTION
Brass (Delta Metal) Base, 3 Ribs, 2 1/2" Wide

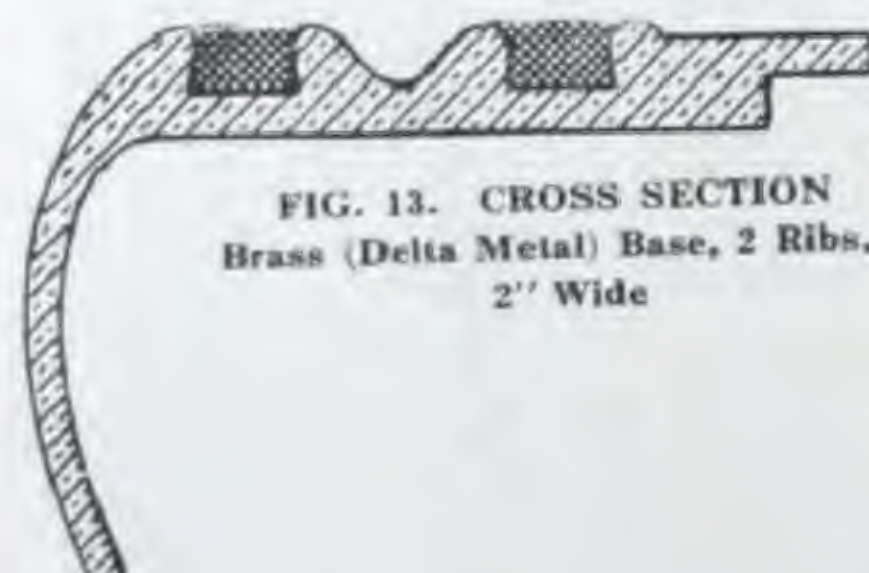


FIG. 11. CROSS SECTION.

Brass (Delta Metal) Base, 4 Ribs, 3 1/2" Wide

FIG. 13. CROSS SECTION
Brass (Delta Metal) Base, 2 Ribs,
2" Wide



FIG. 14. CROSS SECTION
Brass (Delta Metal) Base, with Nosing,
3 Ribs, 2 1/2" Wide

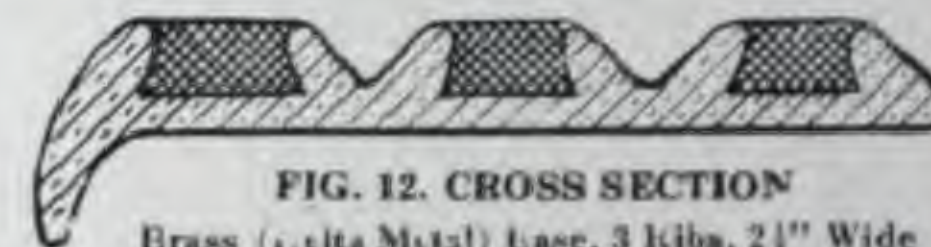


FIG. 12. CROSS SECTION
Brass (Delta Metal) Base, 3 Ribs, 2 1/2" Wide

Treads with hard brass (delta metal) base of almost any desired width, may be made from our standard widths as indicated above.

The 2-inch deep nosing (Fig. 13) is designated expressly for use with cork composition, Karbolith flooring and concrete.

MASON SAFETY
TREAD.

For use upon outer or inner stairs of granite, marble, slate, cement, iron or wood; upon old, partly worn, as well as new surfaces; upon thresholds of doors and elevators, fire doors, inclined passages, straight or curved, vault light borders, vault entrances, granolithic walks, ship ladders, the steps, running boards, platforms and vestibules of cars, around machinery where the presence of oil is dangerous, in trolley car barn pits, along the edges of platforms, and many other places.

Ask for Catalogue, Section 17.

See also our advertisement on Elevators page 117 and Steam Specialties page 232.



MASON SAFETY TREAD ON IRON STAIRS.

H. J. ST. CLAIR CO., LIMITED

Established 1909.

MANUFACTURERS AND BUILDERS OF COMPLETE STORE FRONTS.

165 KING STREET EAST,
TORONTO.

REPRESENTATIVES THROUGHOUT THE DOMINION.

HALIFAX,
Eagar-Coombs & Co.

MONTREAL,
J. A. Gendron,
149 St. Elizabeth Street.

WINNIPEG,
Winnipeg Marble & Tile Co.,
199 Main Street.

REGINA,
Western Mfg. Co.

CALGARY,
McDonald-Baker Co.

EDMONTON,
Edmonton Paint & Glass Co.

VANCOUVER & VICTORIA,
Wm. N. O'Neil Co. Ltd.

PRODUCTS.

DESIGNERS AND CRAFTSMEN; COMPLETE STORE FRONTS; COPPER BRONZE;
FINE WOODS; GLASS; TILE; MARBLE; SOLID BRONZE FRONTS; STEEL SHAPES; SIDE
WALK PRISMS; EASY SET CONSTRUCTION; NU-METAL.



We are equipped to install up-to-date business-getting store fronts of any size. We are organized to carry out work in the most expeditious manner, as all material is assembled and finished in our own shop—shipped complete to the building, and erected by our own mechanics who are specialists in this particular line.



The artistic side of this business is competently handled—and Architects can rely on intelligent co-operation in working out any special scheme or treatment.



For the benefit of the Architectural profession and the Building trades we have a special service—which enables anyone interested to at once obtain suitable designs for any specific line of merchandising—or building—on sending us sizes of openings, etc. Catalogues and Detail sheets of metal sections gladly supplied.



A FEW OF OUR INSTALLATIONS.

(Note that these installations extend from the Atlantic to the Pacific.)

Navy League Bldg., Halifax, N.S.
Tip-Top Tailors, Halifax, N.S.
Lounsbury Bldg., Moncton, N.B.
Gallant & Crockett, Summerside, P.E.I.
Alec Drouin Bldg., Quebec, P. Que.
Almy's Dept. Store, Montreal, P. Que.
Mendelsohn Bros., Montreal, P. Que.
R. A. Lauzon, Montreal, Que.
Walk-Over Shoe Store, Toronto, Montreal and Quebec
Darwin's Limited, Ottawa, Ont.
Union Bank Bldg., Ottawa, Ont.
Stacy's Limited, Kingston, Ont.
Lockett's Shoe Store, Kingston, Ont.

Jury & Lovell Drug Store, Oshawa, Ont.
Page & Shaw's Candy Store, Toronto and Montreal.
Dunfield's Limited, Toronto.
Can. Gen. Elec. Bldg., Toronto.
McLaren's Jewellery Store, Hamilton, Ont.
Grafton & Co., Hamilton, Ont.
Thomas Furniture Store, London, Ont.
R. H. & J. Dowler, London, St. Thomas and Windsor
Samsburn-Pashley Jewellery Store, Windsor, Ont.
Confederation Life Bldg., Winnipeg, Man.
Allen Theatre, Winnipeg, Man.
Sherwood Bldg., Regina, Sask.
Hammond Bldg., Moose Jaw, Sask.

Robinson & MacBean, Ltd., Moose Jaw, Sask.
Cairn's Dept. Store, Saskatoon, Sask.
McMillan's Dept. Store, Saskatoon, Sask.
Caledonian's Dept. Store, Edmonton, Alta.
McLeod Bldg., Edmonton, Alta.
Hudson Bay Bldg., Calgary, Alta., Lethbridge, Alta.
and Yorktown, Sask.
Oddfellows' Bldg., Calgary, Alta.
White's Hardware, Banff, Alta.
Scott's Bldg., Vancouver, B.C.
Sun Ban, Vancouver, B.C.
Central Block, Victoria, B.C.
Fitzpatrick O'Connell, Victoria, B.C.
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ZOURI DRAWN METALS COMPANY

GENERAL OFFICES AND FACTORY:
CHICAGO HEIGHTS, ILL.

CANADIAN DISTRIBUTORS:

CONSOLIDATED PLATE GLASS CO. OF CANADA, LIMITED

241 SPADINA AVENUE, TORONTO, ONT.

WAREHOUSES AT

MONTREAL.

TORONTO.

WINNIPEG.

PRODUCT.

ZOURI SAFETY KEY-SET STORE FRONT CONSTRUCTION.

WAREHOUSE STOCKS.

We would particularly draw the attention of Architects and Builders to the fact that The Consolidated Plate Glass Co. carry a full and complete stock of all our systems in their Toronto, Montreal and Winnipeg warehouses. We are, therefore, in a position to guarantee prompt deliveries.

SAFETY.

Preferential rating on plate glass is inevitable, as it is now in successful operation in every other line of insurance.

Flat rating is the arch enemy of safety. It encourages the cheapest substitutions that mechanical ingenuity can produce.

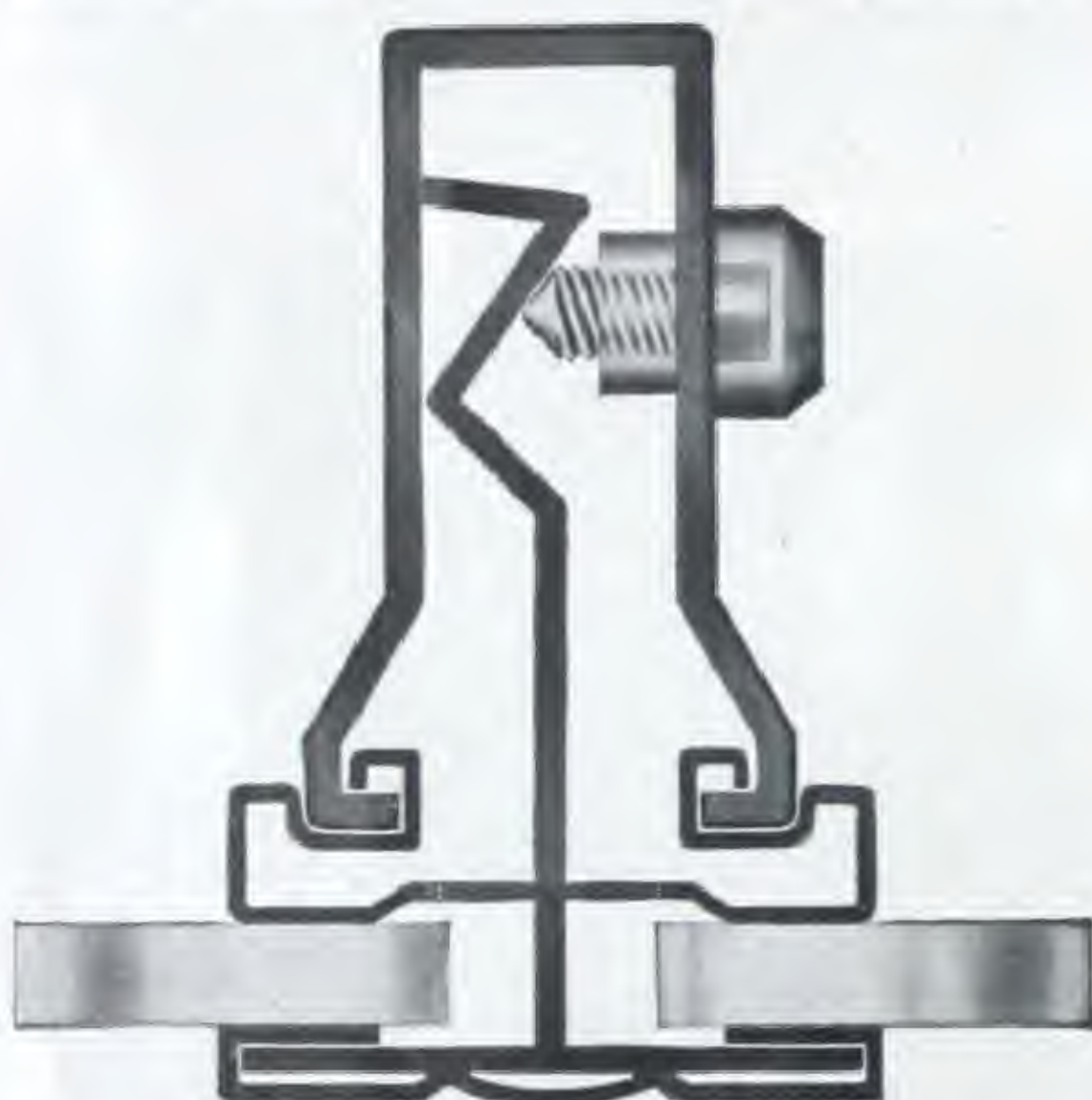
Zouri safety key-set sash, corner and division bars with self-adjusting setting blocks offer features of safety not found in any other line.

PATENTS.

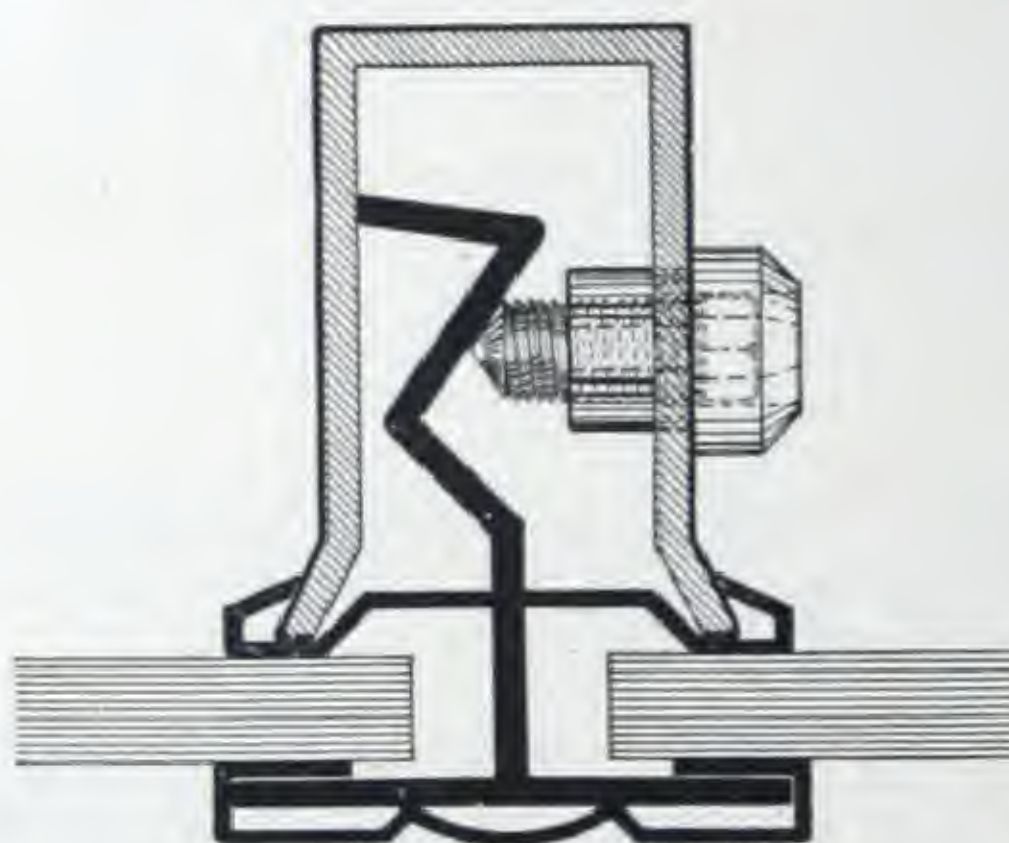
Operating under Murnane and Marr patents.
Other patents pending.

CATALOGUE.

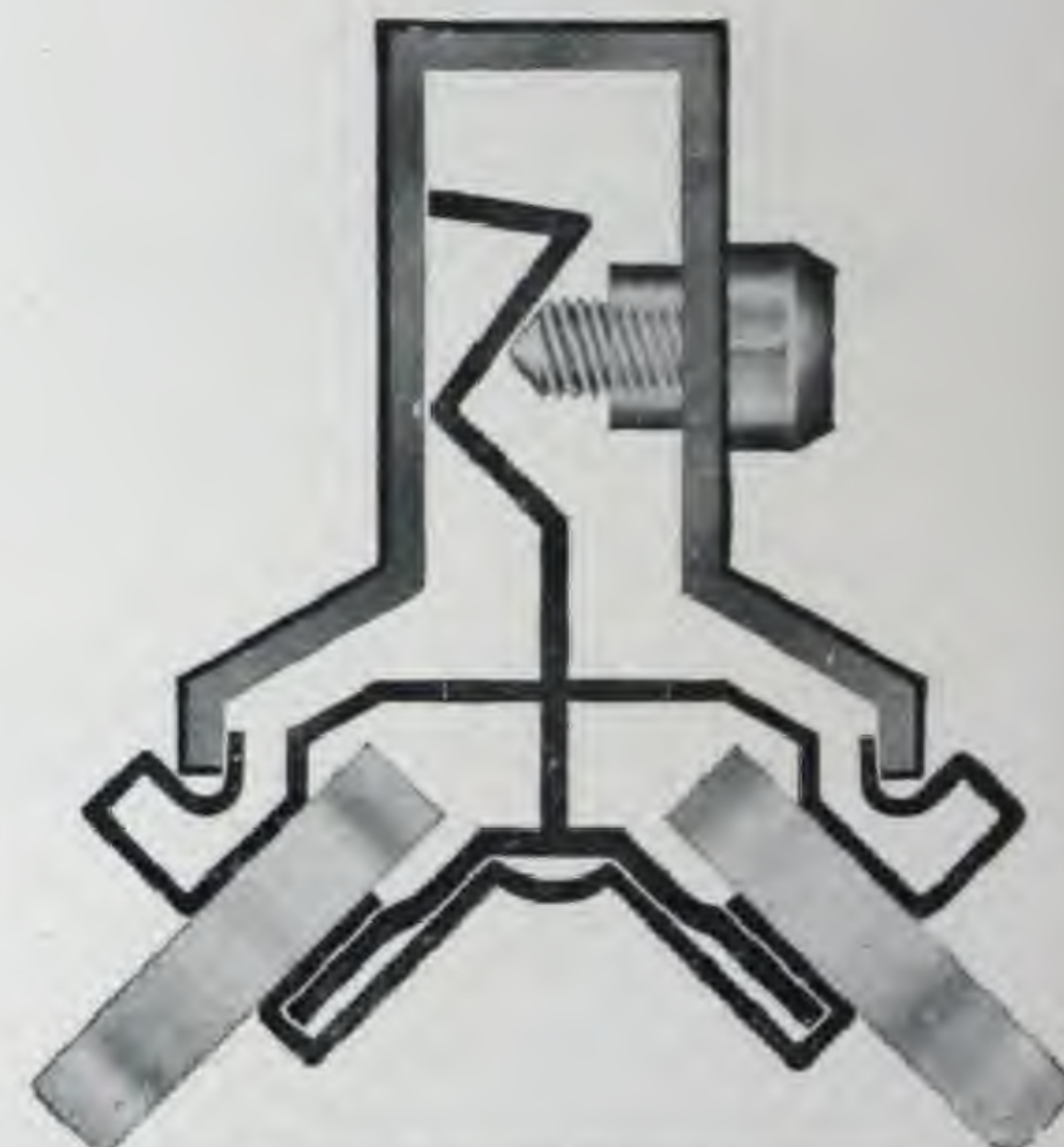
Catalogue free on application.



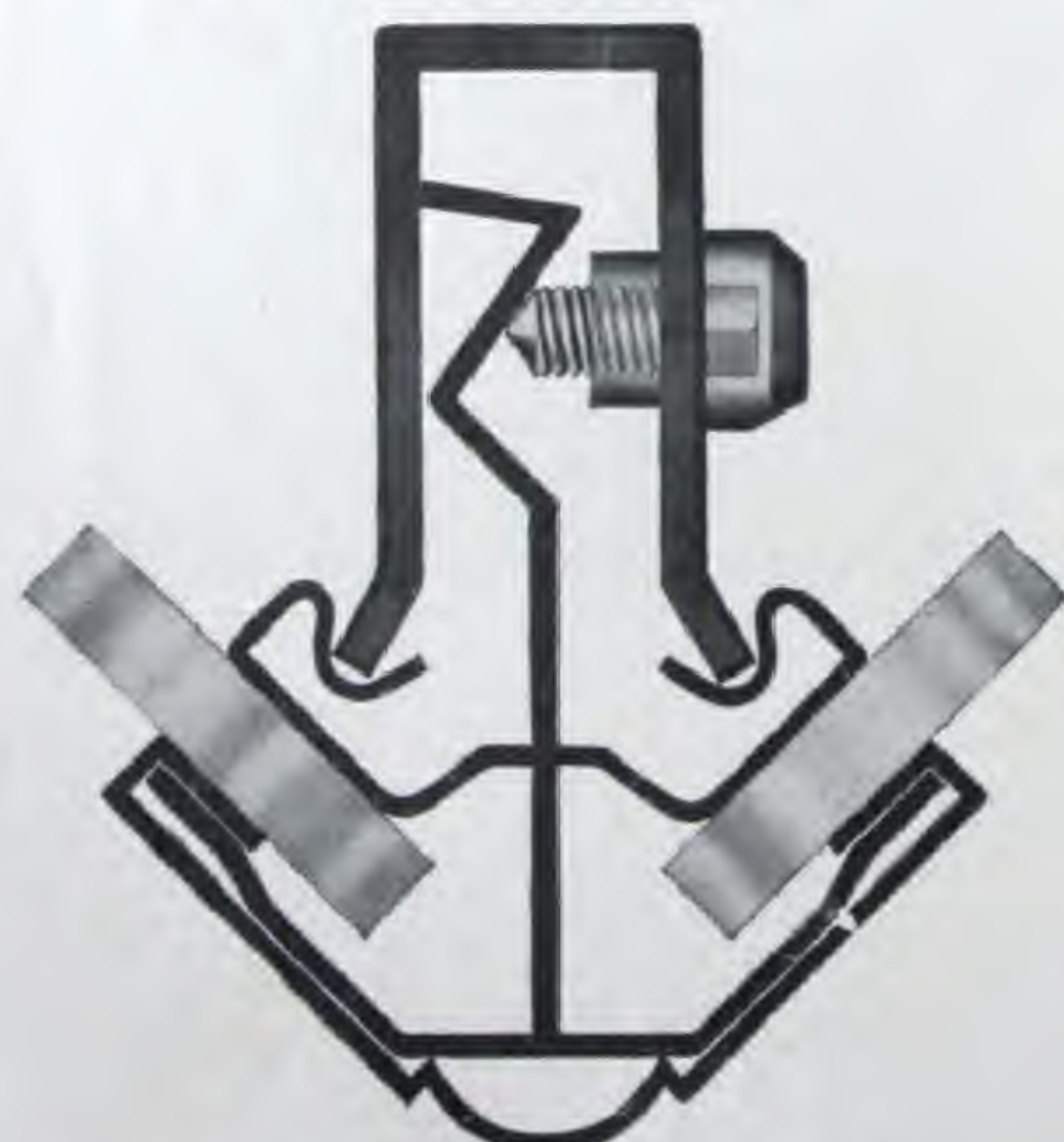
Full Size.
No. 301 SAFETY KEY-SET DIVISION BAR.
Weight 29 oz. per lin. ft.



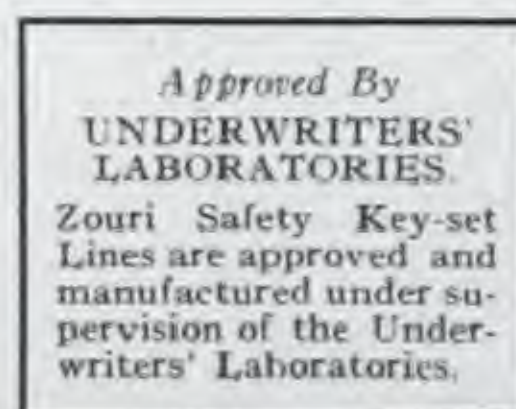
No. 305 SAFETY KEY-SET DIVISION BAR.
For glass up to 78 in. high and not over 10 ft. long.



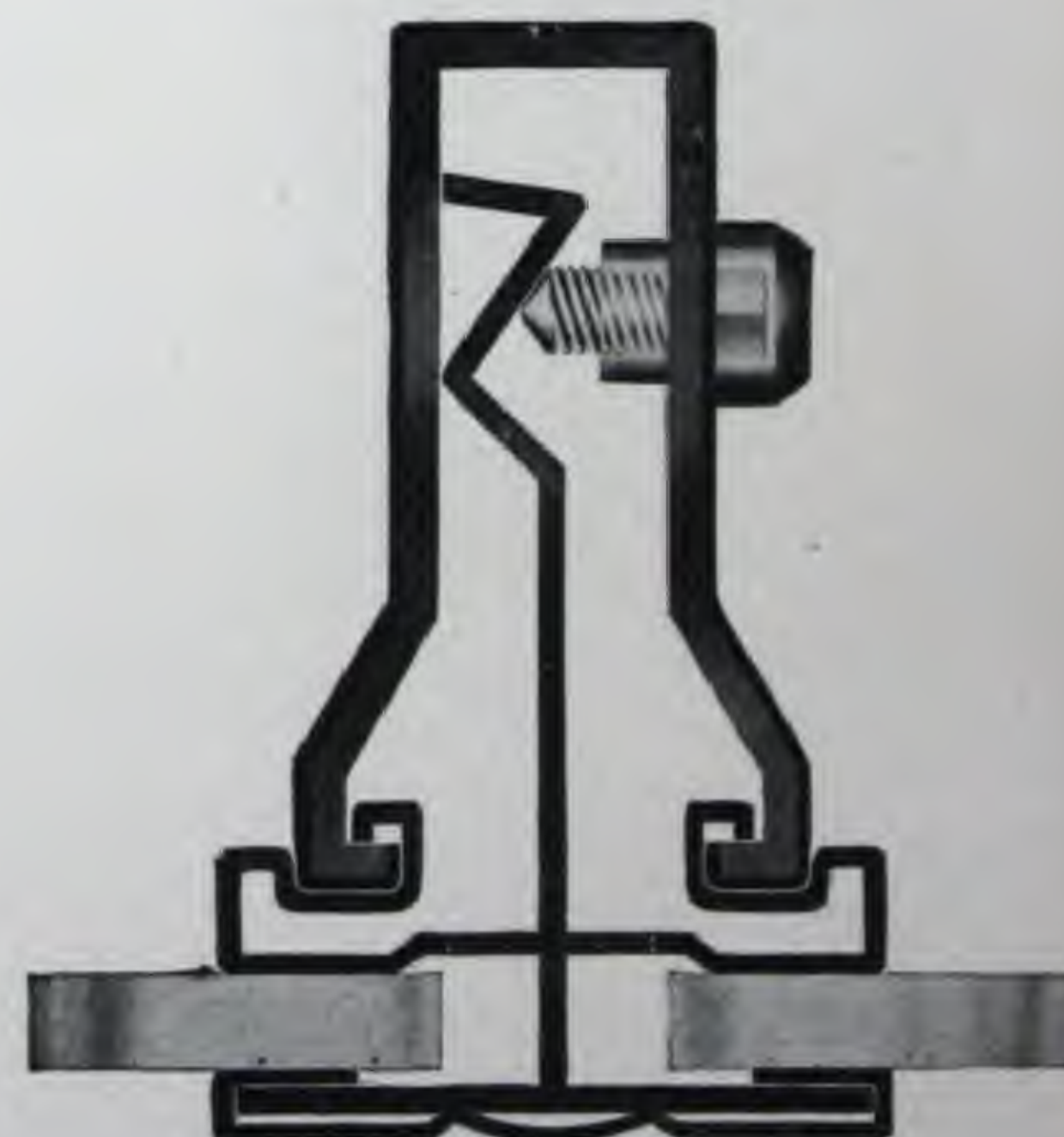
No. 201 SAFETY KEY-SET REVERSE CORNER BAR.
Made in angles from 85° to 145°, inclusive, for glass of largest size.



No. 200 SAFETY KEY-SET CORNER BAR.
Made in angles from 85° to 145°, inclusive, for glass of largest size.



FULL SIZE SOCKET
KEY FOR SETTING
ZOURI BARS.

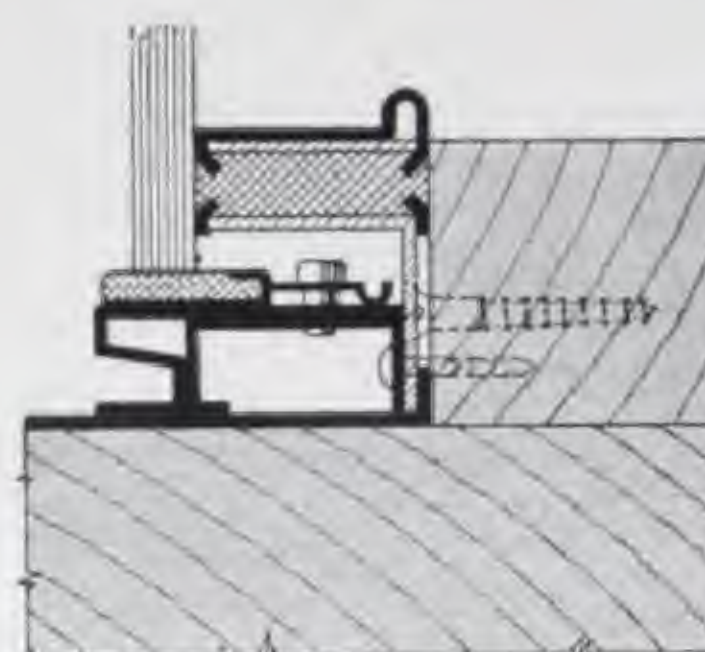


No. 300 SAFETY KEY-SET DIVISION BAR.
For glass of largest size.

FULL SIZE DETAILS OF ZOURI CORNER AND DIVISION BARS.



MURNANE SELF-ADJUSTING SETTING BLOCK.
Three-quarters actual size.

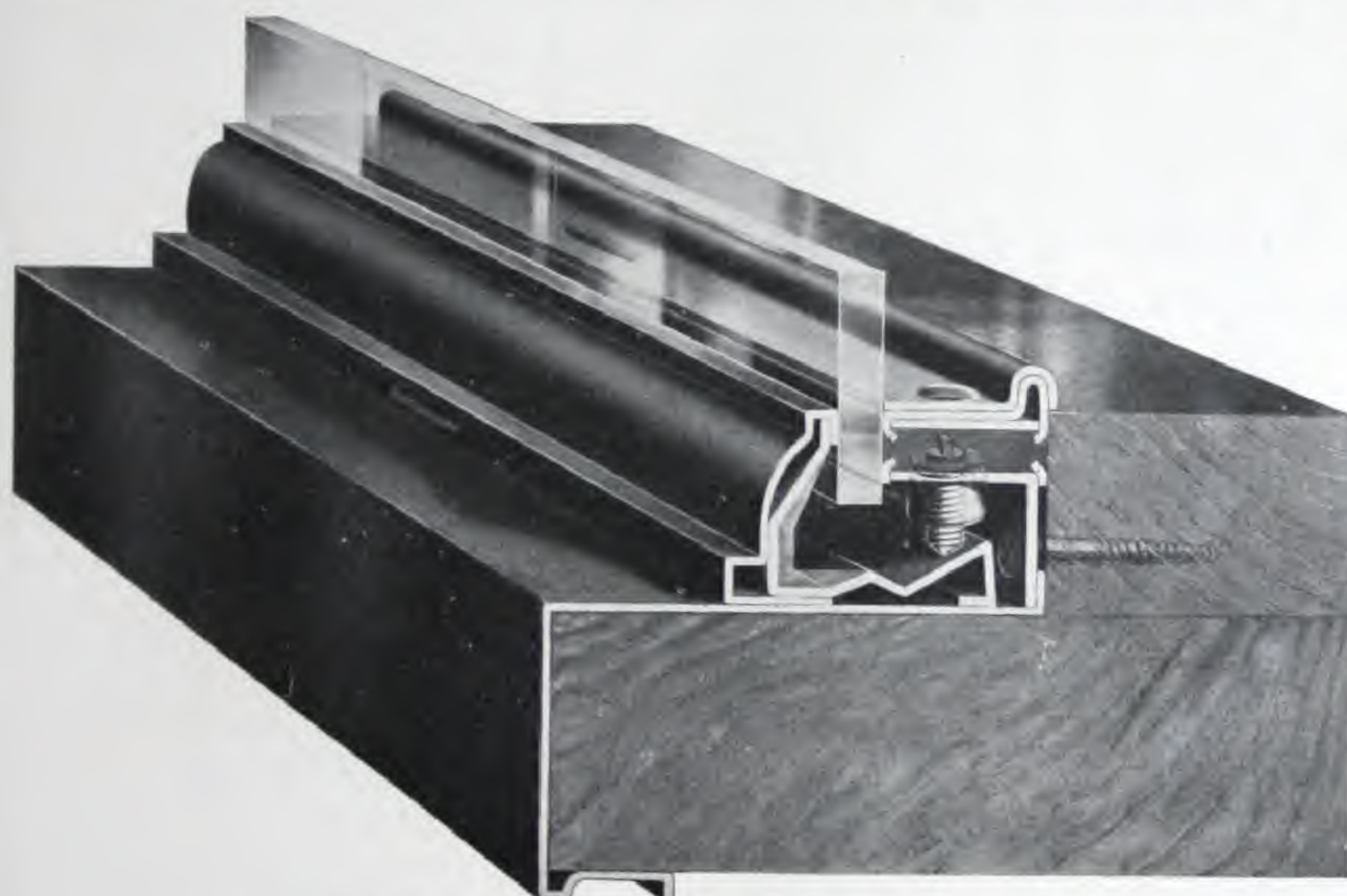


INNER MEMBER OF NO. 115 ZOURI
SAFETY KEY-SET SASH.

Illustrating the Murnane self-adjusting setting block in position before the outside moulding is applied.

SHOWING THE NECESSITY FOR SELF-ADJUSTING SETTING BLOCKS.

Plate glass over 20 sq. ft. can not be safely set without self-adjusting setting blocks, the purpose of which is to insure that glass is brought into contact with the rabbet at points where it sets on blocks when outside moulding is applied. The cost of self-adjusting setting blocks is negligible considering the function they perform in the preservation of plate glass. Note the distorted position of glass above illustrated at points A and B, caused by glass not being in contact with rabbet at points where it sets on blocks. The weight and friction of plate glass on setting blocks is such that it will not slide, hence the necessity of self-adjusting setting blocks. Glass distorted in the slightest degree becomes an easy prey to wind pressure or vibration.

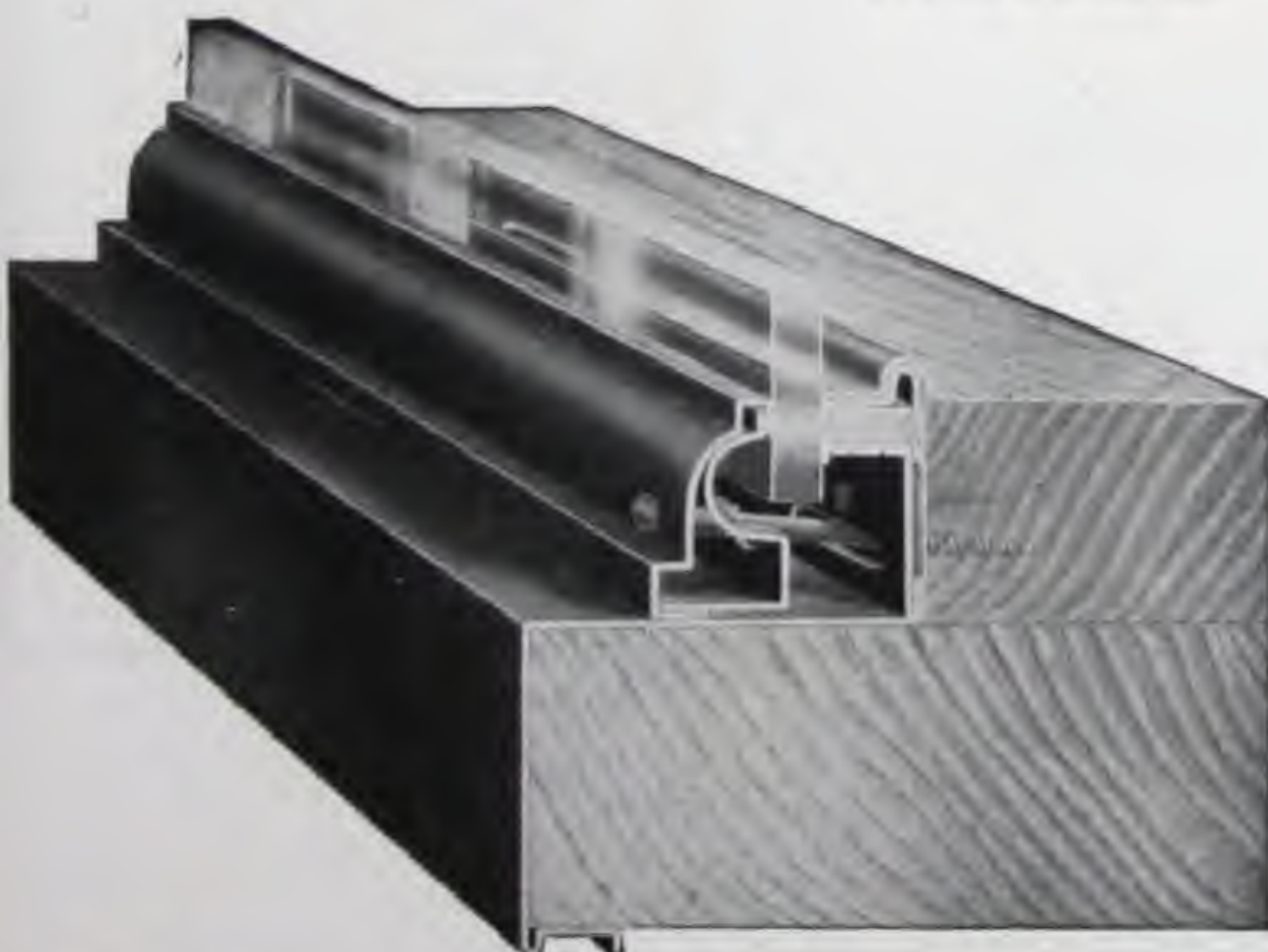


NO. 115 ZOURI SAFETY KEY-SET SASH WITH NO. 705 SILL COVERING.
Two-thirds actual size.

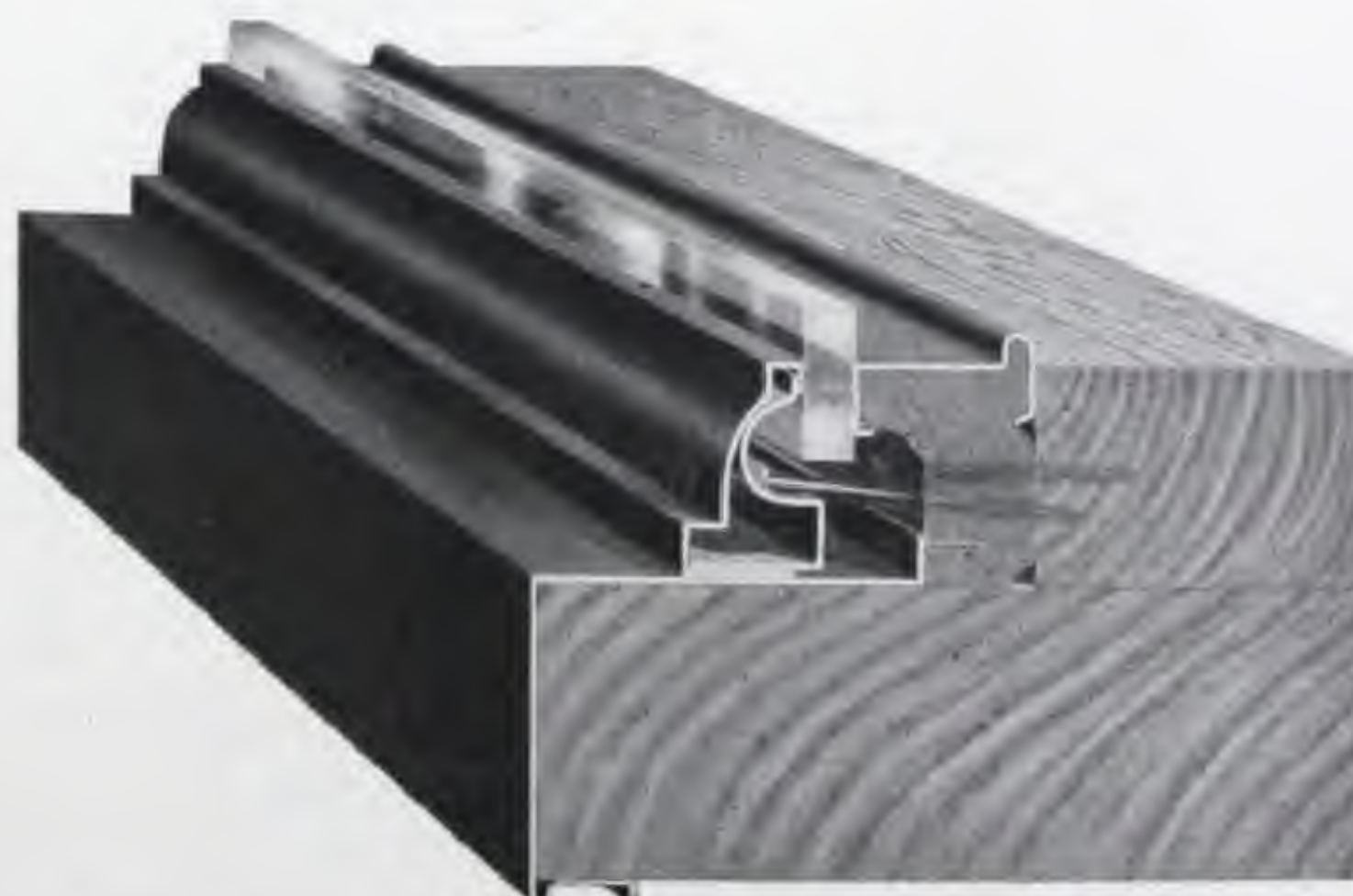
Approved By
UNDERWRITERS'
LABORATORIES.
Zouri Safety Key-set
Lines are approved and
manufactured under su-
pervision of the Under-
writers' Laboratories.



KEY FOR ZOURI SASH
No. 115.



NO. 160 INTERNATIONAL DIRECT SCREW PRESSURE SASH WITH NO. 708
SILL COVERING.
One-half actual size.



NO. 145 INTERNATIONAL DIRECT SCREW PRESSURE SASH WITH NO. 707
SILL COVERING.
One-half actual size.

DETROIT SHOW CASE COMPANY

MAKERS OF METAL STORE FRONT CONSTRUCTION,
DETROIT, MICH.THE TORONTO PLATE GLASS
IMPORTING CO., LIMITED.
91 DON ROADWAY, TORONTO.**Desco**
METAL
STORE FRONTS

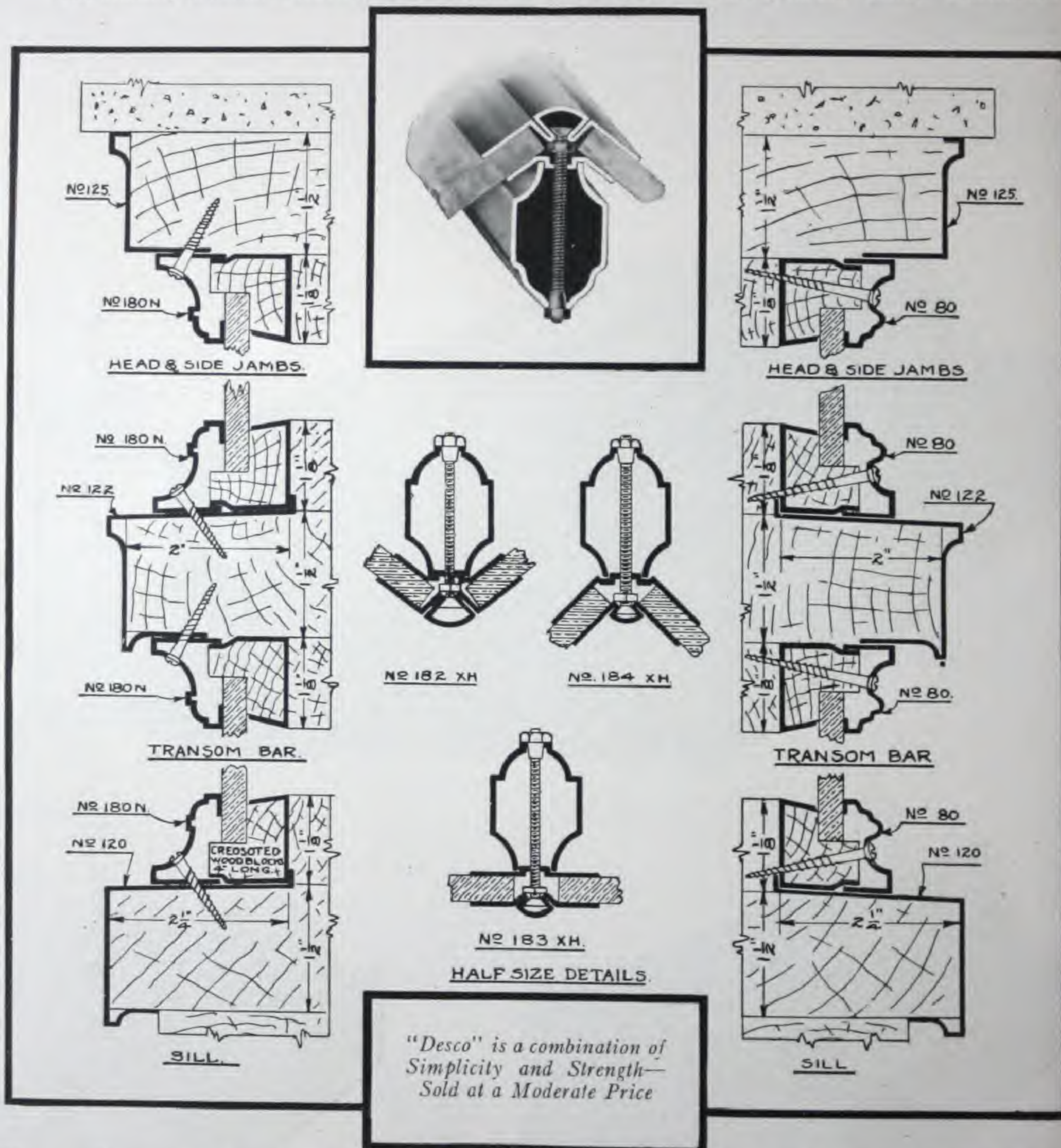
DESCRIPTION

"DESCO" METAL STORE FRONT CONSTRUCTION. (PATENTED Oct. 29, 1918.)

"Desco" store front construction is made and designed along the most approved architectural lines. The several shapes harmonize perfectly with the modern styles of store front construction. All glass bearing members are of solid, heavy gauge copper, reinforced at the back by steel channels, which have been treated by the universally used Parker Rust-Proof Process. This makes for greater strength, safety to the glass, and permanency.

"DESCO" LINE COMPLETE.—The "Desco" line of store front construction is complete in every detail, including ventilated sash, glass stops, division bars, corner bars, 3-way bars, reverse corner bars, sill coverings, transom bar coverings, bulkhead constructions, copper panel work, kick plates, thresholds, etc.

SIMPLICITY.—The simplicity of "Desco" store front construction is one of its strongest points. The ordinary mechanic without previous experience can properly and hastily install "Desco" construction.

CONSTRUCTION
FEATURES.

VENTILATED SASH CONSTRUCTION.—The ventilated sash is made to hold the glass firmly in a deep rabbet and to take care of any expansion or contraction of the glass. The glass setting blocks are of creosoted cypress, about 6 ins. long, and are set well apart so as to give ample freedom to ventilation and drainage. Air has free access through the "Desco" sash and materially facilitates proper show window ventilation. Particular emphasis is given to the simplicity of "Desco" sash.

CORNER AND DIVISION BARS.—All glass bearing members are of solid copper, reinforced by rust-proofed steel channels. Ease of installation is a particular feature of "Desco" construction.

SEND FOR COMPLETE ARCHITECTURAL DETAILS, A REPRINT OF OUR NINE-PAGE INSERT IN SWEET'S ARCHITECTURAL INDEX.

TAYLOR-BRASCO, LIMITED

108 MERRICK STREET,
HAMILTON, ONTARIO.

Brasco

STORE FRONTS.

BRASCO
COPPER—WITH WOOD FOR SAFETY.

BRASCO-HESTER
HOLLOW METAL COPPER.

LARGE COMPLETE STOCK FOR IMMEDIATE SHIPMENT.

3/8-SIZE VERTICAL

BRASCO STORE FRONT SECTIONS.

ADVANTAGES OF BRASCO COPPER-COVERED CREOSOTED TYPE.

Utilizes the merit of the wood setting, determined by every insurance company as being safest for glass, together with

The imperishable properties of cypress and creosote, and

The beautifying and protective qualities of copper.

Instead of the resilient and erratic glass grip or the hard tension grip, BRASCO employs the approved firm, supple, and uniform hold.

Glass is set from outside and sash placed by the indirect screw pressure method.

Has the widest drainage gutter of any store front system on the market.

Affords more ventilation than any other copper front, therefore,

Insures clearer plates and more efficient display service.

Details show the sturdy, durable and beautifully designed mouldings used.

BRASCO jamb, transom, sill and sash members take standard size of lumber.

Copper used where copper is necessary, therefore, BRASCO COSTS LESS.

ADVANTAGES OF BRASCO-HESTER HOLLOW METAL COPPER TYPE.

Large heavy gauged solid copper sash.

Drain and vent holes are embossed in the inner member and NOT punched in the outer retaining strip. The latter method, which is ordinarily practiced, tends to weaken the sash and to catch lint and dirt.

The inside gutter holes do not show.

The even indirect screw pressure method of glass setting is employed.

Affords maximum daylight.

Sash can be used without jamb or sill.

The most efficient system for keeping show windows free from frost and mist.

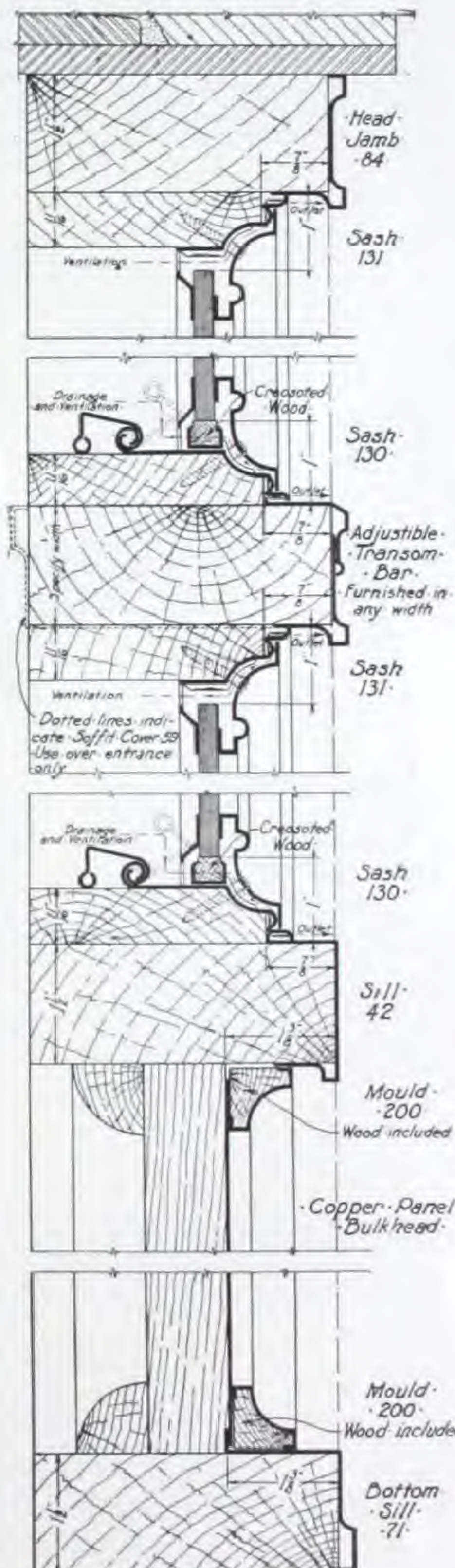
Has a smooth working dust regulator.

Mouldings are of substantial and artistic design.

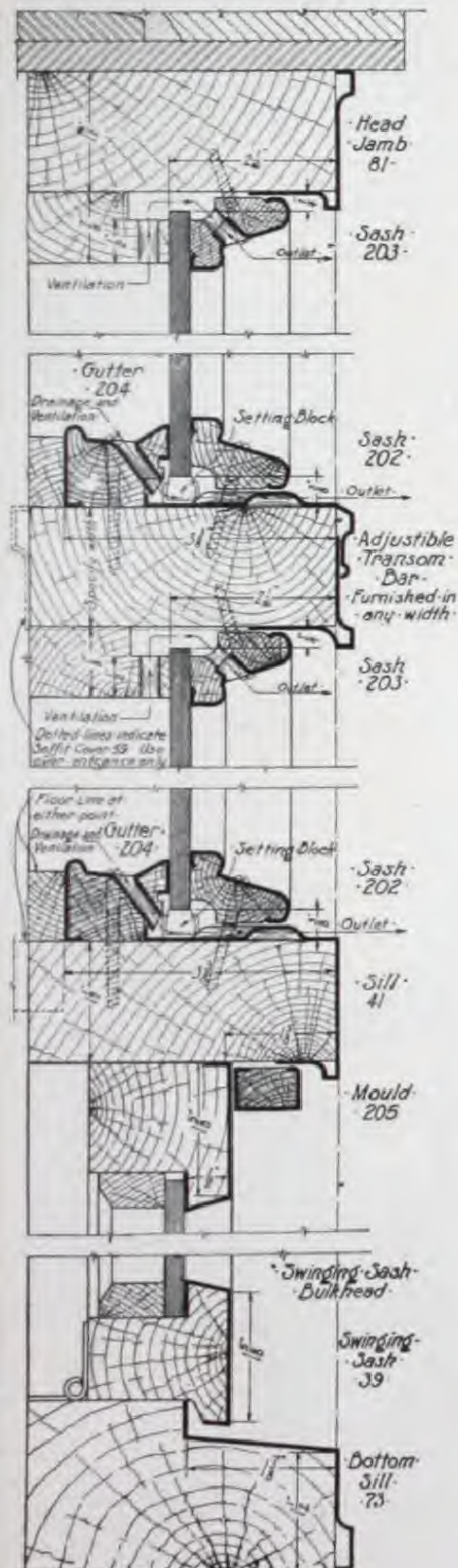
Takes stock sizes of mill work.

COSTS NO MORE than the ordinary sash.

BRASCO-HESTER SHELL COPPER TYPE.



BRASCO COPPER COVERED CREOSOTED TYPE.



BRASCO—A BETTER FRONT FOR LESS MONEY.

THE GEO. M. HENDRY CO., LIMITED

SCHOOL EQUIPMENT OF ALL KINDS.

215 VICTORIA STREET,
TORONTO.

PRODUCTS.

SLATE AND HYLOPLATE BLACKBOARDS; SCHOOL FURNITURE; GENERAL SCHOOL EQUIPMENT.

PYRAMID
BRAND SLATE
BLACKBOARD.

"PYRAMID BRAND" SLATE BLACKBOARD is the highest grade cut for school purposes. A large stock carried at our Toronto Warehouse. Prices on application.

HYLOPLATE
BLACKBOARD.

HYLOPLATE is the best composition blackboard made anywhere, and is guaranteed for ten years by the manufacturers when properly installed and used.

We can supply slabs in standard widths of 3, 3½ and 4 feet, and lengths of 6, 8, 10 and 12 feet. Further particulars and prices on application.

BALL-BEARING
DESKS.BALL-BEARING AUTOMATIC DESKS
in Adjustable and Ordinary Styles.

MADE IN CANADA.

Write for full particulars and prices.

MOULTHROP
MOVABLE
AND
ADJUSTABLE
CHAIR DESK.

Made of quartered oak, gloss finish.

All parts are solidly constructed to withstand hard usage.

Adjustable supports for the writing table are of electrically welded steel.

Three simple adjustments are embodied:—

- (a) Perpendicular adjustment of the table for height.
- (b) "Plus and Minus" adjustment by which the writing table slides to or from pupil.
- (c) Angular adjustment for sloping the writing table from horizontal to 45° to obtain a comfortable, convenient position for reading, drawing, etc.

The bases of legs are fitted with "domes of silence," enabling desk to be moved easily to any desired position in room. These domes will not mark hardwood or linoleum-covered floors.

Moulthrop Movable Adjustable Chair Desks are made in six sizes.

Write for special booklet and prices.



MODEL B—TYPE X.

MADE AT COBOURG, ONT.



"R-W" TROLLEY HANGERS.

RICHARDS-WILCOX CANADIAN COMPANY, LIMITED

LONDON, ONTARIO.

MONTREAL BRANCH: 290 ST. PAUL STREET. W.

WINNIPEG BRANCH: 533 HENRY AVENUE. •

AMERICAN PLANT AT AURORA, ILL.

BRANCH OFFICES IN NEW YORK CITY, PHILADELPHIA, BOSTON, CHICAGO, ST. LOUIS, SAN FRANCISCO, MINNEAPOLIS, CLEVELAND, LOS ANGELES AND INDIANAPOLIS.

Complete Catalogue
(160 pages) on request.

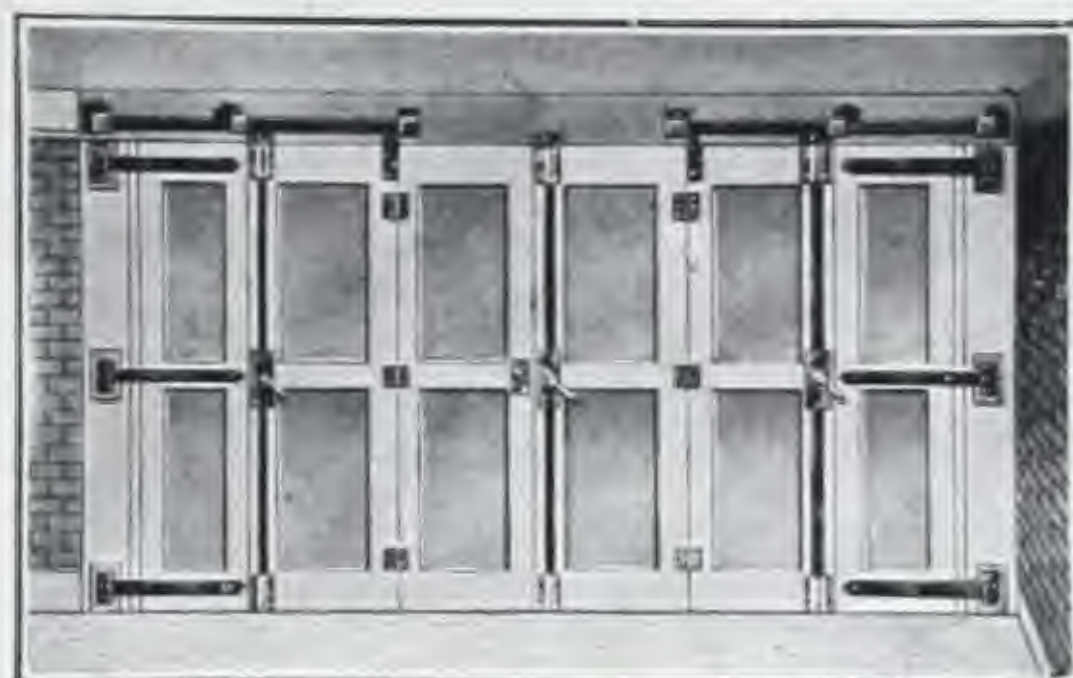
"A Hanger for
Any Door that Slides."



"BULL-DOG"
JOIST HANGER.



No. 331A—"SLIDETITE" OUTFIT.
Two doors fold one way, one door swings the other way. For garage openings up to 10 ft. wide.



No. 237—FACTORY STANDARD GARAGE OUTFIT.
For openings up to 18 ft. wide and any desired height. Doors fold up in small space inside building and fit perfectly tight.



FOLDING DOOR HARDWARE.
For dividing one large room into two or more smaller rooms for churches, auditoriums, schools. Specify No. 135 "R-W" Hangers.



PARALLEL SLIDING DOORS.
For Garages and Drive Barns.
Any number of Doors in the series.



No. 431B—"SLIDETITE" OUTFIT.
Two doors open each way. Ice and snow does not interfere with operation; close perfectly tight. For openings 10 to 13 ft. wide.



No. 235—ANGLE DOOR.
For Garage. Very popular. Costs no more than swing door. No warp. No accidents. Single or Double Doors.



IDEAL FIXTURES FOR ELEVATOR DOORS.
This is a high-grade fixture and always specified for the best work. Ball-bearing, centre-hung, practically dust-proof. Also shows the Ideal Door Controller and Check.



"R-W" TROLLEY CARRIER SYSTEMS.
They pay for themselves in one year. Large saving in handling expense.



FIRE DOORS AND FIRE DOOR HARDWARE.
All Styles: Slide, Swing, Vertical, etc., with Underwriters' Label.



No. 51—HORIZONTAL FIXTURES.
For Elevator Openings, Freight Sheds.



THREE-DOOR TANDEM.
Two doors are hung on hangers, the third door is hinged to the middle door and is used as a passage door. Flat track for cheap work, trolley track for good work.



PARALLEL PARTITIONS.
Hung on trolley track for combining several small rooms into one large room in schools, churches and auditoriums.



HORIZONTAL FOLDING DOOR HARDWARE.
Made to open either inside or outside.

N. SLATER COMPANY, LIMITED

SUCCESSORS TO
SLATER & BARNARD, LIMITED
(FORMERLY ALLIETH MANUFACTURING CO., LIMITED),
HAMILTON, ONT.

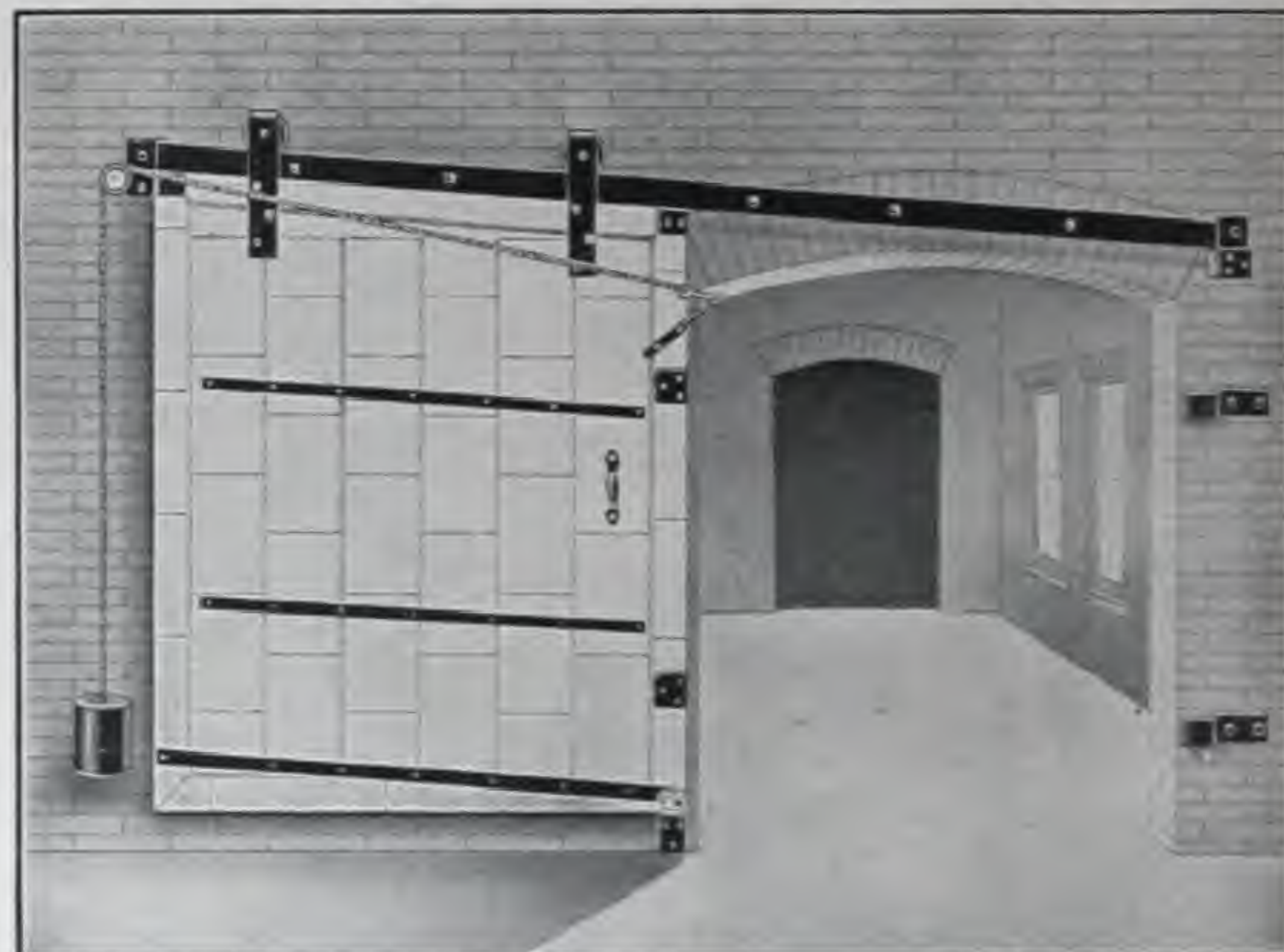


CATALOGUE.
PRODUCTS.

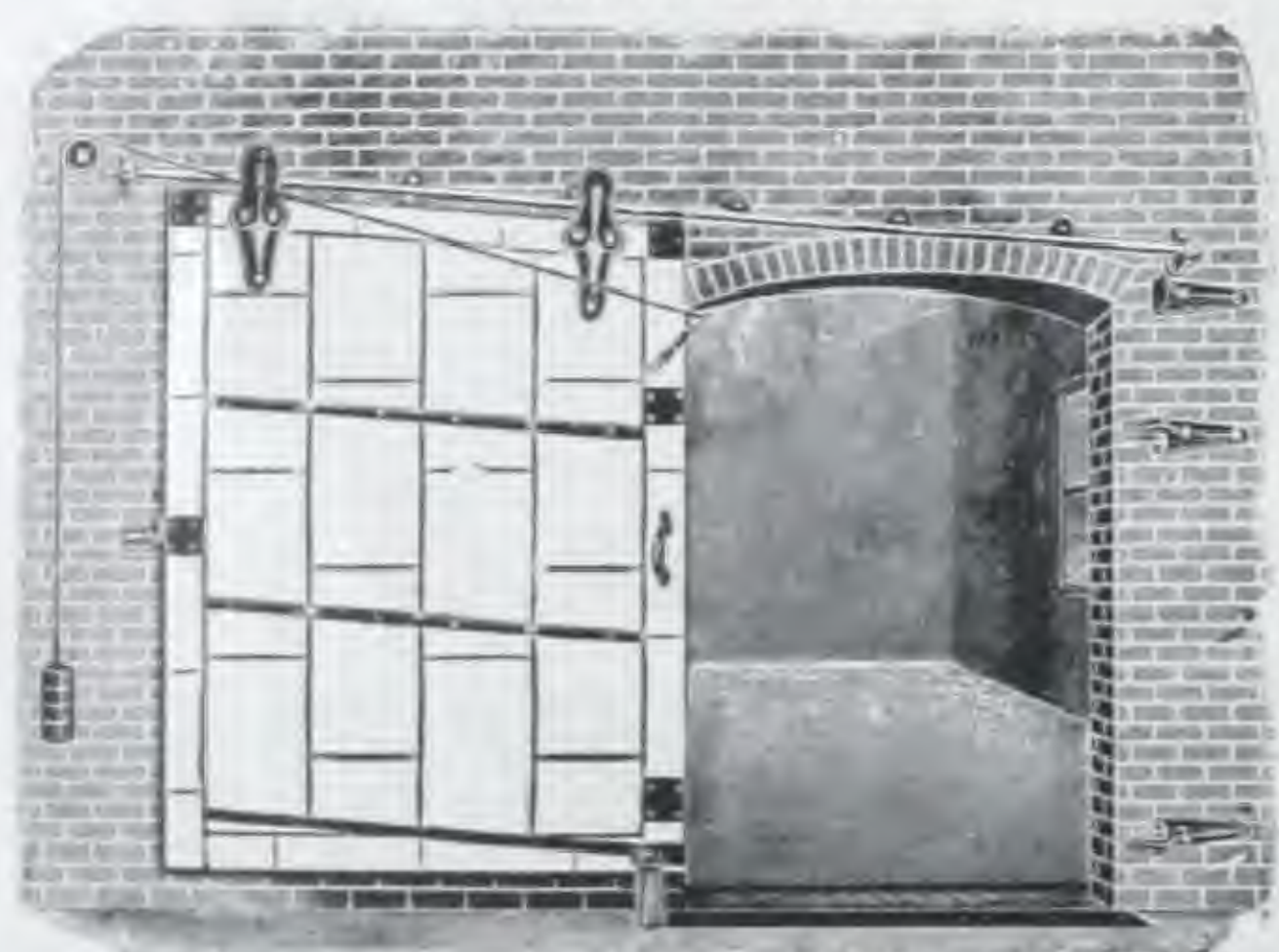
You may have one of our complete catalogues for the asking.
We are manufacturers of Construction HARDWARE, DOOR HANGERS and TRACK for any style door.
FIRE DOOR FIXTURES, sliding, swinging and specials. We require drawing or blue print for special jobs.



SWINGING FIRE DOOR FIXTURES.



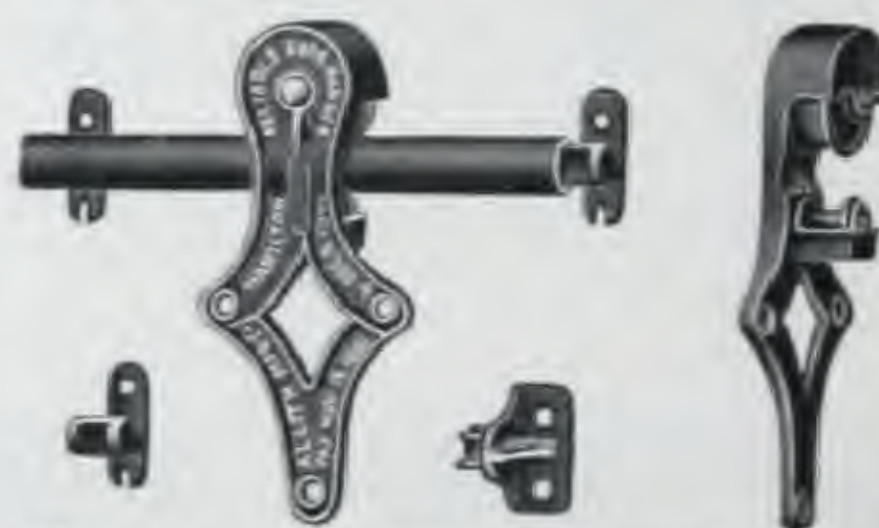
TYPE NO. 500. FLAT TRACK FIRE DOOR FIXTURES.
Carries Underwriters' Label.



NO. 700. ROUND TRACK FIRE DOOR FIXTURES.
Carries Underwriters' Label.

FIRE DOOR FIXTURES all kinds:—
Flat Track, Round Track, Swinging.
Carries Underwriters' Label.

All kinds supplied for Single or
Double Doors.



THE RELIABLE HANGER AND TRACK.

This is an easy running outfit, with
round track and adjustable brackets
(made in 3 sizes), for all weight doors.



TYPE NO. 1918.

Round Trolley Flush Hanger allows
doors to hinge flush with the opening.
Track self-draining and self-cleaning.



TYPE NO. 131.
Flat Track Shed or Light Weight
Door Hanger.



TYPE NO. 1913 ADJUSTABLE SQUARE
TROLLEY HANGER AND NO. 1915 SQUARE
TROLLEY TRACK (actual size).

1915. TRACK.
1915. BRACKET.
1913. HANGER.



End View showing
the Hanger in the track
and the bracket.

NOTE the round run-
ning bed in track.

Easiest operating of all.



PARALLEL DOOR EQUIPMENT.

Send your specifications and we will be pleased to quote you.

CONTINUED ON NEXT PAGE.

N. SLATER COMPANY, LIMITED

SUCCESSORS TO

SLATER & BARNARD, LIMITED

HAMILTON, CANADA.

HIGH TENSION LINE MATERIALS.

CATENARY LINE MATERIALS.

HIGH VOLTAGE INSULATOR PINS.

SECONDARY RACKS AND BRACKETS.

TRANSPOSITION BRACKETS.



No. 354.



No. 254.



No. 154.



No. 540.



No. 73.



No. 88.



No. 80.



No. 93.

ANCHOR RODS.

EYE BOLTS.

SQUARE WASHERS.

CROSS ARM BRACES.

BOLTS.

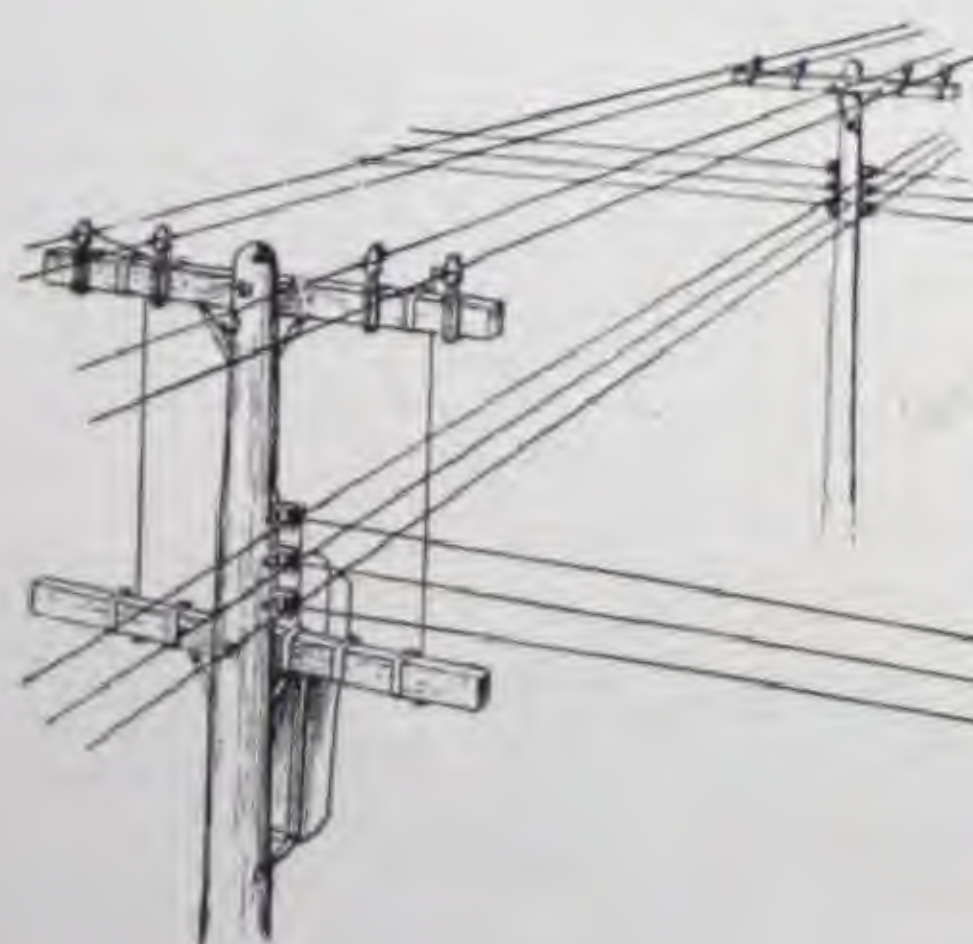
AERIAL RINGS.

FORGINGS.

STAMPINGS.

HOT GALVANIZING.

SHERARDIZING.



No. 91.



No. 183.



No. 383.



No. 583.



No. 72.

Made in Canada under Peirce and Hubbard Patents.

RELIANCE-GRANT ELEVATOR EQUIPMENT CORPORATION

101 PARK AVENUE, NEW YORK, N.Y.

AGENCIES:

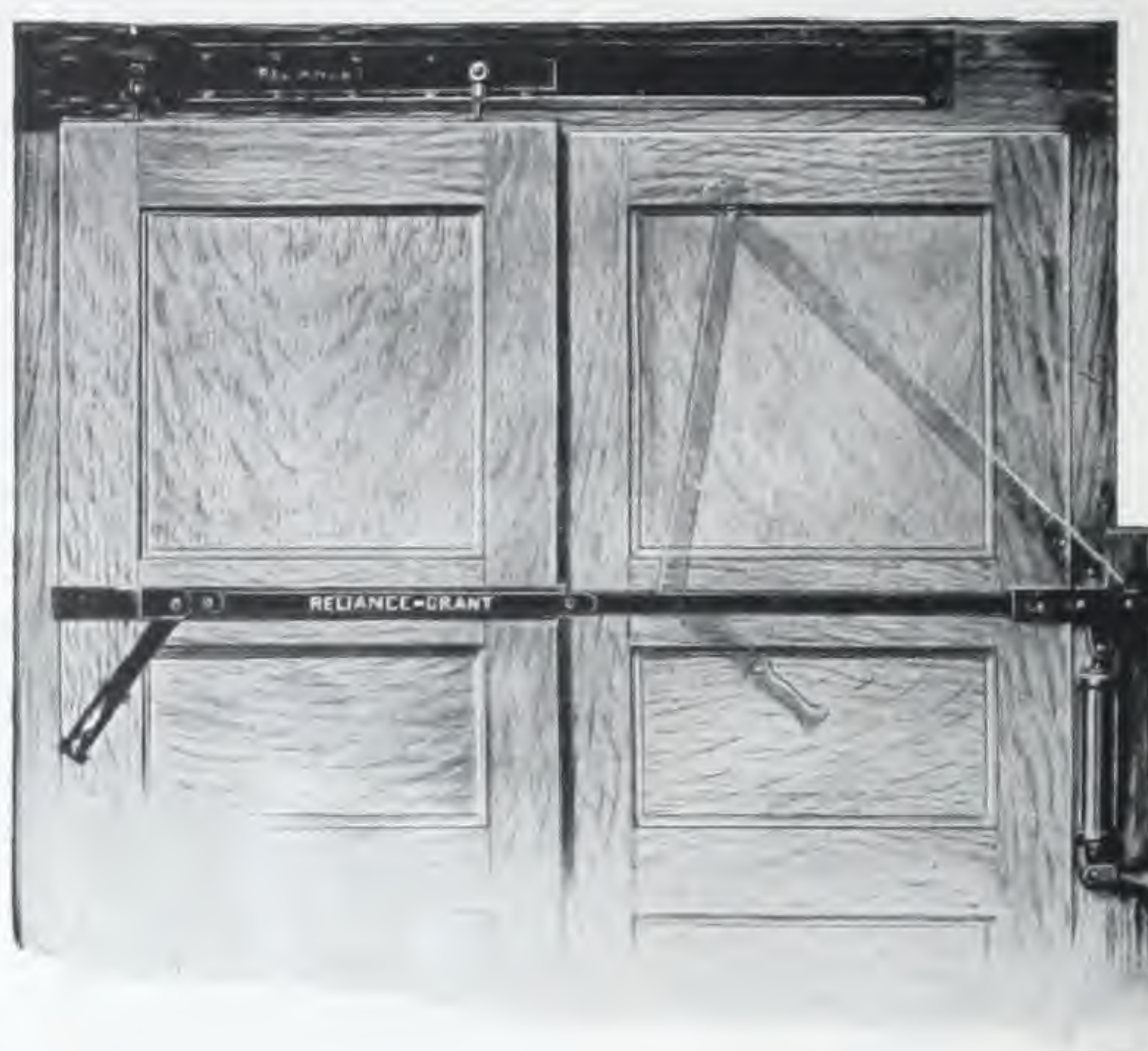
VANCOUVER, B.C.—WM. N. O'NEIL CO., LTD. MONTREAL, CAN.—DOUGLAS-MILLIGAN CO.
TORONTO, CAN.—RICHARD H. FALKINER.

PRODUCTS.

"RELIANCE" AND "DIAMOND" HANGERS, ELEVATOR DOOR CONTROLLERS, ELEVATOR BAR LOCKS AND DRAWER SLIDES.

CONSTRUCTION.

All Hangers are *directly* Ball-Bearing, which means Easy Running, Noiseless Action.



"RELIANCE" SINGLE HANGER "D."



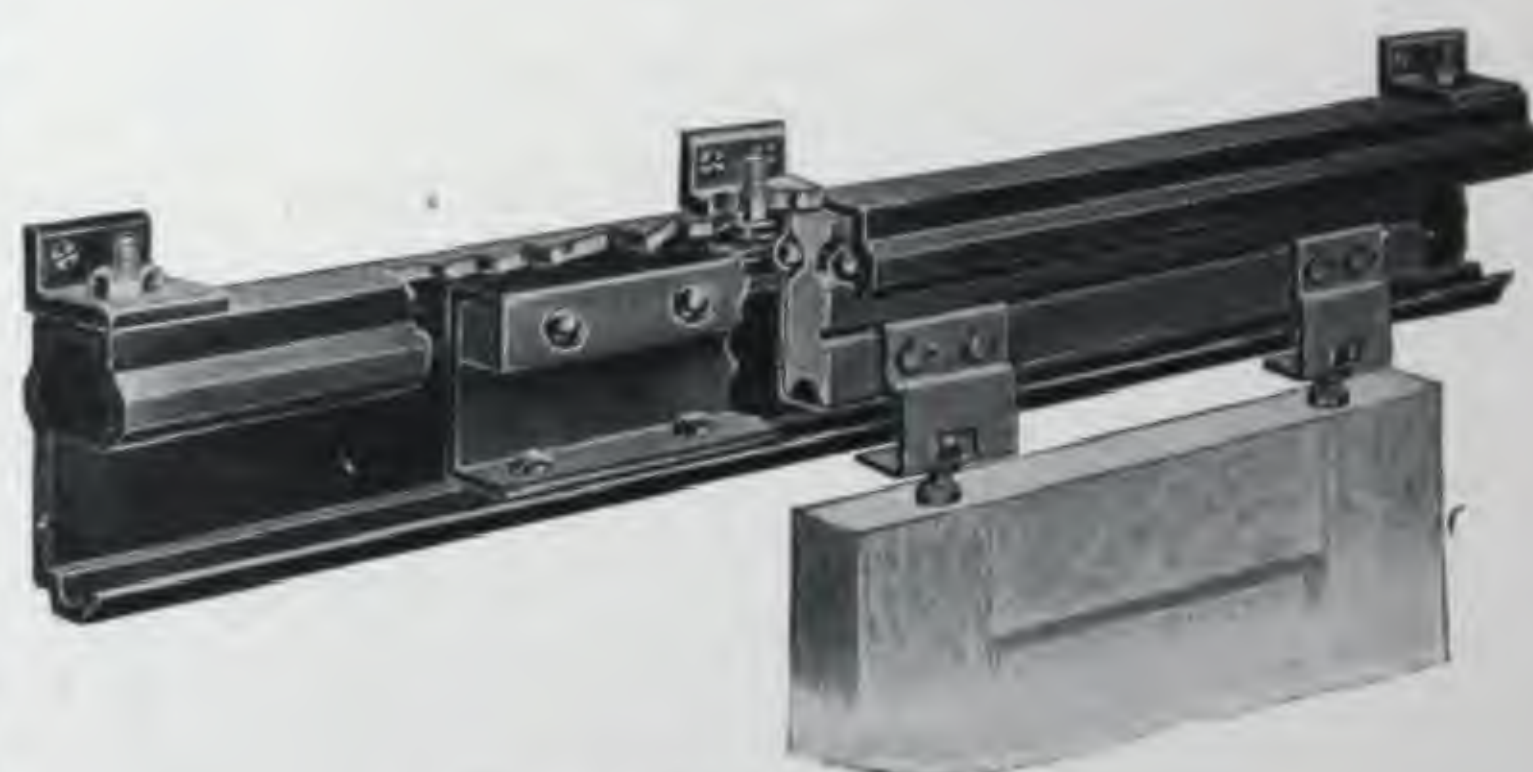
"RELIANCE" DOUBLE HANGER "H."



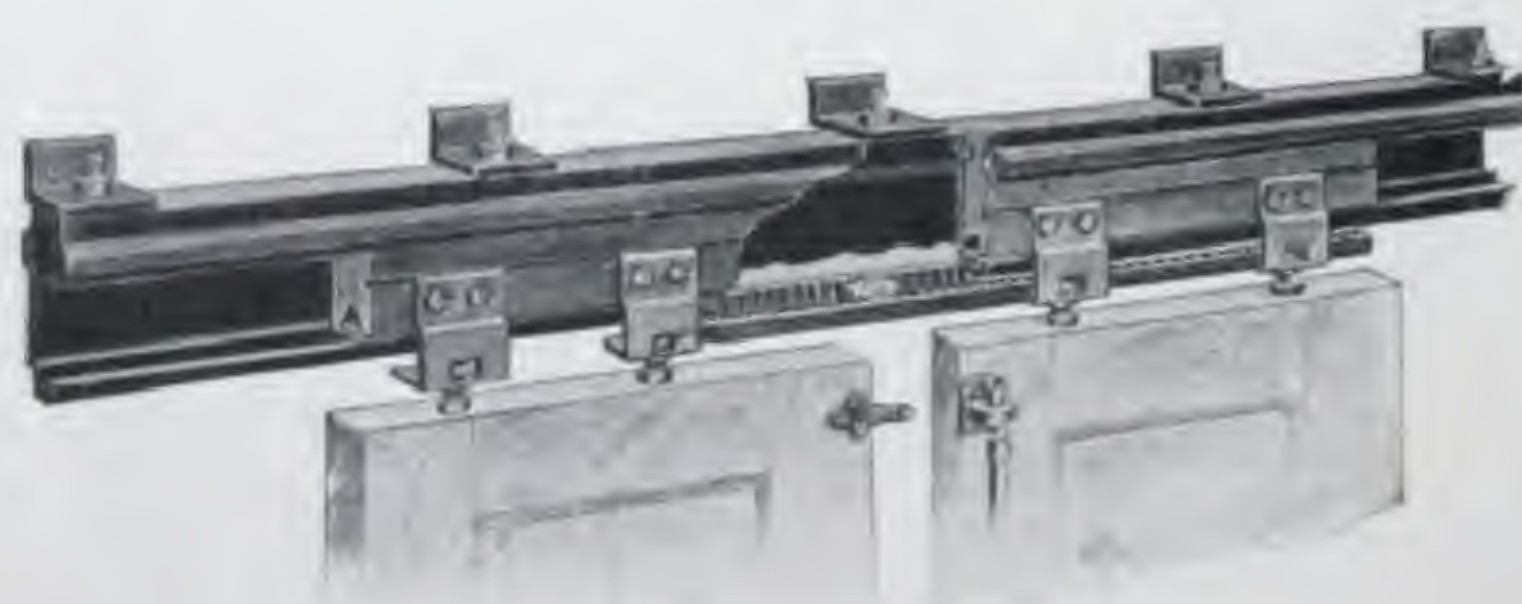
"RELIANCE" TWO-SPEED HANGER "KB."

RELIANCE SINGLE DOOR CONTROLLER.

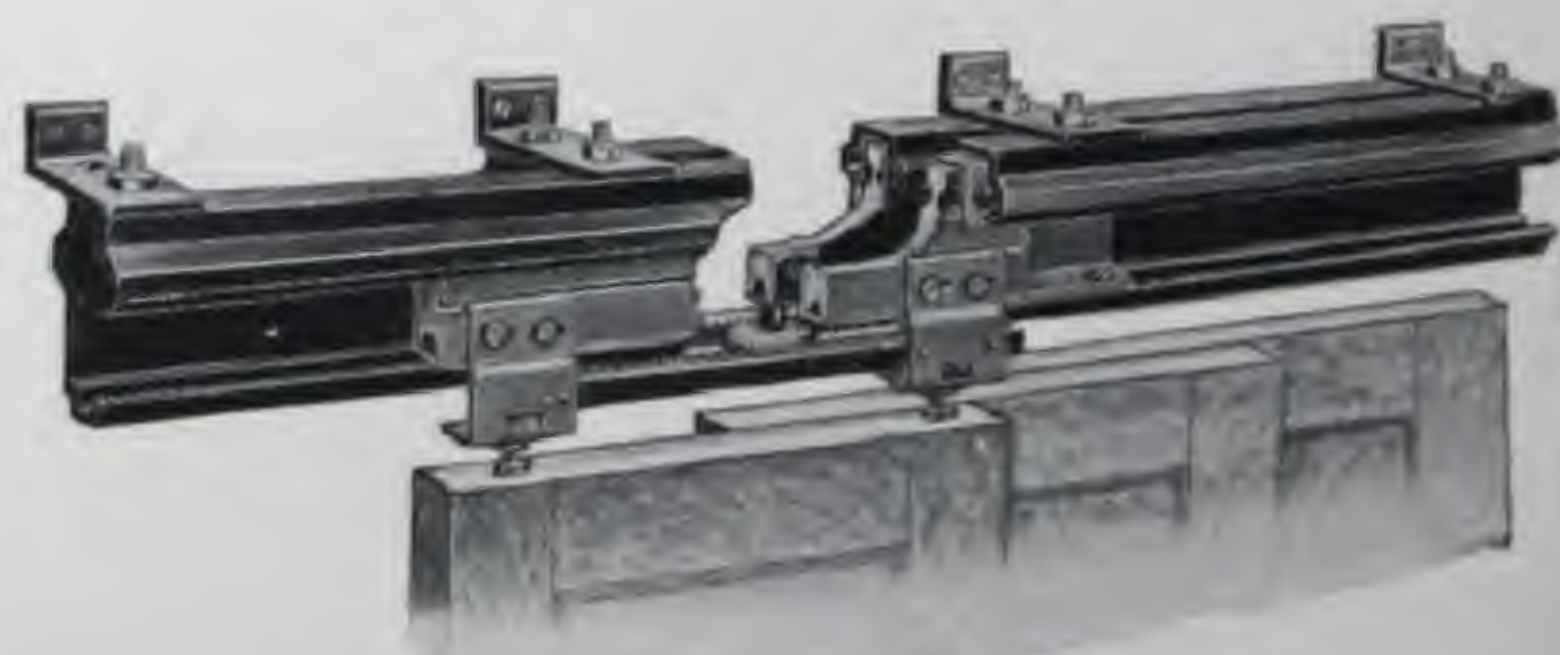
A continuous straight pull on handle both unlocks and opens the door. The action of the door when released is rapid past the danger point —when the liquid checking device takes control, checks the rapid movement and brings the door to a noiseless, slamless stop. Door when closed is securely locked, but key can be furnished to unlock from hall side. Controller can also be furnished for center closing doors and for doors moving in same direction.



"DIAMOND" SINGLE HANGER NO. 2.



"DIAMOND" HANGER NO. 3.



"DIAMOND" TWO-SPEED HANGER NO. 4.

CANADIAN CINCH ANCHORING SYSTEMS, LIMITED

MONTREAL, P.Q.:
BEVERIDGE SUPPLY CO., LIMITED
(MILL SUPPLY DEPT.):
628 ST. PAUL ST. WEST.

250 RICHMOND STREET W.,
TORONTO, ONT.

WINNIPEG, MAN.:
GEO. OXTON,
401 NOTRE DAME INVESTMENT
BUILDING

PRODUCT.

CINCH ANCHORING SPECIALTIES:

CINCH EXPANSION BOLT, CINCH ANCHOR AND CINCH STUD ANCHOR.

PRINCIPLE.

The principle employed in constructing the Cinch anchoring specialties is scientifically sound. It is based on the wedge, the screw and the lever.

A cinch anchorage bites quickly and positively. Properly installed, it cannot pull out or work loose. Its lead-composition parts get a complete surface grip, filling even the shallowest irregularities in the wall of a hole. As the pull increases, the push against the side of the hole increases more than proportionately on account of the wedging action of the iron cones. The greater the load sustained the stronger the hold obtained.

A Cinch anchorage can be used on any machine bolt or machine-threaded attachment device. It consists of two or more lead-and-iron expansion units, as explained below. An anchorage of less than two expansion units is never used. A two-unit anchorage is sufficient to carry ordinary loads. The smallest Cinch anchorage, $3/16$ of an inch, has carried a weight of over one thousand pounds in numerous tests.

Typical Example of Installation

Cinch Expansion Unit



Fig. 1

One Cinch expansion unit is shown in Figure 1. It consists of two parts: (a) a conical wedge male part, either plain or threaded, made of malleable iron; (b) a lead-composition female part.



Fig. 2

Insert bolt with first unit in hole. (A Cinch anchor is being used here. If a Cinch stud anchor were being used, the first unit would be threaded and a stud bolt would be used instead of a standard machine bolt.)

Cinch Expansion Bolt



Fig. 3

A two-unit Cinch expansion bolt consists of a two-unit, threaded, Cinch anchor, reversed, fitted on a standard machine bolt. Figure 3 shows a two-unit Cinch expansion bolt, before expansion. The iron at the left is threaded. The other iron is plain without thread.

Cinch Anchor



Fig. 4

A two-unit Cinch anchor consists of a two-unit, plain, Cinch anchorage fitted on a standard machine bolt with nut. Figure 4 shows a two-unit Cinch anchor, before expansion.

Cinch Stud Anchor



Fig. 5

A two-unit Cinch stud anchor consists of a two-unit, threaded, Cinch anchorage, fitted on a stud bolt with nut. Figure 5 shows a two-unit Cinch anchor, before expansion. Note that the order of the parts is the same as in the case of the Cinch anchor—iron, lead, iron, lead.

ALL THREE CINCH ANCHORING SPECIALTIES, the Cinch expansion bolt, the Cinch anchor and the Cinch stud anchor, are a combination of the Cinch anchorages and either a standard machine bolt or a stud bolt. The two-unit anchorage only is illustrated here. Additional expansion units, not threaded, may be added whenever more than ordinary strength is required.

POINTS OF SUPERIORITY.

1. The Cinch Anchoring System is 100% efficient.
2. *Stronger than the Strongest Bolt.* Cinch anchoring specialties give the only anchorage guaranteed to hold beyond the tensile and shearing strength of any wrought iron steel bolt, as well as the breaking strength of the nut. They will not crush or otherwise mar the face of masonry. Vibration will not loosen the grip of the anchorage.
3. *Cut Drilling Costs.* Cinch anchoring specialties require a hole of less depth than any other expansion device, affording a great saving of labour and time in drilling, and a substantial saving of material because of the shorter length of bolt needed.
4. *Easy to Install in Any Position.* Cinch anchoring specialties are easy to install in any position. They can be set in masonry with the head of the bolt out of or in the hole. When the latter method is followed, expansion can be completed before work is lifted into place and bolted fast.

THE CANADIAN LAUNDRY MACHINERY CO., LIMITED

47-79 STERLING ROAD,
TORONTO, ONT.

PRODUCTS.

A complete line of LAUNDRY MACHINERY of every description.

Complete LAUNDRY PLANTS for hospitals, hotels, institutions and private residences, as well as for the commercial laundry; STERILIZING and WASHING MACHINES, of various sizes, for handling contaminated and infected linen; FLAT WORK IRONERS; DISINFECTING PLANTS for hospitals and institutions; TAHARA AUTOMATIC SILVER BURNISHING MACHINES for burnishing silverware, and a complete line of Machinery for CLEANERS and DYERS.

SERVICE.

Our Engineering Department will furnish, promptly, complete plans, specifications and estimates. Catalogue, or a complete set of specifications covering all "Canadian" Laundry Machinery, will be sent to any Architect on request.

FACILITIES.

Our experience in manufacturing laundry equipment extends over a period of more than thirty years and we have every facility for turning out high grade work, including the smaller as well as the larger equipment for the modern and efficient laundry.

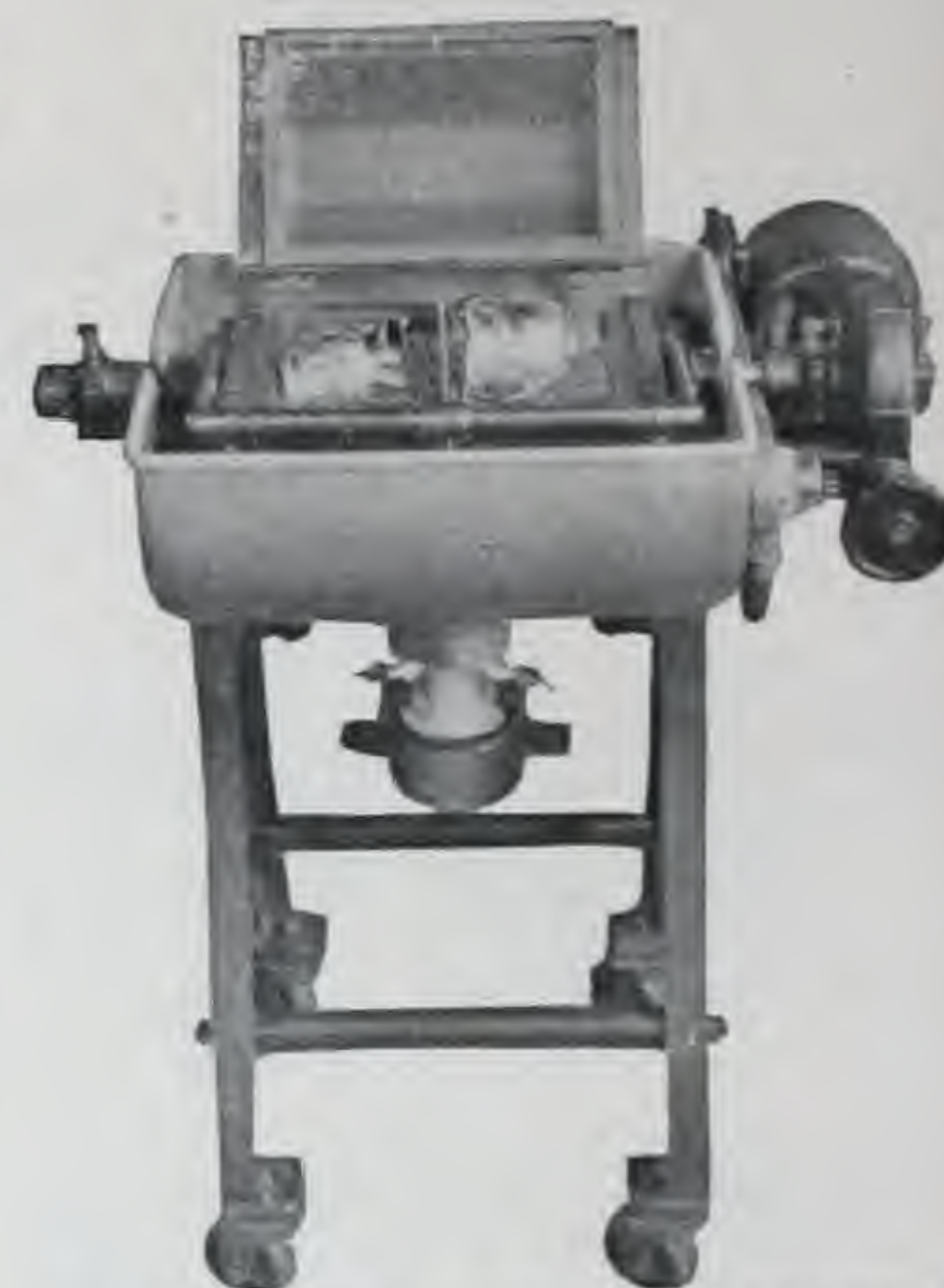


6-ROLL FLAT WORK IRONER.

The famous Hagen line, made in all convenient sizes, from 1-roll to 8-roll; equipped with all "American" features, such as ribbon feed, automatic finger guard, power pressure device, pressure indicator, etc. Made in 100-in., 110-in. and 120-in. lengths; also manufacture cylinder type Flat Work Ironers.

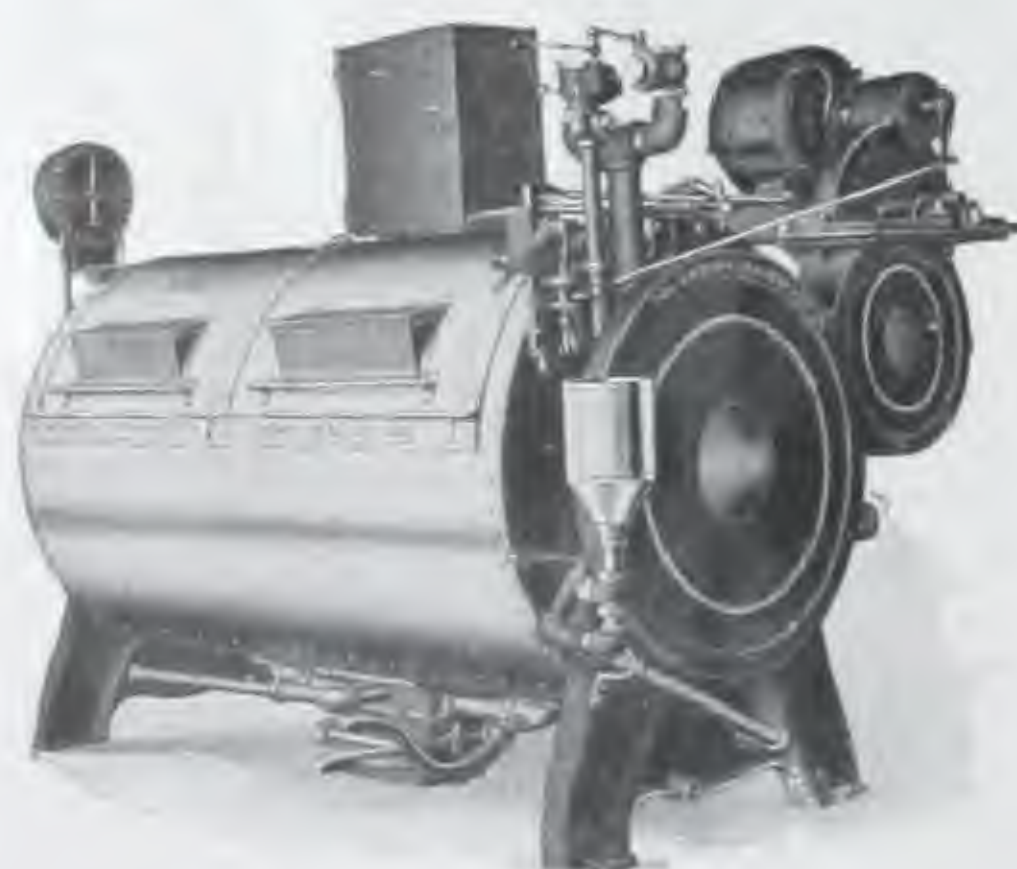


TRADE-MARK.



TAHARA SILVER BURNISHING MACHINE.

For Hotels, Clubs, Restaurants, Hospitals, etc. Built in a number of sizes and combinations. Restores silver to its original lustre and finish with no injurious effects to the silverware.



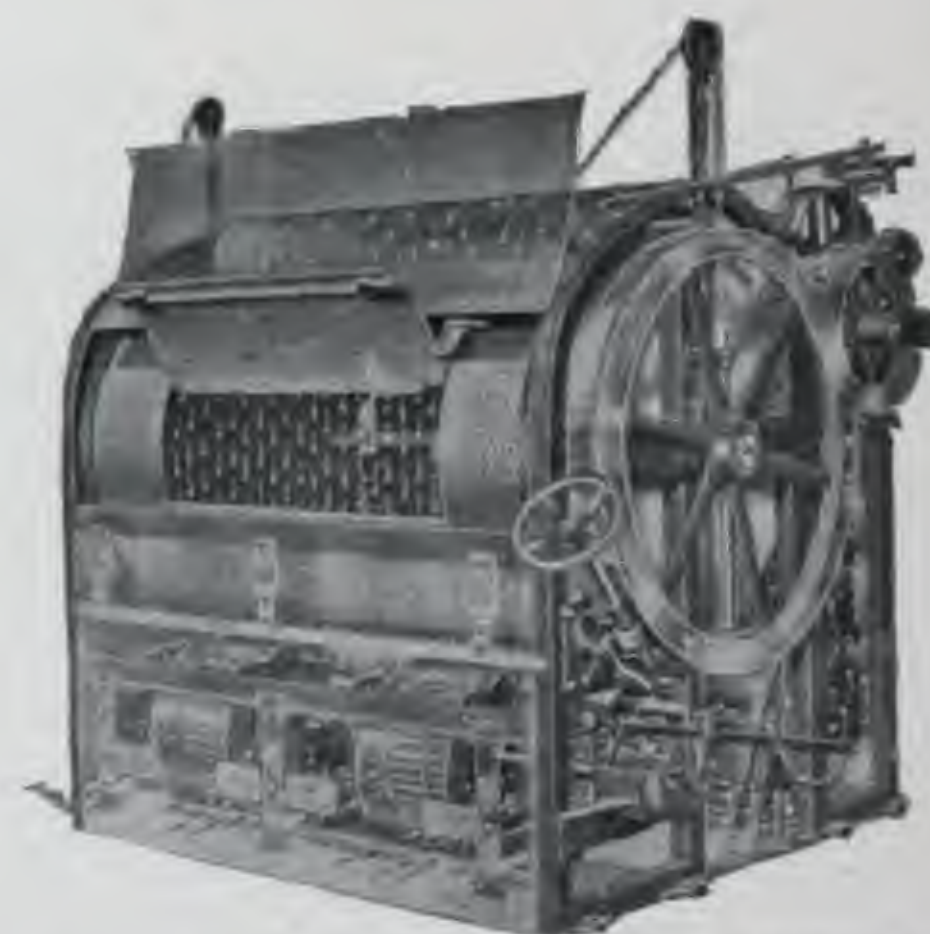
CASCADE WASHER.

Made with brass cylinder, of either brass or galvanized iron outer case; cylinder 36 or 42 ins. in diameter, and either 64, 72 or 84 ins. in length; has capacity of 4 ordinary washers and particularly adapted for use in hotels and institutions.



EXTRACTOR WITH AUTOMATIC SAFETY COVER.

Inner basket revolving rapidly removes moisture by centrifugal force. Smooth running. Highly efficient. Made both underdriven and overdriven, with either belt or motor drive. Diameter 20 to 48 ins.



CANADIAN VENTO DRYING TUMBLER.

Case made of galvanized iron, cylinder of either brass or heavy galvanized iron wire; cylinder 40 ins. in diameter and either 44, 54, 64 or 94 ins. in length; either belt driven, reverse or non-reversing type; single or double motor drive or panel controlled. One feature of the machine is that it uses practically 80% of the heated air over again.

REFERENCES.

The booklet "References," giving a list of hundreds of "Canadian" laundry installations, will be sent on request.

GENERAL.

We cannot illustrate all our machinery in the space at our disposal in this publication, but are always anxious to do our very best for each customer, and urge you to give our Engineering Department details of your requirements.

Architects should always provide in their plans for a six-foot door into laundry room.

THE GALT STOVE & FURNACE CO., LIMITED

MANUFACTURERS OF THE "BANNER" PIPELESS FURNACE.

GALT, ONTARIO, CANADA.



THE OLD WAY.



GRAVITY LOCK.



THE MODERN WAY.

MAJESTIC COAL CHUTES.

- (1) PROTECT AGAINST DAMAGE.
- (2) ENHANCE PROPERTY VALUE.
- (3) LESSEN DEPRECIATION.
- (4) SAVE MONEY.

The value of the Majestic Coal Chute can only be estimated when it is remembered that every delivery of coal by careless drivers can occasion enough damage to necessitate repairs. With the present high cost of labour and materials, it takes but a few repair bills to more than equal the cost of a Majestic Coal Chute.

No one likes crawling through a dirty coal bin to unlock or lock a cellar window. With a Majestic Coal Chute there's no need to. The Majestic is unlocked from the inside—without going into the bin. It is locked by the coalman from the outside when he closes the hopper of the chute.

When closed, the Majestic Coal Chute locks automatically and sets flush with the walls of the building. When open, the door of the chute protects the hopper above the coalman right where the damage is usually done. When the hopper is open the coalman has a large coal hole to receive the coal.

Majestic Coal Chutes are absolutely fireproof and burglarproof. Their various styles and sizes make them adaptable to any coal room window. Several hundred thousand are now in use in the United States and Canada, having been specified by the leading architects of both countries.

NUMBERS 10-A AND 20-A.

Styles 10-A and 20-A are more than coal chutes—they are windows as well.

The doors are fitted with $\frac{1}{4}$ inch wire glass, secured by adjustable wire clips, making it possible to change over to a steel front chute at any time.

When closed, the chute hopper and protecting shield lies flat on the bottom of the chute, allowing the daylight to shine into the coal bin, lighting the basement.

When open, the steel protecting shield lies over the glass, giving it ample protection from being broken. The door automatically locks open and when the hopper is pulled out is ready to receive coal.

In homes where a well-lighted basement is desirable, these chutes are ideal.

NUMBERS 10-B AND 20-B.

Style B is the same as Style A with a steel panel replacing the glass front. For this panel the Style A protecting shield is used. This makes the Style B chute interchangeable with Style A by merely adding the $\frac{1}{4}$ inch wire glass. Style C is the same as Style A only has no hopper. Style D is the same as Style B without a hopper.

MAJESTIC GRADE LINE CHUTES.

Where a building has no foundation above ground, or has a very low one, the Grade Line Chute is used. It can also be used in store buildings where the floor level is flush with the sidewalk. The door and frame are made of heavy cast semi-steel, they can even be driven over by a wagon without damage. The hopper sides are boiler plate, the body is made of steel plate and angle iron. Can be unlocked only from the inside.

MAJESTIC DOME DAMPER.

The Majestic Dome Damper can be operated from the end or from the front. When the damper is operated from the front, the long arm called "operate front" is used. When the damper is operated from the end, the long arm called the "operate end" is used. In regulating the damper from the end, one can insert the short arm in the long arm either to the right or left of left side of long arm.

There are no bolts or screws in the Majestic Dome Damper to get out of place or to become lost. Operated by the knuckle joint, the working parts are easily adjusted, and the damper can be opened and locked at any desired point. Neither ashes nor soot can collect back of the Majestic Dome Damper, because the damper is centre bearing and can be regulated so that soot and ashes fall into the grate after the damper is opened.

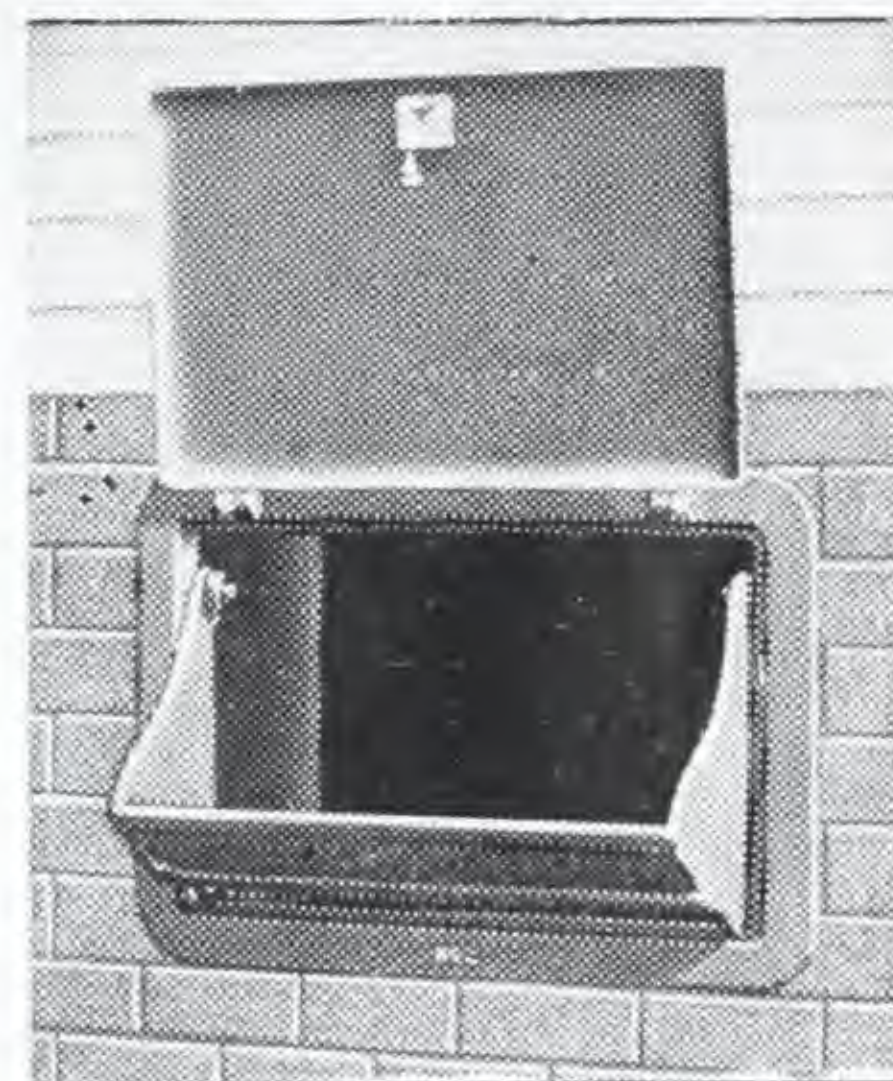
Front.	Throat.	Weight Crated.
24"	18" x 10"	30 lbs.
30"	24" x 10"	35 lbs.
36"	30" x 10"	40 lbs.
42"	26" x 10"	50 lbs.
48"	42" x 10"	60 lbs.



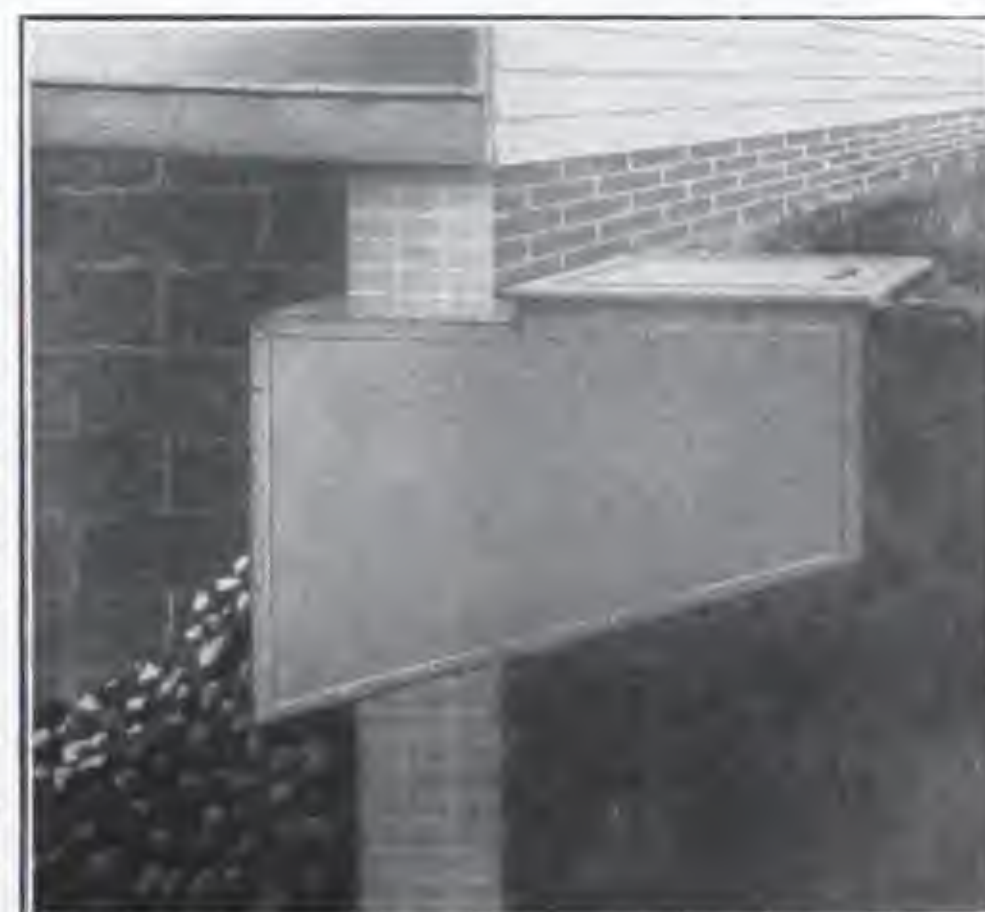
FRONT VIEW.

END VIEW.

A copy of our Majestic building specialty catalogue will be gladly sent to any architect upon request.



MAJESTIC COAL CHUTE, OPEN.



MAJESTIC GRADE LINE CHUTE.

THE McCLARY MANUFACTURING COMPANY

HEAD OFFICES AND FACTORIES AT LONDON, ONT.

Distributing Warehouses at LONDON, ONT., TORONTO, ONT., MONTREAL, QUE., WINNIPEG, MAN.,
VANCOUVER, B.C., ST. JOHN, N.B., HAMILTON, ONT., CALGARY, ALTA.,
SASKATOON, SASK., EDMONTON, ALTA.

McClary's

HOTEL AND INSTITUTIONAL KITCHEN EQUIPMENT


**McCLARY'S
HOTEL AND
INSTITUTIONAL
KITCHEN
EQUIPMENT**

We are Manufacturers and Distributors of equipment covering the complete requirements of the Modern Hotel or Institutional Kitchen. Many years of experience brings to your assistance the aid of men expert in planning and laying out a thoroughly efficient kitchen. Our Hotel and Kitchen Equipment Department is fully conversant with the requirements of the Chef and our Dominion-wide installations testify to their general acceptance.

We beg to announce the completion of our latest catalogue. As far as is possible, it covers the equipment necessary for the complete kitchen. In designing layouts we offer the services of our experts who will gladly furnish you with drawings and blue prints for you to submit to your clients. It is our desire to co-operate with you in every way and we are equipped to extend a service that is unequalled.

If you require further particulars on the following, a request will bring you all necessary information without obligation.

RANGES—Coal, wood, gas or electric.
BAKING OVENS—Coal, wood, gas or electric.
BROILERS—Gas or charcoal.
HOT PLATES, GRIDDLES AND TOASTERS.

COOKS' TABLES—Wood or Steel top, furnished with pot rack supported from table or ceiling. Bain Mariés fitted into Cooks' Table or as a separate unit.

BAKERS' TABLES—With drawers and bins, furnished with elevated shelf or pot rack.

COOKS' CUPBOARDS AND SINKS, STEAM TABLES—Steam, Gas or Electric.

HOSPITAL DIET TABLES—SERVING TABLES.
PLATE WARMERS.

STEAM COOKERS—JACKETED KETTLES.
DISH WASHERS—Soiled and Clean Dish Tables.
URNS and URN STANDS.

COOLERS, FREEZERS, REFRIGERATORS.
BUTCHER BLOCKS.

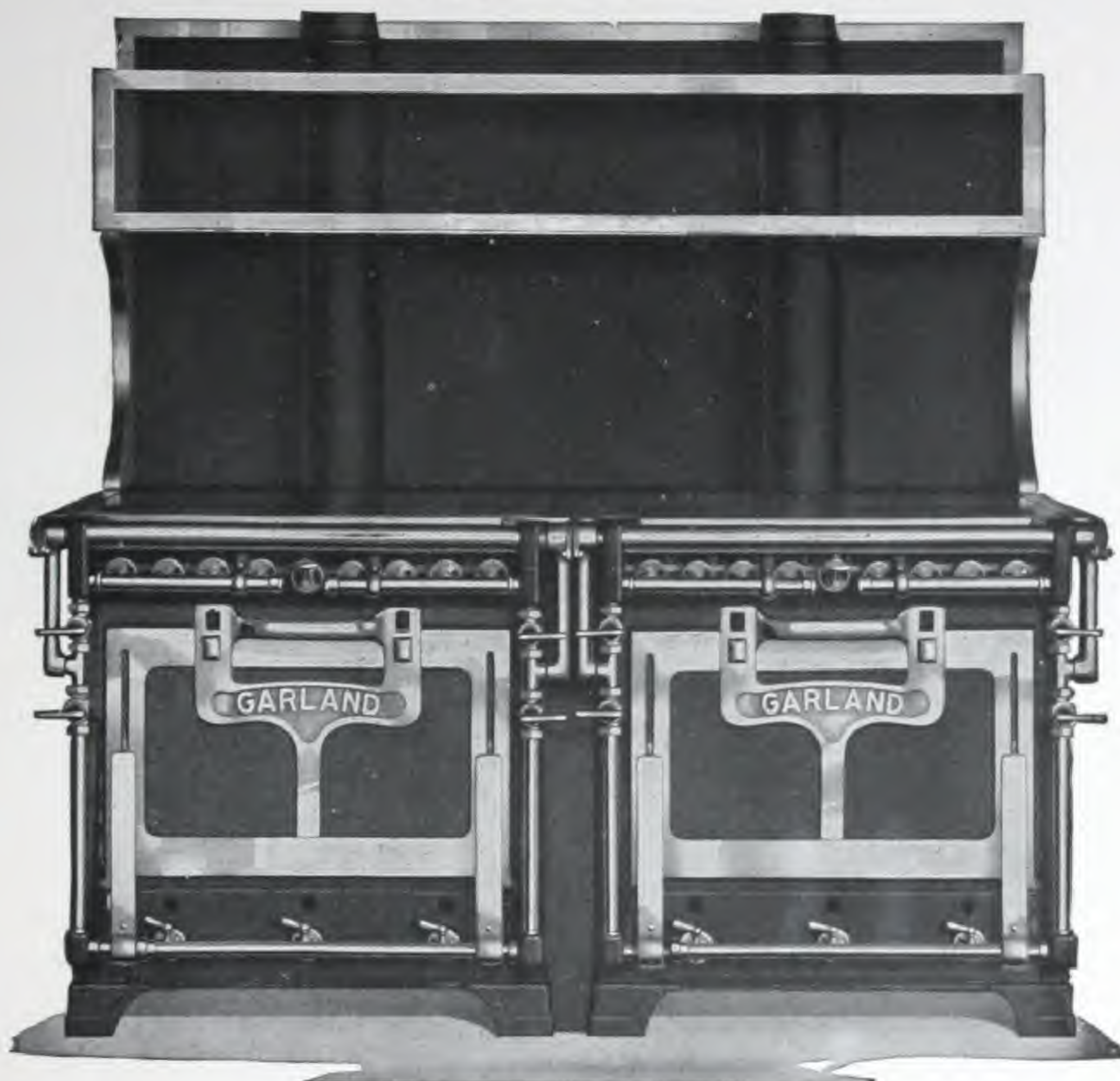
UTENSIL TRUCKS—Dish and Tray Carriers.

POTATO PEELERS, KITCHEN MACHINES OR CHOPPERS,
Butter Cutters, Bread Slicers. Egg Boilers, Apple Parers.
UTENSILS and CUTLERY.

McClary's

"GARLAND" HOTEL RANGES

FOR ARTIFICIAL OR NATURAL GAS



45-26 DDDS.

McCLARY'S ALL HOT TOP "GARLAND" HOTEL RANGES

In Hotels, Restaurants, Cafeterias, large or small, this range has met with tremendous success. It is adaptable to the chef's every requirement, affording the capacity from a single range to a battery of any desired length, sections being so constructed they may be added without any structural alterations.

The All-Hot Solid Top, heated by nine single-jet Bunsen Burners, forming practically a solid sheet of spreading flame underneath the top, will maintain a cooking heat on the ENTIRE FRONT SECTION of 1,250 degrees, graduating to 600 degrees at the back—quicker and hotter than anything else available.

Either side of this top can be operated independently of the other by the manipulation of a single valve, thus affording any required temperature and a great economy in fuel. When the heavy work has been completed, and the gas under both sections turned off, prepared articles can be kept at a serving temperature by the use of the centre or "Simmer" burner alone.

CONSTRUCTION—Body and Front of heavy steel.

TOP—has four sections—solid polished cast-iron pan tops—each equipped with Boston Ring Cover. Maximum temperature attainable, 1,250 to 600 degrees from front to back of range—producing all-hot, solid top.

TOP BURNERS—Nine single jet Bunsen Burners to each section, forming a solid sheet of spreading flame underneath the cooking top. Burner box lining of 2 1/4-inch fire-brick.

STEEL OVEN BOTTOM—Entirely new construction—ventilated instead of insulated. (Patented). Quickens oven action 25 per cent. Insures even and economical baking. Removable without unfastening any bolts.

OVEN BURNERS—Three regular tubular burners of the "Garland" Type and efficiency for each oven. Easily removable, through front openings, without tools. Controlled by individual cocks in addition to side lever.

PANCAKE GRIDDLE.—To fit into space of right or left section of top can be furnished. Width 12 1/2 inches.

OVEN DOORS—of extra heavy iron and steel, substantially braced and counterbalanced.

Can be fitted with Salamander Broiler.

Top Surface.....68 1/2 x 38 inches.

Height from floor to cooking top.....33 1/2 "

To Top of High Shelf.....62 "

Ovens.....26 x 26 x 26 "

LIST OF HOTELS EQUIPPED WITH "GARLAND" RANGE.

Biger Hotel, Montreal:
Walker House, Toronto:
King Edward Hotel, Toronto:
G.T.R. Restaurant, Montreal:

Commercial Dining Room, Montreal:
Cafeterias Limited, Toronto:
National Club, Montreal:

and hundreds of other satisfied users.

SEE ALSO OUR ADVERTISEMENT PAGE 163

INSTALLA- TIONS

LORD & BURNHAM CO., LIMITED OF CANADA

TORONTO:

ROYAL BANK BUILDING.

FACTORY:

ST. CATHARINES, ONT.



ORNAMENTAL GROUP OF GLASS GARDENS ERECTED FOR SIR JOHN C. EATON, TORONTO, ONTARIO. IT HAS FIVE SEPARATE GARDEN PLOTS, BESIDES A PALM HOUSE AND SWIMMING POOL. WICKSON & GREGG, ARCHITECTS.

PRODUCT.

SECTIONAL IRON-FRAME GREENHOUSES AND CONSERVATORIES.

SECTIONAL
CONSTRUCTION.

Sections are formed by setting up spans of rafters, 8 feet 4 inches apart, at either end of two lengths of cast-iron sills. The cross framing between these two spans of rafters consists of the gutters at the eaves and purlins between the eaves and ridge, upon which the cypress roof bars rest.

MATERIALS.

All iron and steel are of the highest grade; the wood used is clear Gulf cypress of best quality, thoroughly air-dried or British Columbia White Cedar.

GLAZING.

All glass is bedded in putty and supported by wooden parts, which prevent breakage by expansion and contraction.

ERECTION.

This ideal greenhouse construction is so scientifically worked out that the labour of preparing materials and erecting is reduced to a minimum. It is not a house that has to be cut and fitted by hand, on the job. When the materials are delivered, it is merely a matter of bolting up the iron parts and fastening the screws. The expense of erecting is thus greatly reduced, practically equalizing the advance in cost of the iron-frame house over the wooden structure.

BEDS AND
TABLES.

BEDS are made with galvanized iron frames, having cypress bottoms and sides; or galvanized iron frames with tile bottoms and cypress sides. Also all cypress.

TABLES are made same as beds excepting sides are lower.

BEDS are used when it is desired to grow plants directly in soil.

TABLES are used for potted plants.

VENTILATION.

Ventilation sash are located at ridge and where required on the sides. They are in continuous runs and are opened and closed by our patented Ventilating Machinery, with hand wheel placed in convenient location.

HEATING

Coils of 3½-inch (I.D.) cast-iron pipes or 2-inch steel made up with caulked joints are generally located under the benches, where they do not take up any growing space, and are so arranged as to secure a free circulation of air around them. Their surfaces are so distributed as to give the desired temperature, with sufficient control in each compartment to produce the best growing conditions.

Burnham Boilers are used, with ample mains for carrying water to the coils.

The system is installed with sufficient grade to insure rapid circulation and even distribution. The coils are equipped with automatic air headers to prevent all air locks.

CATALOGUE.

We have a very complete Catalogue, to which you are most welcome.

LORD & BURNHAM CO., LIMITED OF CANADA

TORONTO:

ROYAL BANK BUILDING

FACTORY:

ST, CATHARINES, ONT.

PRODUCTS.

CONTINUOUS SASH OPERATING APPARATUS in various styles and sizes for Operating Hinged and Pivoted Sash in Factories, Foundries, Car Barns, Roundhouses, Power Houses, Machine Shops, Steamers, Banks, Churches, Prisons, Greenhouses, etc.; TRANSOM OPERATORS for heavy Transoms in such places as Store Fronts, Hotels, Public Buildings, etc.

SASH OPERATING APPARATUS.

We make three distinct types of apparatus. There is hardly a sash operating requirement that cannot be met satisfactorily by one of them. In cases, however, where unusual conditions make it desirable, we will make such modifications in our standard type as are necessary to meet requirements in the most efficient manner.

ROCKER SHAFT APPARATUS.

For short and medium length runs. Arms are attached to shaft that act directly on sash, through suitable rods. Self-locking at any point. No complicated mechanisms. Easy to erect and simple and easy to operate.

RACK AND PINION APPARATUS.

Particularly adapted to long runs of heavy hinged sash. The direct horizontal thrust given to sash, by racks running over the shoulders of the pinions, minimizes the leverage which reduces the torsion. Its simplicity is a strong point in its favor

SCREW THREAD APPARATUS.

For transoms and windows where especially neat and compact fixtures are desired. Consists of two mitre gears enclosed in metal box. Hub of horizontal gear is threaded and engages with threaded vertical rod, which has a vertical movement as threaded mitre gear is turned. Powerful, smooth running and non-sticking. Self-locking at any point.

TENSION LEVER APPARATUS.

For runs too long or too heavy for practical operation with either our Rocker Shaft or Rack and Pinion type. Special circular on request

ESTIMATES AND CO-OPERATIVE SERVICE.

On receipt of data giving description of sash and surrounding construction, the designing department will gladly submit sketches, suggestions and estimates for furnishing either standard or specially designed apparatus to exactly meet individual conditions; also estimates for erecting the apparatus.

CATALOGUE.

Our Catalogue illustrates and describes more fully our types of sash operating apparatus. It will be sent on request.



SCREW THREAD APPARATUS.

By means of suitable arms and rods, motion is transmitted from vertical rod to the transom through a rocker shaft, in heavier forms of transom operators; and directly by bent steel rod in lighter forms.



ROCKER SHAFT APPARATUS.

The worm gear mounted in a yoke and collar imparts the rocker motion to the shaft. This motion is transmitted to the sash by means of arms and rods, the arms being attached to the shaft and the rods to the sash by means of small rod hangers.

RACK AND PINION APPARATUS.
For short and medium length runs.

KING CONSTRUCTION CO., LIMITED

MANUFACTURERS OF GREENHOUSES AND CONSERVATORIES.

40 DOVERCOURT ROAD,
TORONTO, ONTARIO.

PRODUCTS.

CONSERVATORIES—ALL TYPES. IRON FRAME FLAT RAFTER, IRON FRAME PIPE RAFTER, SEMI-PIPE FRAME, TRUSSED FRAME.

SASH OPERATORS OF ALL TYPES—TORSION, TENSION, RACK AND PINION.



GROUP OF KING CHANNEL BAR GLASS HOUSES WITH CHANNEL BAR PALM HOUSE AS CENTRAL FEATURE.

CONSTRUCTION.

Our houses are designed to give the maximum of strength with the least amount of shade casting members. Flat iron rafters, one-half inch thick, are spaced every six lights apart. The rafters are connected by iron purlins of sufficient strength to carry the wood bars. In our curved eave type all wood bars are reinforced from sill to first purlin.

GUTTERS.

An important part in greenhouse designing is to arrange for the collection and disposal of the water of condensation within the greenhouse. We have provided for this by incorporating a condensation gutter in the design of our combination sill and gutter. This gutter also provides ample means to collect and dispose of the rain water from the roof.

MATERIALS.

All material used in the construction of our greenhouses are the best of their several kinds. The wood is air-dried, clear Gulf Cypress.

GLAZING.

All glass is supported by wood members. Each light is bedded in "Our Special Greenhouse Putty" or Permanite. Each light is laid with a lapped joint and firmly secured in place by means of our Special Zinc Glazing Points.

BENCHES.

The benches are constructed with Angle Iron Frames with cypress bottoms and sides. Plant tables have galvanized iron frames and cypress or planed slate bottoms.

VENTILATION.

Ventilating sash are placed on the roof and on the side when desired. They are formed into sections and each section is operated with our Easy Running Ventilating Apparatus from a convenient point.

HEATING.

We recommend hot water heating, as it is more economical and requires less attention than steam. The coils are placed under the growing benches or plant tables. The mains are run in heating trenches under the floor. This does away with the unsightly overhead pipes.

INFORMATION.

We have a complete catalogue, which will give you all the details. Write for a copy.

THE HOLTZER-CABOT ELECTRIC CO. ELECTRIC SIGNALING SYSTEMS.

HOME OFFICE AND FACTORY:
125 AMORY STREET, BOSTON, MASS.

BRANCH OFFICES:

6161-65 So. State St., CHICAGO, ILL.

101 PARK AVE., NEW YORK, N.Y.

1104 UNION TRUST BLDG., BALTIMORE, MD.

MANUFACTURERS OF

Factory Signaling Systems
Fire Alarm Systems
Watchmen's Clock Systems
Fire and Watch Systems
Indicating Systems
Nurses' Calling Systems

Horn Calling Systems
Factory Calling Systems
School Signal Systems
Fractional Horse-Power Motors
Motor Generators
Dynamotors

HOSPITAL
CALLING
SYSTEMS.

The simplicity and convenience of Holtzer-Cabot Systems is largely due to the patented Push Locking Button which contains all the working parts. Lighting of lamps, sounding of buzzers, operation of annunciators are all controlled from the button. This type of safety-operating button is exclusive to the Holtzer Cabot Systems.

Should a station become temporarily out of order, a nurse or attendant can readily plug in another cord and button; there can be no interruption of service at that station or any other station; this is because there are no mechanical or electrical contrivances within the walls—simply the wires coming to a standard wall plate.

The button locks when pressed by the patient and operates the various Signals considered necessary. It is only at the patient's bedside that the Signals may be extinguished by the nurse.

These simple, safe, reliable Systems are operated from any 10-volt source of current (direct or alternating). A transformer, motor generator set, or storage battery of adequate capacity, giving normally 10 volts may be used. While we manufacture Signaling Apparatus of the relay, solenoid, high or low voltage types, we recommend emphatically the low voltage System with Push Locking Button. It precludes all possibility of serious shock to the patients, should cords become worn.

During the course of construction and reconstruction is the most satisfactory time for installing a Signaling System; but Holtzer-Cabot Systems may be very readily installed in existing institutions with very little trouble and expense.

We will be glad to co-operate with any architect who may be interested in Hospital Signaling Systems.

FIRE ALARM
SYSTEMS.

Even in "fire-proof" buildings, Fire Alarm Systems are necessary to avoid panic. It has been truly said that the first five minutes in fire-fighting is worth more than the next five hours. Every fire starts small, and, arrested in time will never grow into a big fire.

Holtzer-Cabot Fire Alarm Systems are made for various purposes to suit exactly the conditions required—calling the "house" force only, to put out a little fire, or an alarm for the staff to be ready at their designated stations, or a general alarm calling out the City. Send us your requirements and our engineers will be pleased to supply blue prints and specifications for a safety-first system for any building.

AD BELL.

This is an entirely new type of signal or alarm bell which may be used on alternating or direct current. The hammer operates entirely independent of the frequency; therefore, the gong is struck a succession of powerful blows, with a slight interval of time between each. We find resonance is thus brought out making the AD Bell an extremely loud and penetrating type of signal or alarm.

There are bulletins issued to assist the architect in his work, describing and illustrating in detail all Holtzer-Cabot products. Any of these bulletins will be forwarded on request.



PRIVATE ROOM
CALLING
STATION.

WARD CALLING
STATION.



DOME CORRIDOR LAMP
STATION.



"GB" ANNUNCIATOR, PILOT
AND BUZZER STATION.



"NYS" FIRE ALARM
STATION.



AD BELL WITH COVER
REMOVED.



JEFFERSON GLASS COMPANY, LIMITED

FACTORY AND HEAD OFFICE:
TORONTO, CANADA.

BRANCH OFFICES:

MONTREAL.

WINNIPEG.

VANCOUVER.

ILLUMINATING
GLASSWARE.

Over 3000 styles and designs to select from, comprising glassware for every lighting purpose.

"LUMO." Our milk-white glass. It has a high efficiency and is especially adaptable for use with nitrogen lamps.

"MOONSTONE." The highest quality of semi-translucent glass. Made in heavy pressed and blown pieces.

"MONOLUX." The new soft golden amber glass. Finished with mother-of-pearl exterior and etched designs.

"AMBER." Genuine amber in all shapes and sizes. Finished in all etched designs.

"CRYSTAL." Our crystal glass is of the highest quality. Finished in various decorations, tints, and etchings.

"RUBY." All that the name implies—Genuine Ruby—not red. For exits, hallways, fire escapes, danger lights, etc.

DECORATIONS. Our Decorating Department is equal to any on the continent.

"HAND PAINTED."

"ETCHED."

"ETCHED AND
COLORED."

"TINTED."

"SAND BLAST."

"SATIN FINISH."

"CRACKLED
FINISH."

"CUT DESIGNS."

PORTABLE
LAMPS.

"HAND DECORATED."

"ETCHED."



No. 6050.

SAMPLE WALL PIECE OR SEMI-DIRECT BOWL.

ILLUMINATING
GLASSWARE."SEMI-DIRECT
BOWLS."

"SHADES."

"GLOBES."

"BALL GLOBES."

"REFLECTORS."

"CYLINDERS."

"STALACTITES."

"LANTERNS."

"MARINE BOWLS."

"CEILING BOWLS."

"WALL PIECES."

"HEMISPHERES."

COMMERCIAL
UNITS.

"DUSTPROOF."

"JEFFERSONLITE."

"DOMINIONLITE."

BATTERY JARS.

LIGHTNING ROD
BALLS.

LENS (ALL DESIGNS).

TABLEWARE AND
SUNDRIES.

TUMBLERS.

INFORMATION. We will gladly supply any information to architects and engineers.

TALLMAN BRASS & METAL LIMITED

ARCHITECTURAL AND ORNAMENTAL METAL WORK.

HAMILTON, CANADA.

REALITE
LIGHTING FIXTURES

REALITE No. 2767.



REALITE No. 2766



REALITE No. 2768.

LIGHTING
EFFICIENCY.

The vitreous enamel surfaces of the concave reflector is independent of the color of the ceiling and gives maximum light on the working plane with even distribution. The cased glass diffusing bowl radiates a soft white light with low absorption.

The exceptional efficiency of this light is shown by actual tests, copies of which will be sent upon request.

MAINTEN-
ANCE.

Gas filled lamps of low current consumption are used. Thorough ventilation gives long life to the lamps with small decrease in their efficiency.

Releasing one supporting wire gives access to the lamp and interior of the bowl. The smooth glass surfaces of the reflector and bowl do not collect dust readily and are easily washed.

SIZES,
DESIGNS,
INSTALLA-
TION.

The mechanical features of ReaLite are simple, and it is easily installed. Sizes and types are furnished for every need. Architects or builders are invited to let us know their requirements or complete descriptions will be sent upon request.

THE UNITED ELECTRIC CO., LTD.

MANUFACTURERS OF
ELECTRICAL VACUUM CLEANERS—STATIONARY AND PORTABLE.
TORONTO, ONT.

PRODUCTS.

TUEC (ELECTRIC) STATIONARY VACUUM CLEANER.

OHIO-TUEC (ELECTRIC) VACUUM CLEANERS (PORTABLE).

We have installed more stationary cleaning systems than the total output of all other manufacturers combined—and everyone is in operation.

TUEC 260.

Our new TUEC 260 is a perfected stationary vacuum cleaning unit, specially designed for the modern house. It is the same TUEC cleaning outfit in every respect excepting capacity only, that of late years has been accepted by Architects generally as almost standard equipment for the first residences in the United States and Canada.

It unquestionably provides the easiest and quickest and beyond any comparison the most sanitary, thorough and economical method of cleaning for any residence.

The installation cost of the new TUEC 260 unit complete is so small compared to the many savings it effects, as to make it a real economy in any home.

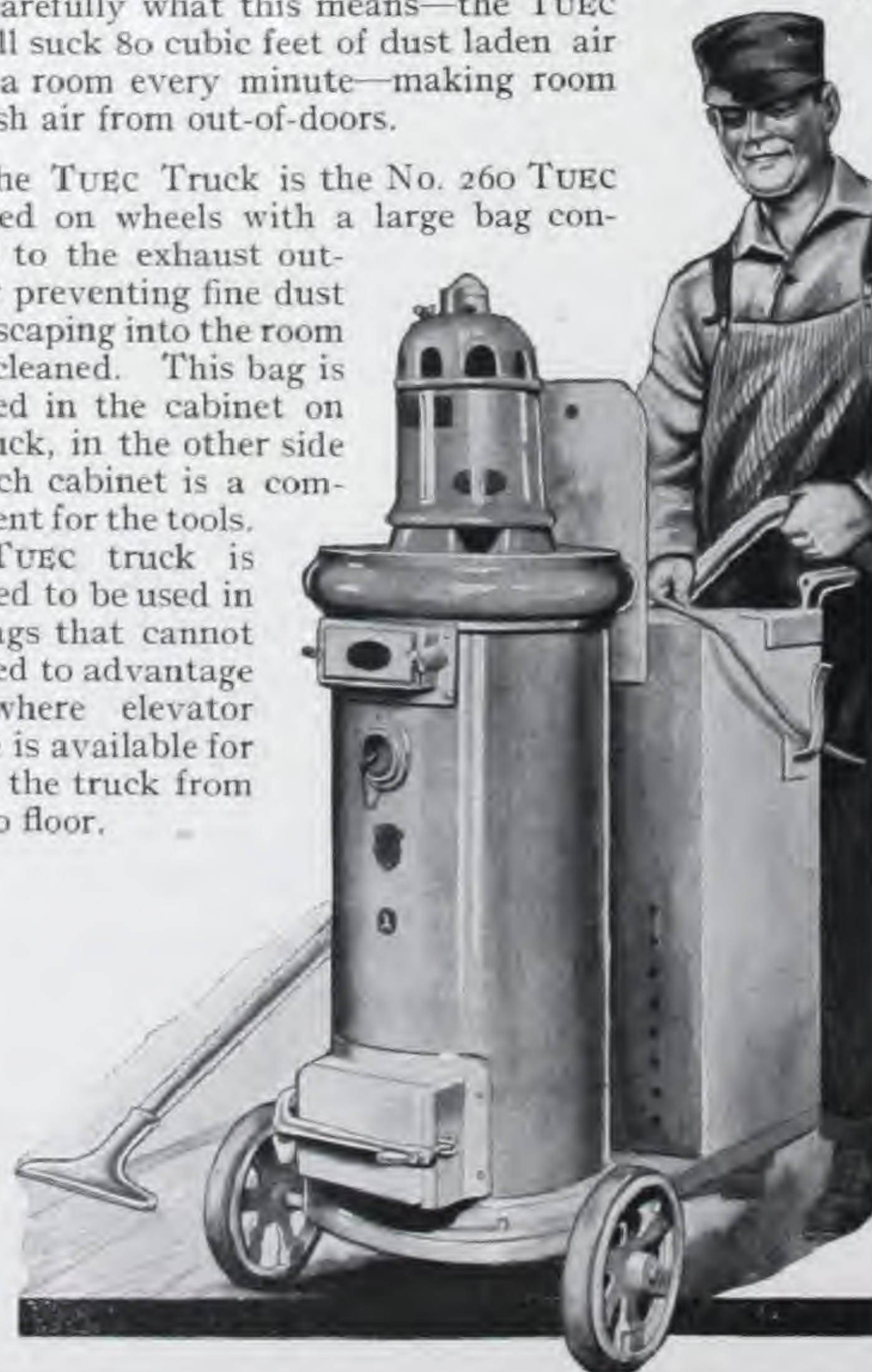
In addition to cleaning floors, walls, furnishings and clothing in the home the TUEC 260 actually changes the very air in every room.

The working end of a TUEC handle has a suction capacity of 80 cubic feet of air in a minute. Consider carefully what this means—the TUEC 260 will suck 80 cubic feet of dust laden air out of a room every minute—making room for fresh air from out-of-doors.

TUEC No. 260 TRUCK.

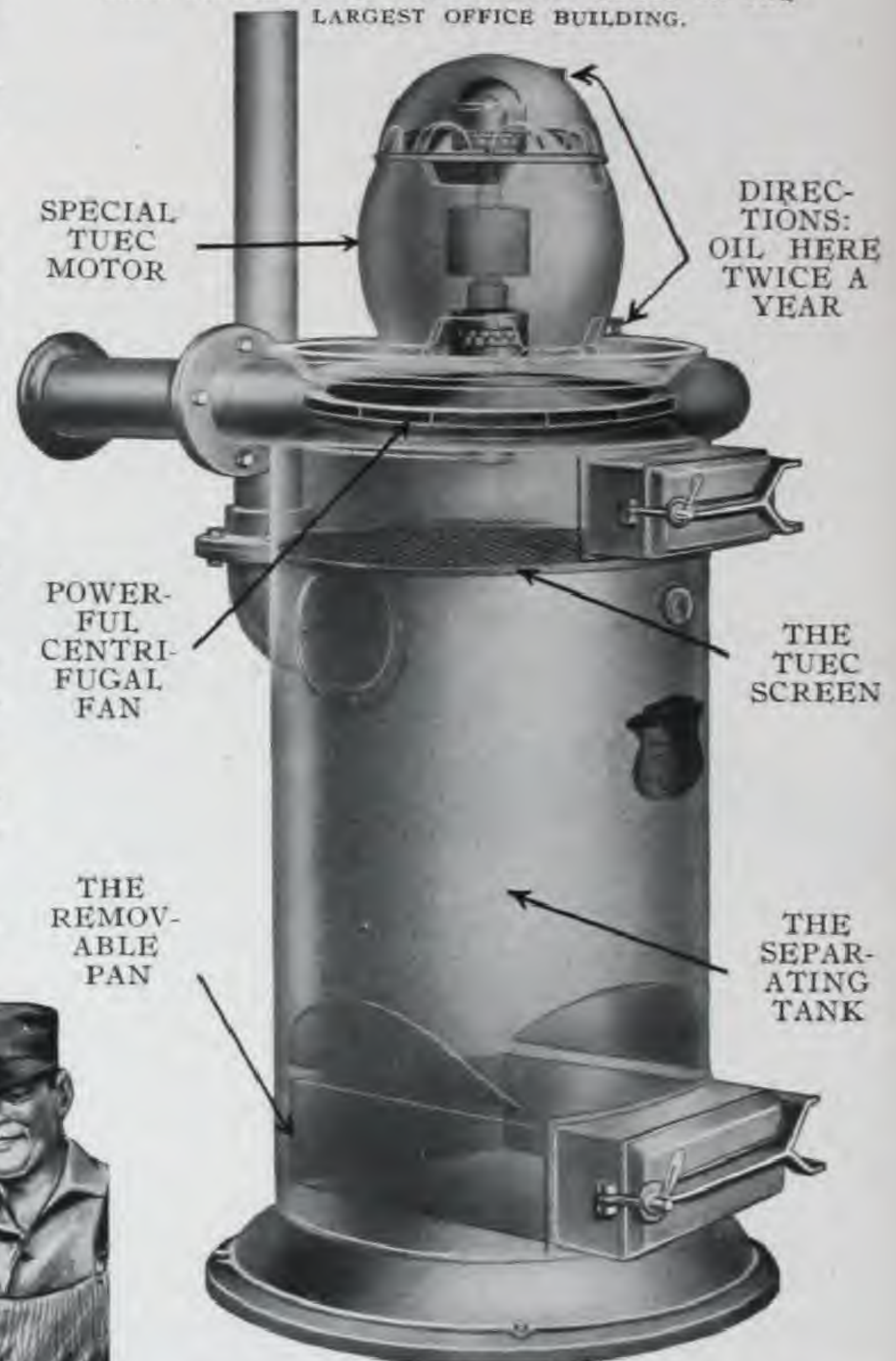
The TUEC Truck is the No. 260 TUEC mounted on wheels with a large bag connected to the exhaust outlet, for preventing fine dust from escaping into the room being cleaned. This bag is installed in the cabinet on the truck, in the other side of which cabinet is a compartment for the tools. The TUEC truck is designed to be used in buildings that cannot be piped to advantage and where elevator service is available for taking the truck from floor to floor.

OFFICES
AND PUBLIC
BUILDINGS.



THE TUEC (VACUUM CLEANING) MACHINE.

SIZES SUITABLE FOR THE SMALLEST HOUSE OR THE LARGEST OFFICE BUILDING.



The TUEC Machine is made in six sizes. The smallest is the Universal type motor and adapted to homes and small office buildings; the five larger sizes are adapted to large office and other public buildings, and are made to accommodate piping systems ranging up to 2,000 feet.

A regular set of tools and accessories goes with this truck the same as is furnished with the stationary installed No. 260. This portable No. 260 is being sold to many building owners who want the service of a TUEC Cleaner even though the stationary plant cannot be conveniently installed on account of the difficulty of piping the building after its erection.

The net weight of the No. 260 TUEC is 250 pounds. The crated weight of the outfit complete including accessories is 325 pounds. The dimensions of this machine are: Height, 52 inches; length, 41 inches; width, 25 inches; wheels, 9 inch diameter. This machine is equipped with rubber tires and is roller bearing.

We also make other and larger sizes of TUEC machines. The larger sizes are adapted to large office and other public buildings, and are made to accommodate piping systems ranging up to 2,000 feet.

NATIONAL EQUIPMENT CO., LIMITED

1 WABASH AVENUE, TORONTO, ONT.

Peerless WATER SYSTEMS
Made in Canada Since 1909

PEERLESS
WATER
SYSTEMS

Peerless Water Systems are *Storage* Systems, the tanks have sufficient capacity to provide an adequate service, even during extended interruptions of the electric power—.

Peerless pumps are exclusively of the positive displacement piston type, at least 75% more efficient than either the rotary or centrifugal type, and eliminate entirely the noise of the former and the danger of loss of prime to which both are subject.

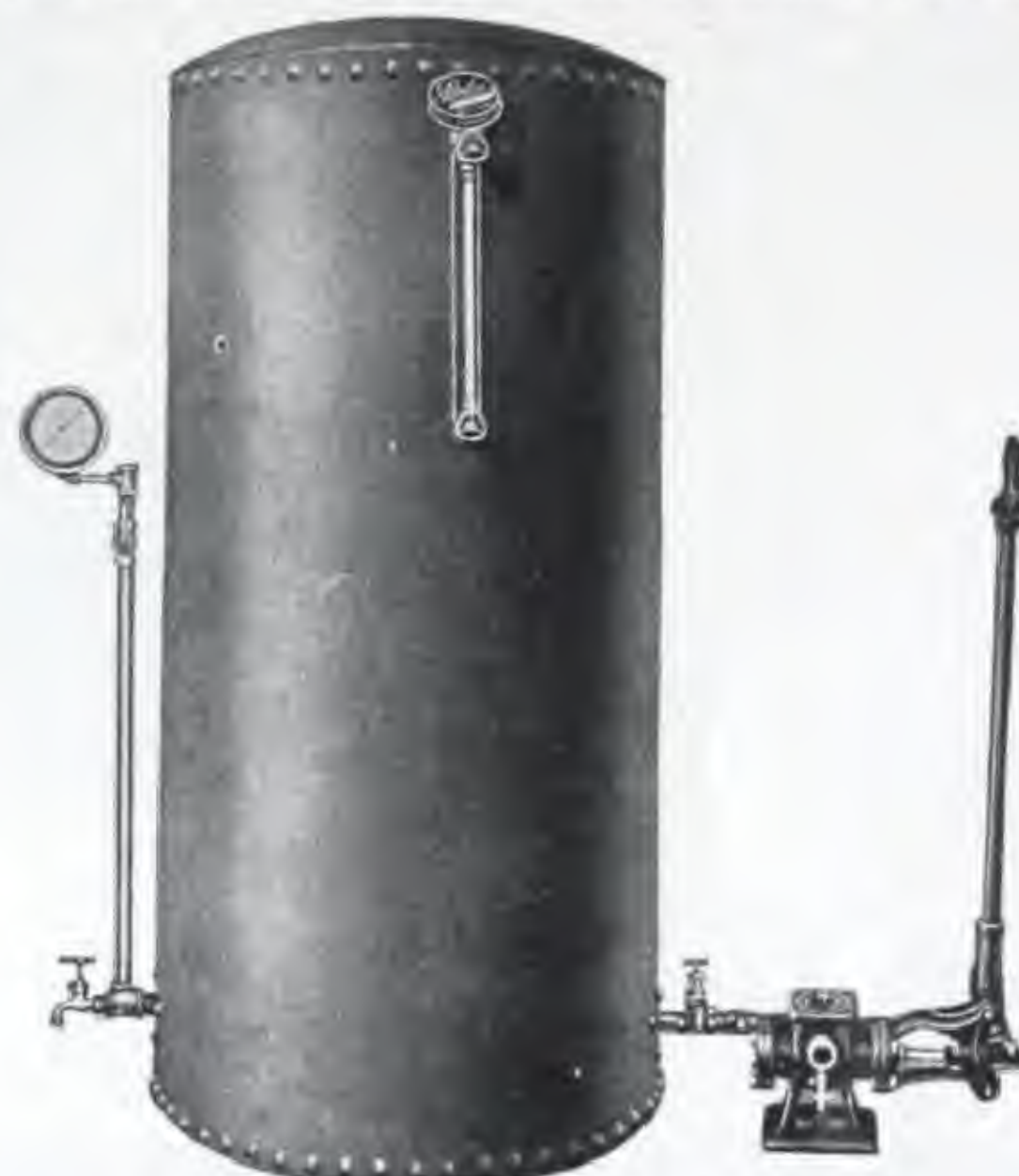
We are in a position to supply (almost invariably direct from stock) Peerless Systems for any possible conditions of service, regardless of location of source of supply, distance to be delivered, or volume required.

INFORMATION
REQUIRED

We are always glad to furnish any necessary information, and to recommend and quote upon a plant suitable for the work to be done, and in order that the mutual interests of the architect, the owner and ourselves shall be best served, it is desirable that we should be furnished with the following information, namely:—

1. For what service is water required—House, Barns, etc.? If for cattle, how many?
2. How many persons will use the service?
3. How many lines of garden hose (if any) will be in use at one time?
4. What is the source of supply—well, cistern, lake, stream, etc.?
5. If a well or cistern, what is its depth and diameter?
6. What is the distance vertically and horizontally from the pump location to the water level at low water mark?
7. Does the water fall rapidly when pumped continuously?
8. Is pumping to be done by hand or power?
9. If electric motor, is the current direct or alternating, and if the latter what cycles—phase—and voltage?
10. What are the smallest dimensions through which the tank must pass?
11. Do you require both hard and soft water services?
12. What is the greatest height to which water is to be forced?

NOTE.—A rough pencil sketch indicating anything extraordinary in the way of rise, distance, etc., with approximate measurements is often of great value to us, and it is important that we should have the approximate lengths of suction pipe.



THE NO. 112 SERIES PEERLESS

600 SERIES—AUTOMATIC ELECTRIC, 300 to 4,000
GALLONS PER HOUR

TORONTO, Ont., July 25th, 1920
 NATIONAL EQUIPMENT CO., LTD., TORONTO.

DEAR SIR:—

Will you please be good enough to ship to Sir John Eaton at King, Ont., and charge to our account, two 600 G. Electric Pumping Systems with auxiliary gasoline driven Pumps, which were specified during our conference yesterday.

It may interest you to know that this is the third of your systems that we have installed for the same client, and we are glad to be able to add that our total purchases of more than \$70,000 worth of Peerless Water Systems have given us the very highest degree of satisfaction.

Yours very truly,
 THE BENNETT & WRIGHT CO., LTD.
 GEORGE CLAPPERTON,
 Vice-President.

A PEERLESS
INSTALLATION

DE LA SALLE TRAINING COLLEGE, OAK RIDGES, ONT.
 HYNES FELDMAN AND WATSON, ARCHITECTS.

A "PEERLESS" INSTALLATION.

Kaustine
Waterless Toilets

KAUSTINE COMPANY LIMITED

WATER SUPPLY AND SEWAGE DISPOSAL SYSTEMS.

HEAD OFFICE AND WORKS:
TORONTO, ONT.

Kaustine
Waterless Toilets

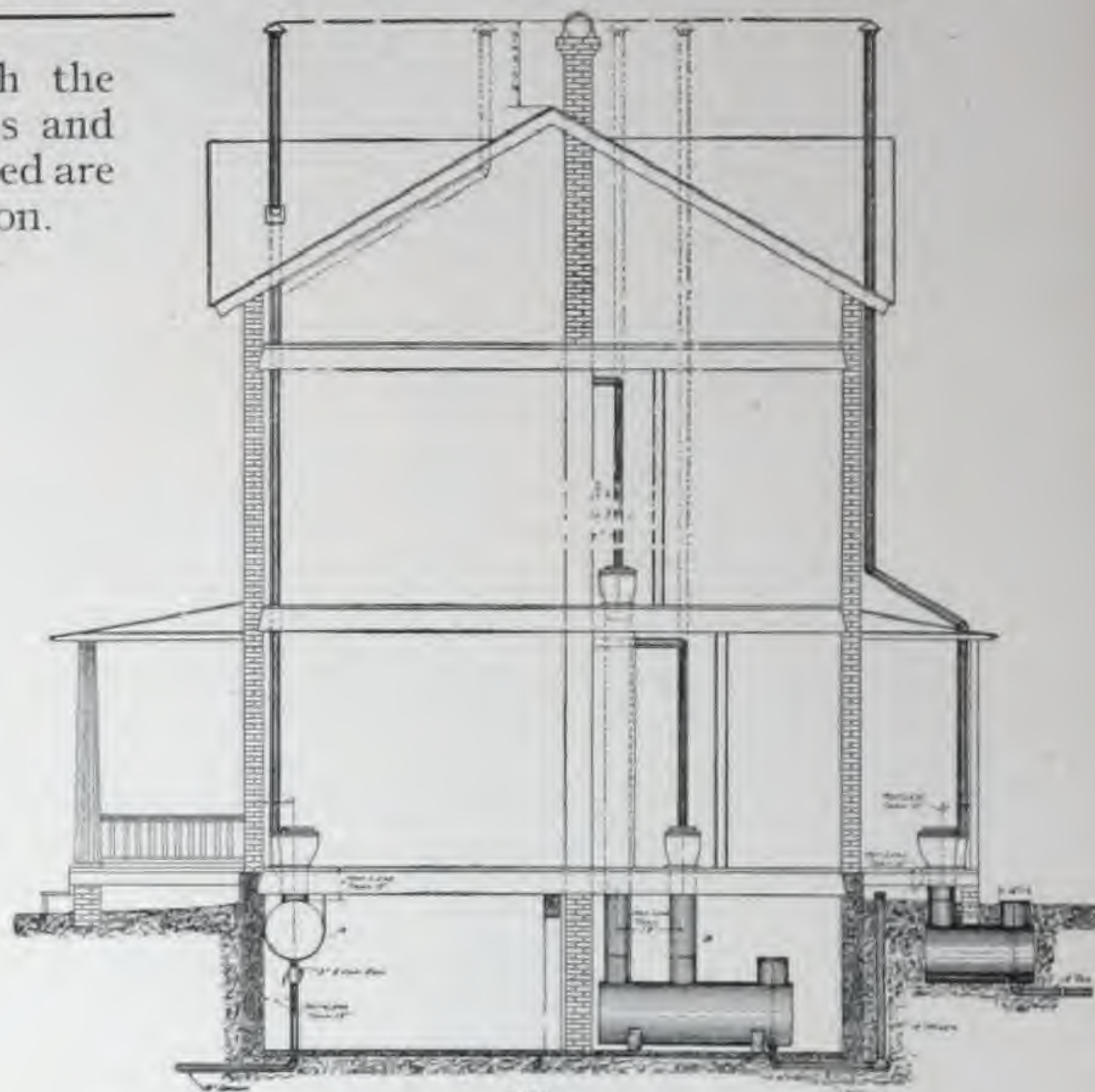
BRANCHES:— VANCOUVER. CALGARY. WINNIPEG. OTTAWA. MONTREAL. HALIFAX.

PRINCIPLES.

The principles upon which the KAUSTINE SYSTEM operates and its sanitary functions are performed are chemical sterilization and aeration.



TYPE OF AGITATOR
USED IN ALL TANKS.



SHOWING A FEW COMMON WAYS OF INSTALLING KAUSTINE SYSTEMS.

INSTALLATIONS.

Installations for Industrial Buildings, Railroads and Schools can be arranged to insure propersanitation.



SET UP IN A LARGE TORONTO INDUSTRIAL PLANT, SHOWING VENT PIPE BEFORE BEING COVERED IN.



G.T.R. ROUNDHOUSE, FOOT OF SPADINA AVENUE, TORONTO, SHOWING VENT PIPE COMPLETELY COVERED IN.

SOME INDUSTRIAL FIRMS WHO ARE USING KAUSTINE EQUIPMENT IN THEIR PLANTS:

Dominion Cannery Co., Ltd.
Hydro-Electric Power Com. of Ontario.
Imperial Oil Limited.
Hollinger Con. Gold Mines, Ltd.
International Nickel Co., Ltd.
Port Arthur Shipbuilding Co., Ltd.
Spanish Mills Pulp & Paper Co., Ltd.

RAILROADS USING KAUSTINE EQUIPMENT.

Grand Trunk Railway.
Canadian Pacific Railway.
Temiskaming & Northern Ontario Ry.
Canadian Northern Railway.
Grand Trunk Pacific Railway.

A FEW ONTARIO SCHOOLS EQUIPPED WITH KAUSTINE TOILETS:

Hespeler	Public School
Acton	" "
Arthur	" "
Orillia	" "
Manotick	" "
Echo Bay	" "
Lambton	" "
St. George	" "
Mattawa Separate School.	
St. Agatha Orphanage.	
Sault Ste. Marie Schools.	
Port Credit Schools.	

CATALOGUE.

Write for our descriptive catalogue.

BRANCHES:

VANCOUVER—
WILLARD, HUME CO., LIMITED,
808 Mercantile Building.

WINNIPEG—
KAUSTINE CO. OF WESTERN CANADA,
709 Merchants Bank Building.

KAUSTINE COMPANY LIMITED

WATER SUPPLY AND SEWAGE
DISPOSAL SYSTEMS.

HEAD OFFICE:
TORONTO, CANADA.

BRANCHES:

OTTAWA—
KAUSTINE CO., LIMITED,
Booth Building.

MONTREAL—
KAUSTINE CO., LIMITED,
711 New Birks Building.

HALIFAX—
EAGAR, COOMBS & CO., LIMITED.

KAUSTINE
SEPTIC
TANKS.

KAUSTINE SEPTIC TANKS are made throughout of Armco Ingot Iron of 14 gauge thickness. They are coated inside and outside with an Hermastic enamel which is proof against corrosion, atmosphere conditions, acids, alkalies and other chemical or electrolytic influences.

DESIGN.

Both overflow and syphon types standardized designs to insure proper capacity.

CONSTRUC-
TION.

All joints are electrically welded to insure water-tight compartments. Each tank is dipped in hot enamel, insuring complete protection to the tank.

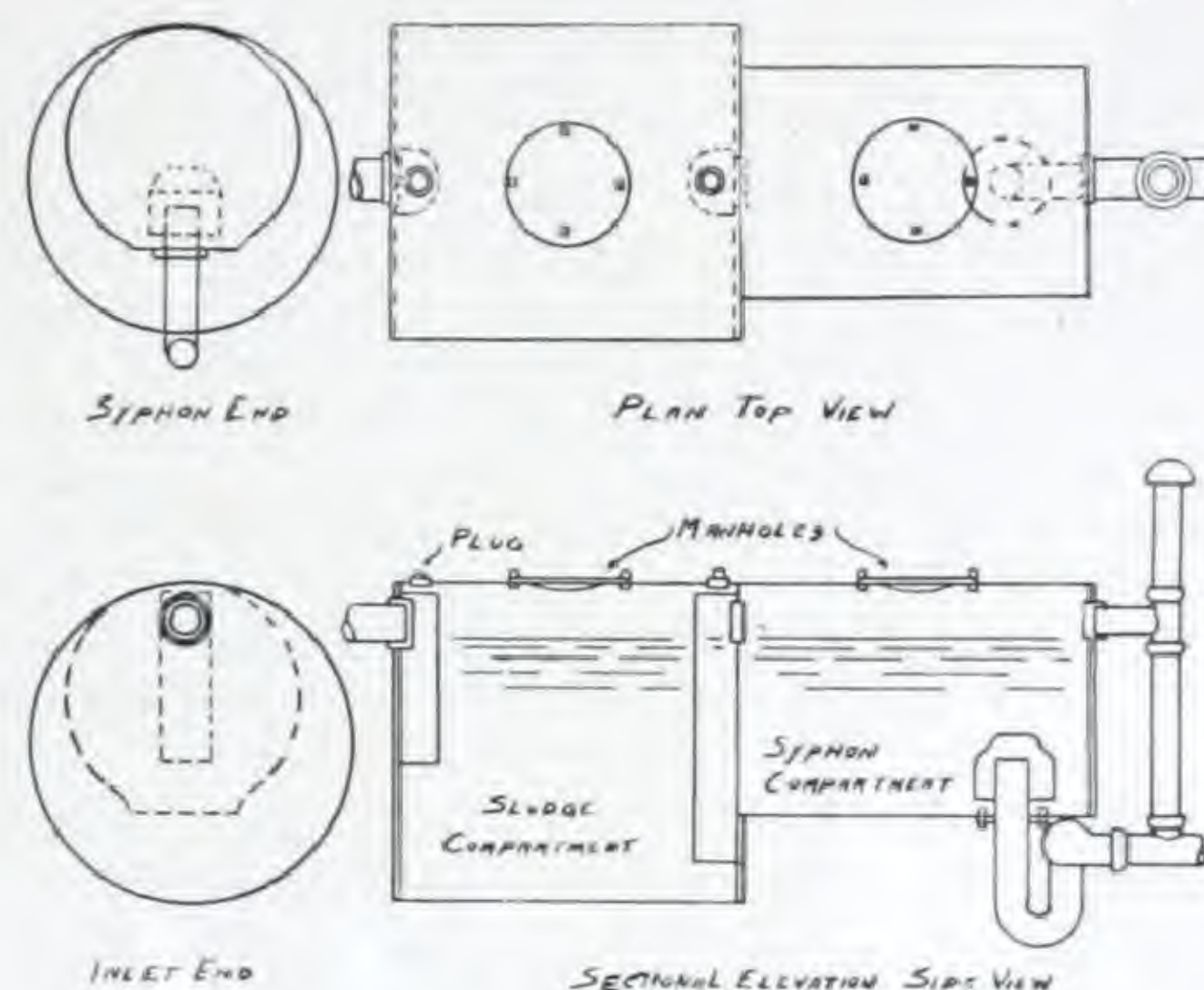
SIZES.

Standards illustrated. Special sizes made up on request.

ADVANTAGES.

Kaustine Iron septic tanks are light, easily shipped to any point desired, insure against frost conditions, and give absolute watertight compartments.

NOTE.—Competent engineers at all times ready to give advice on tile areas, absorption beds, etc.



GOULDS AUTO WATER SYSTEMS.

The complete system except pump is manufactured by this Company in Canada.

CAPACITY.

180 and 360 gallons per hour. Tanks from 30 gallons up.

ENTIRELY
AUTOMATIC.

Pressure regulator controls motor, maintaining pressure 23-43 lbs.

NOISELESS.

No gears in it. Action smooth and quiet. Counterbalanced crank shaft.

SPECIAL
IDLER.

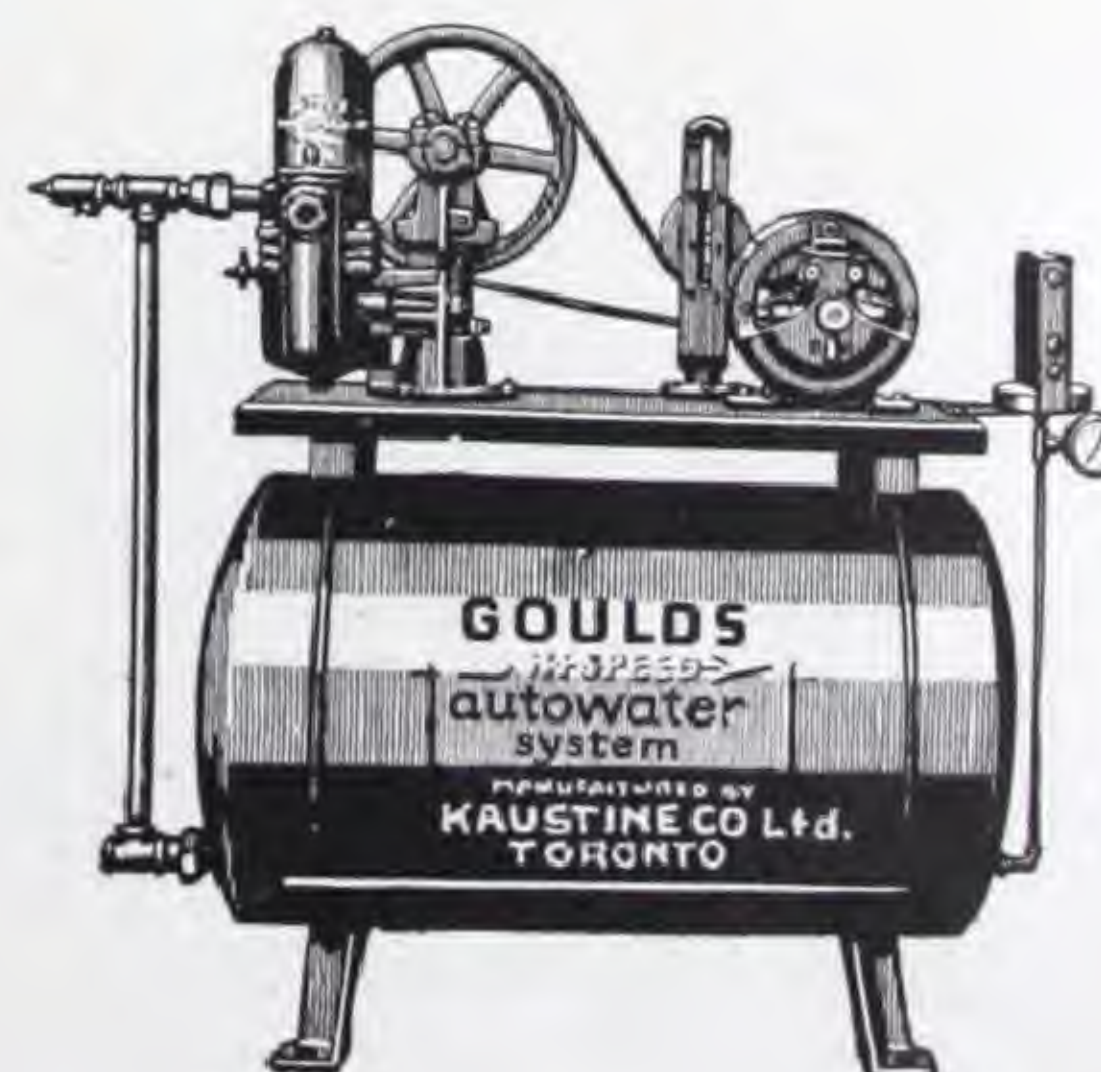
Sheave pulley guided by leather faced bracket rides belt, maintaining constant tension.

COMPACT.

Easily installed.

NOTE.—We can supply pumping systems of any capacity operated by electricity, gasoline, engine or hand.

Write for full particulars.



WESTCO PUMPS, LIMITED

MANUFACTURERS OF
PUMPS AND WATER SYSTEMS.

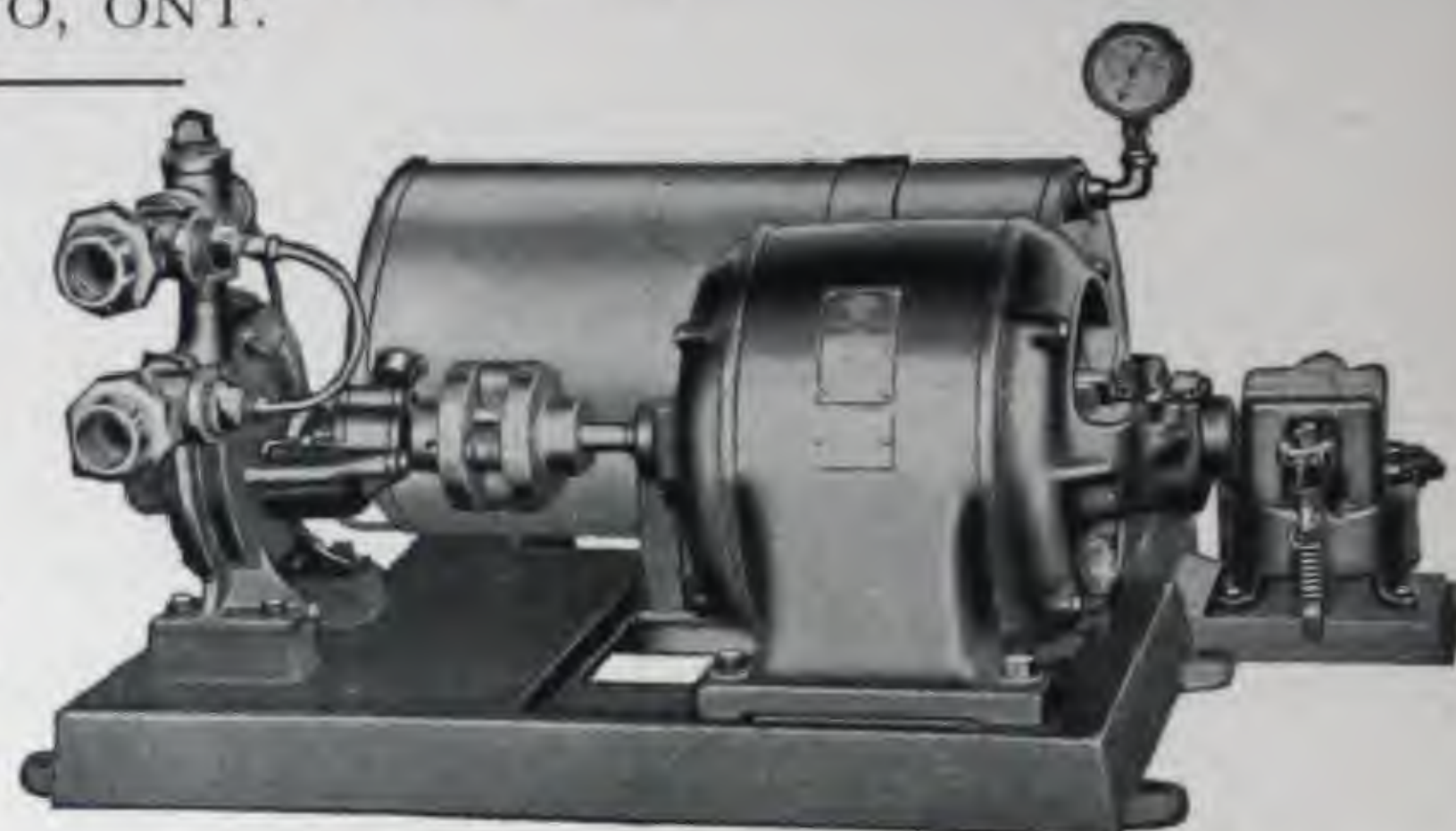
FACTORY AND OFFICE:

Canadian Rumely Bldg., Queen and Abell Streets,
TORONTO, ONT.

PRODUCTS.

Westco PUMPS.*Westco* TANKLESS WATER
SYSTEMS.*Westco* PNEUMATIC
WATER SYSTEMS.*Westco* AUTOMATIC CON-
DENSATION RETURN SYSTEMS.THE
WESTCO
PUMP.

The heart of any water system is the pump; and no water system can be successful if the pump does not function satisfactorily. Until the WESTCO was developed, the only type in general use for pressure water system service was the



No. 5 WESTCO Tankless System with 1 H.P. Motor. Recommended for installation where requirements are considerably in excess of those in homes and buildings, for which $\frac{1}{4}$ or $\frac{1}{2}$ H.P. models would have ample capacity.

plunger or piston pump, with from a dozen to three dozen moving, wearing parts.

The WESTCO pump makes possible a successful, reliable TANKLESS AUTOMATIC WATER SYSTEM. Its ONE MOVING PART, the IMPELLER, reduces the possibilities for wear and the development of trouble to a minimum. Its large capacity and noiseless, vibrationless action and absolutely pulsationless flow make the use of a pneumatic storage tank in conjunction with it entirely unnecessary and a wasteful expense.

WESTCO
TANKLESS
WATER
SYSTEMS.

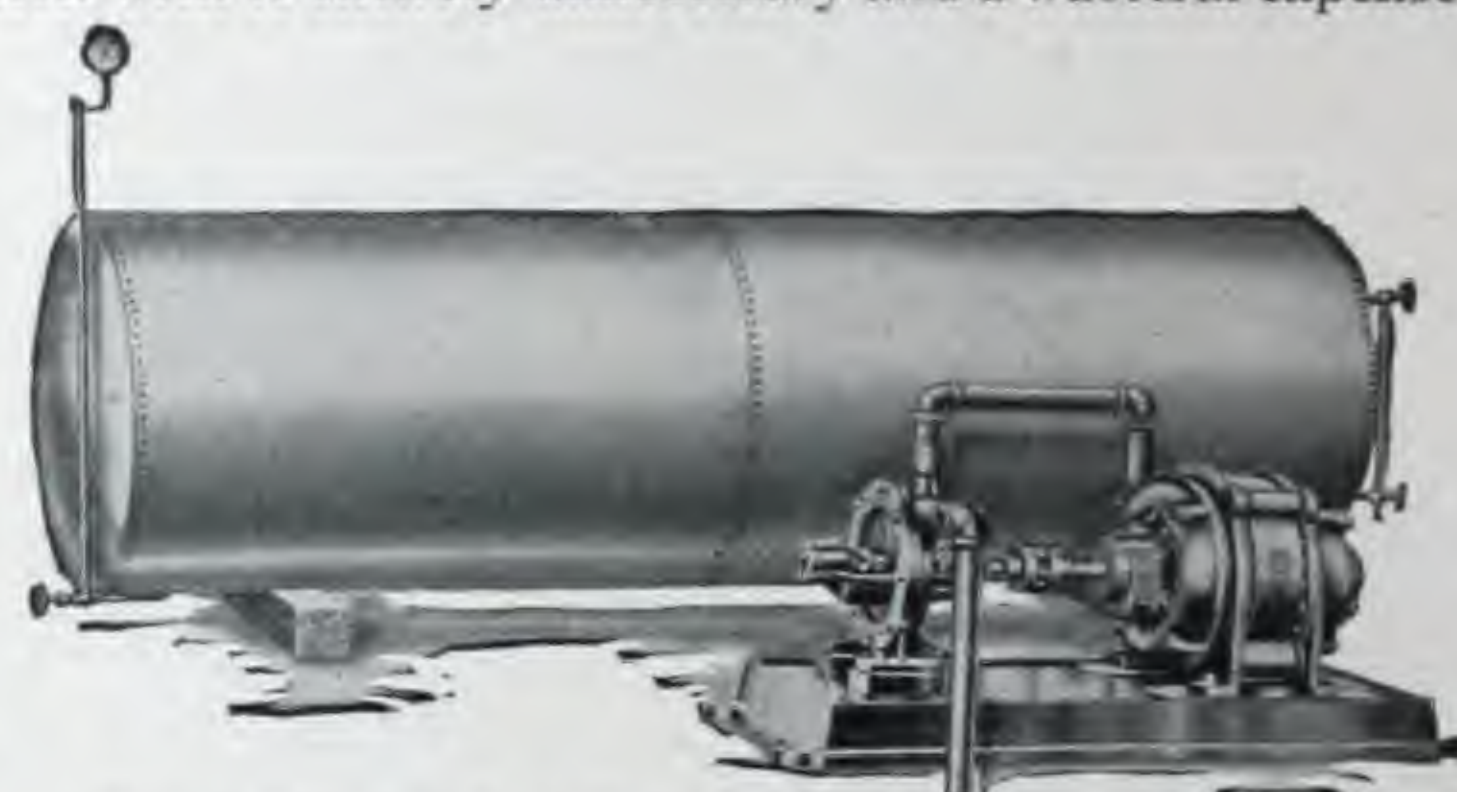
Our AUTOMATIC TANKLESS SYSTEMS are constructed throughout in fitting harmony with the high quality of the WESTCO pump. The pumps themselves are made entirely of BRONZE with MONEL METAL shafts. The only points of contact between the moving part, the impeller and shaft, and the stationary part, the casing, is on DOUBLE THRUST S K F BALL BEARINGS. Only REPULSION INDUCTION type motors are used for alternating current systems. These, with our own special design of TWO-POLE electric pressure control switch, insure the life of the electrical part of the equipment to be in keeping with the proven durability of the WESTCO pump itself. *These systems are sold under an unconditional and iron-bound guarantee.*

The WESTCO TANKLESS AUTOMATIC System delivers water to every part of the house, barn, garage and grounds with full, continuous flow at high pressure, and *absolutely* fresh, direct from your well or cistern to the tap. Simply the opening of a faucet anywhere in the service line starts the pump. Close the faucet and the pump immediately stops. There is no wasted water or energy.

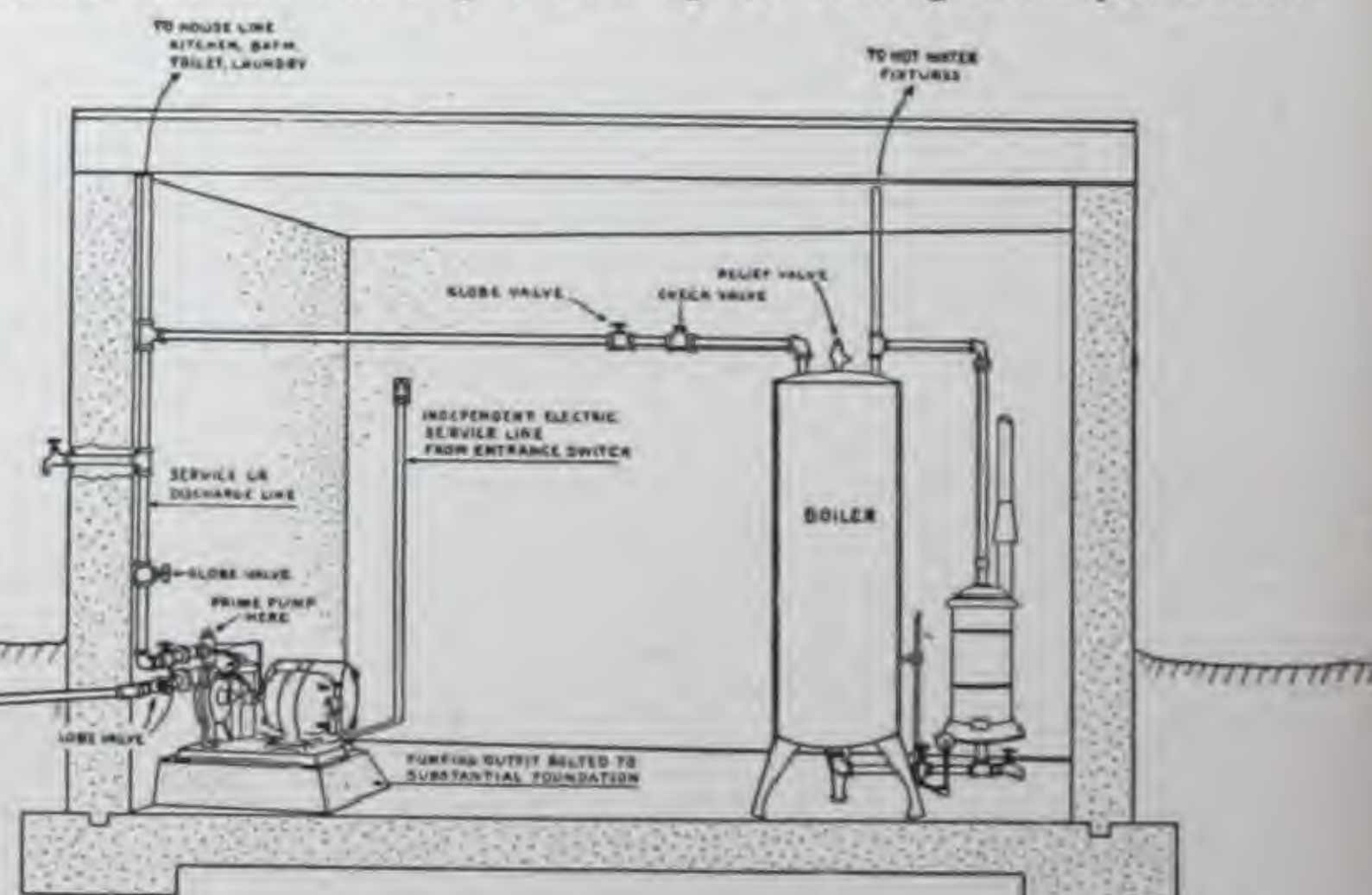
Our WESTCO Tankless Systems are built in different sizes in capacities up to 1000 gallons per hour.

While we recommend our Automatic Tankless Water Systems for all the ordinary home requirements, because of their many proven advantages, still there are places where the local conditions make necessary a certain amount of storage, as, for instance, where the electric power is available only at night. To meet such conditions we build our WESTCO AUTOMATIC TANK Systems in all sizes ranging in capacity from 300 to 20,000 gallons per hour.

These systems are also widely used for booster service in factory buildings, apartment houses, hotels, office buildings, etc., and in conjunction with automatic sprinkler systems for fire protection.



Westco Pneumatic Tank Water System, supplied complete, including tank, pumping outfit, automatic pressure regulating switch, water and pressure gauges and pipe connections at pump.



A typical method of installation of the Westco Tankless System. Sketches covering other installation conditions furnished on request.

WESTCO PUMPS, LIMITED

FACTORY AND OFFICE:

Canadian Rumely Bldg., Queen & Abell Streets,
TORONTO, ONT.

THE WESTCO PUMP.



This shows the impeller, shaft, retainer and casing of the Westco Pump.

DESIGN AND CONSTRUCTION.

The WESTCO embodies a distinctly new idea in Pump design. It differs radically in construction, principle of operation and character of performance from all other known types of pumping machinery. Its principles have been protected in all civilized countries by broad basic patents which insure its being the only pump of its type on the market for many years to come.

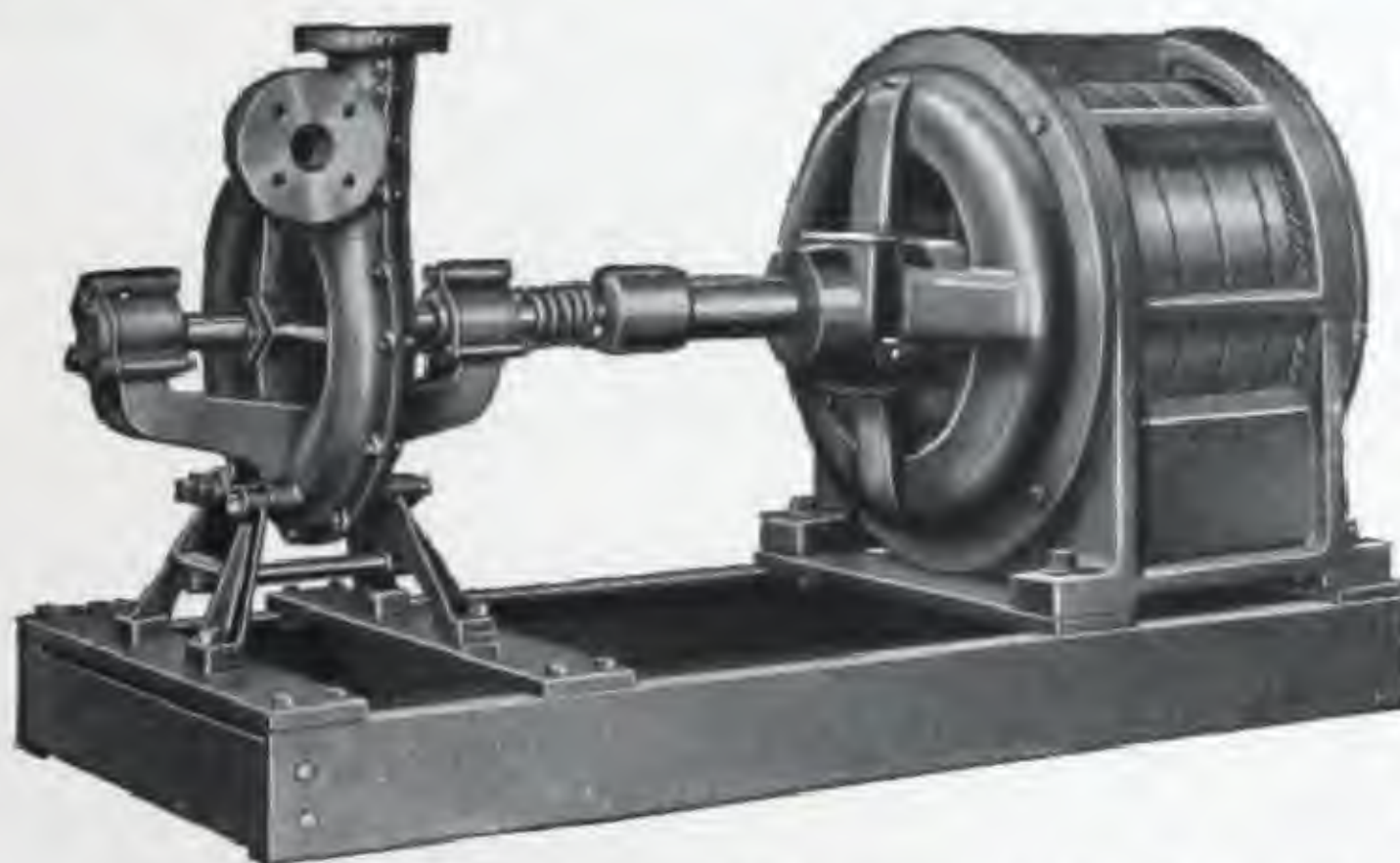


Side view and cross section of a Westco Pump.

The Westco Pump has but one moving part—the impeller. This is a wheel containing a certain determined number of blades on each side of its outer rim. Rotating at high velocity in a water channel cast in the pump casing, it draws the water by powerful suction from the source of supply and discharges it against pressure at the outlet. The WESTCO has accomplished what engineers have long hoped for, but thought never could be done—it combines the extreme simplicity and large capacity of a centrifugal pump with the positive action and high pressure possibilities of a plunger pump.

The WESTCO has nothing even remotely resembling a valve in its make-up. There are no gears, no springs, and no eccentric impeller motion with consequent pulsation of delivery.

WESTCO PUMPS FOR COMMERCIAL PURPOSES.



A typical Westco Pump of commercial size designed to handle capacities up to 500 gals. per minute and to operate against pressures up to 300 lbs.

1200 to 1800 R.P.M. On special work they have operated successfully at as high as 4000 R.P.M. All sizes from 1 H.P. up to the largest, requiring 75 H.P. to drive, are equipped with S.K.F. out-board ball thrust bearings. Our standard construction throughout calls for bronze impeller, Monel metal shaft and cast iron or bronze casing and S.K.F. ball thrust bearings—the highest-grade construction of any pumping machinery on the market.

WESTCO AUTOMATIC CONDENSATION RETURN SYSTEMS.

We make up special complete Automatic Condensation Return Systems. The Westco pump is especially suitable for this work because of the very wide range of pressure against which any model will operate with a relatively small change of efficiency.

We are always glad to make up special equipment to meet unusual or new requirements. Our engineers and our factory are at your service to help you solve your pumping problems.

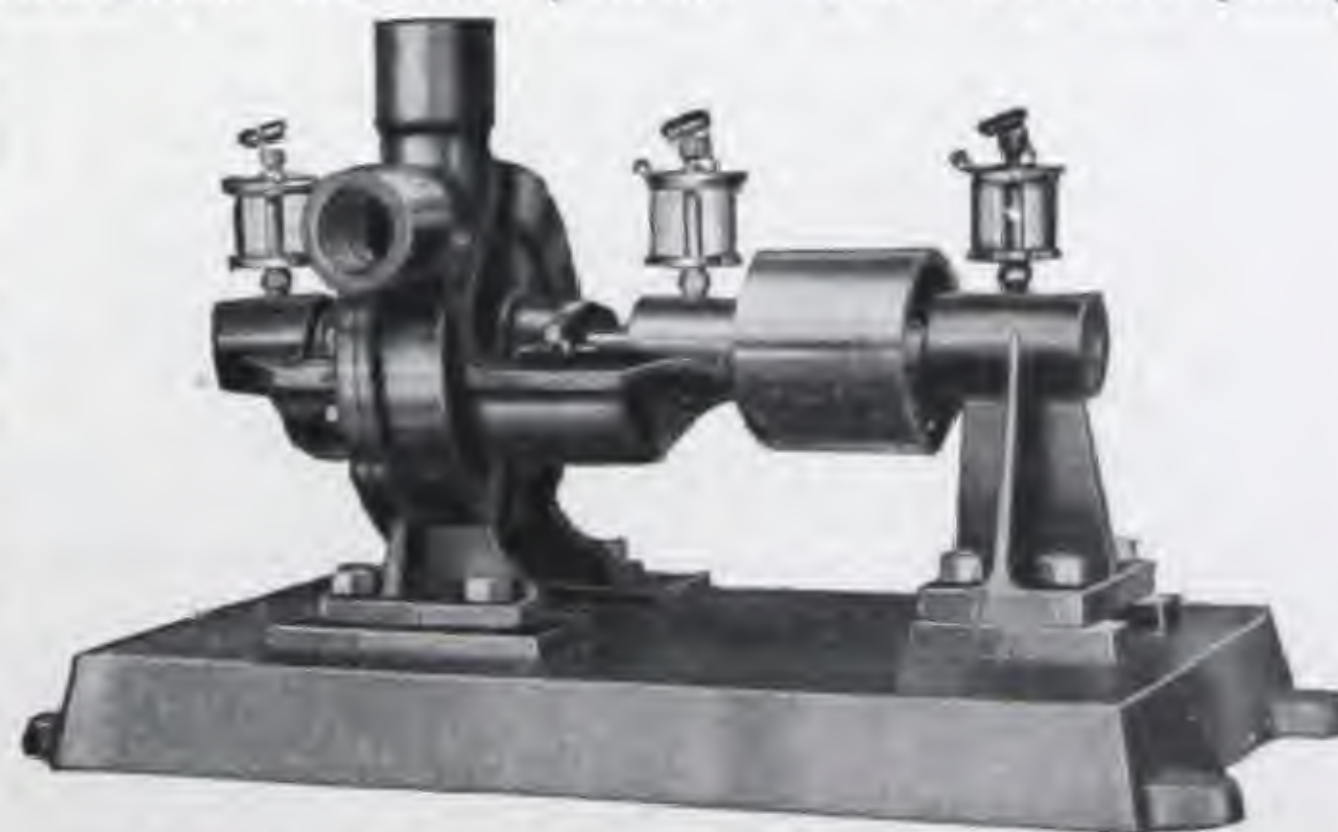
GUARANTEE.

We guarantee all WESTCO Equipment for one year against defects of material or workmanship. We guarantee it absolutely to fulfill all the requirements for which we specify it.

Full particulars and literature will be mailed free upon request.

We have developed models and sizes to meet practically every commercial requirement. Westco pumps to-day are acting as boosters in practically every large city on the continent where the city water pressure is inadequate. They are pumping into almost countless elevated and pneumatic tanks. WESTCO's are pumping such various liquids as brine or ammonia in refrigerating systems, tomato pulp and soup stock in canneries, lubricating oil, gasoline, gas tar, and crude oil in refineries, fuel oil in fuel oil burning equipment. They are used in bottle washing machinery and as agitators in automatic dish washers and for many other purposes. They are ideally designed for handling paper pulp stock.

WESTCO pumps are generally operated direct, connected to standard speed electric motors of



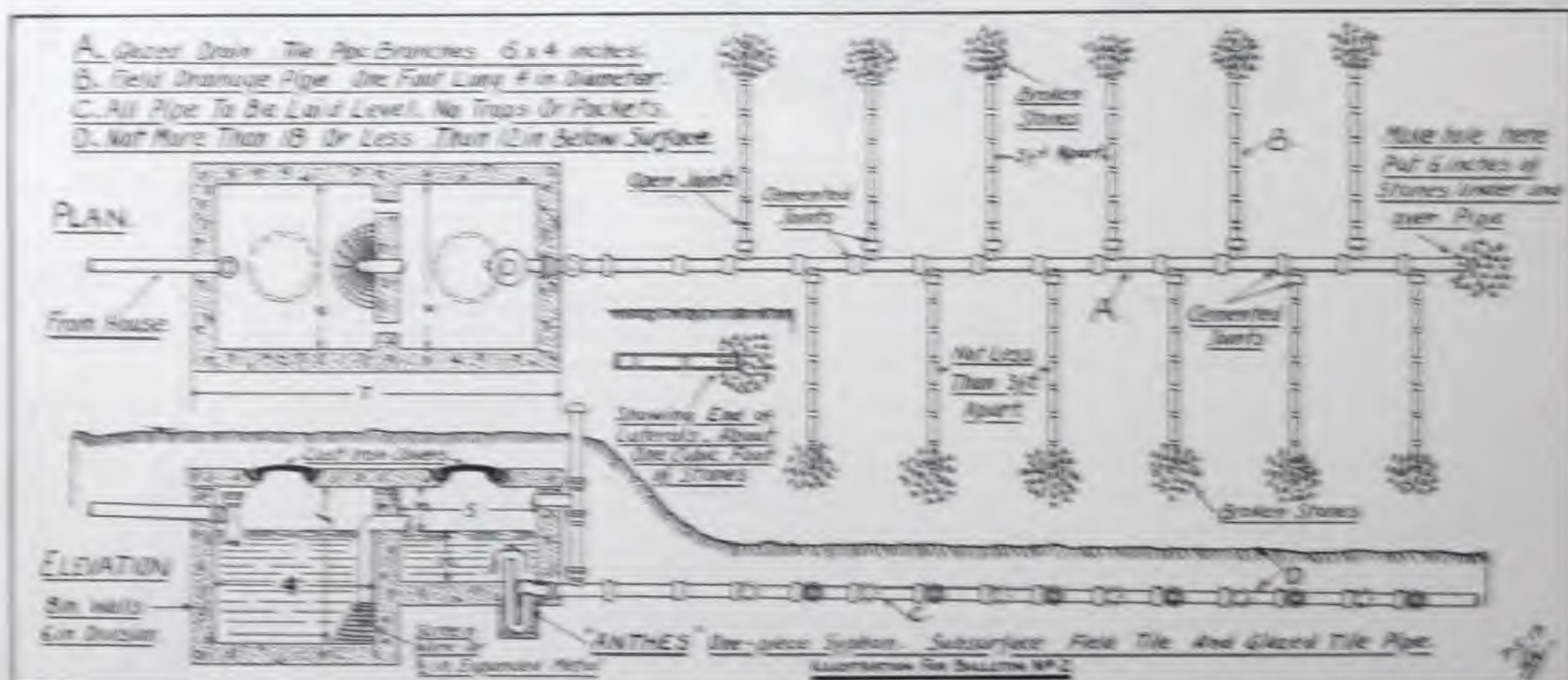
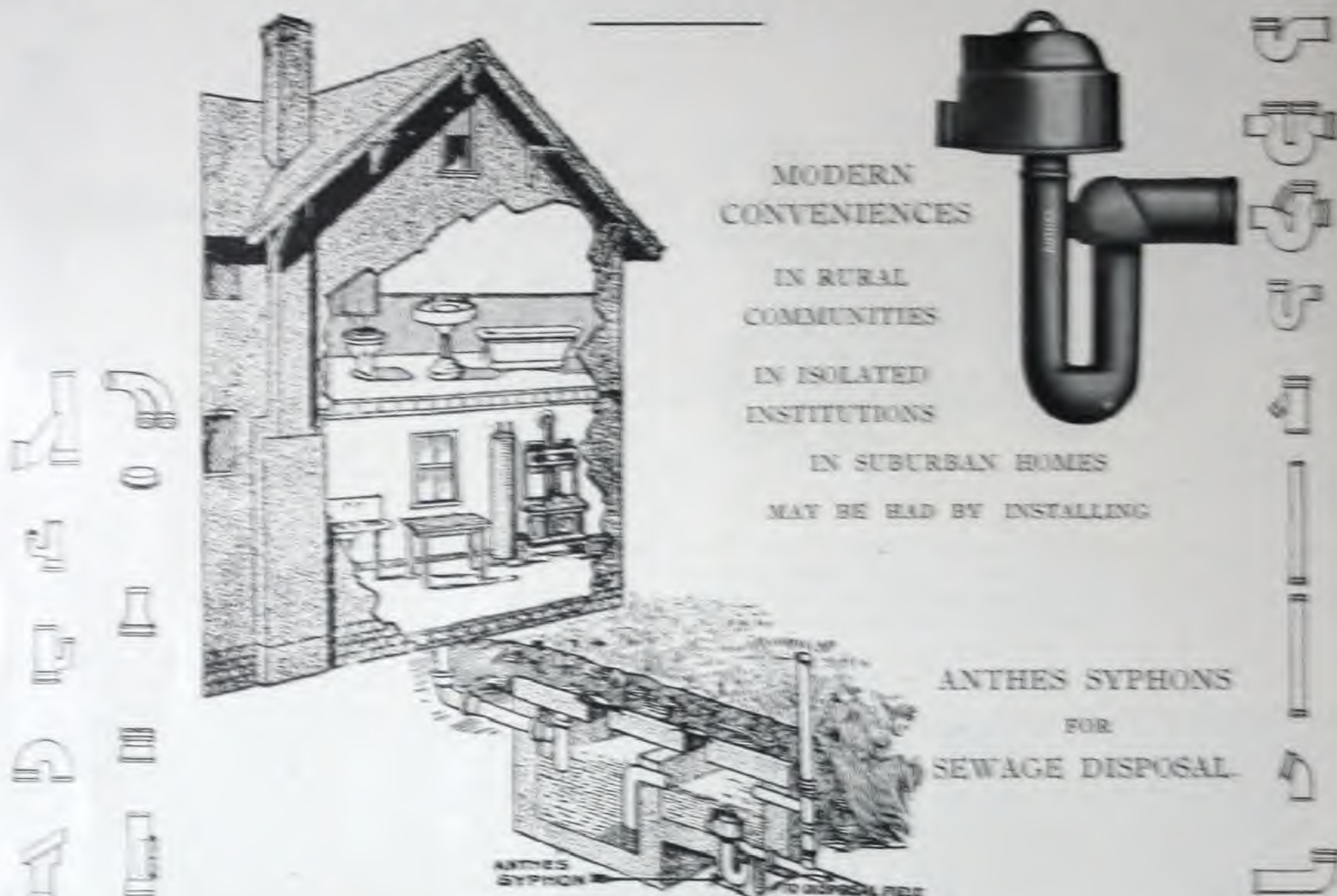
A Belt-Driven Westco, designed for use where electricity available, or where power is generated from some other source. Fast and loose pulleys for all models furnished if desired.

ANTHES FOUNDRY, LIMITED

MANUFACTURERS OF
CAST IRON SOIL PIPE AND FITTINGS.

EASTERN PLANT:
JEFFERSON AVENUE,
TORONTO.

WESTERN PLANT:
SASCHICHAW AVENUE,
WINNIPEG.



The "Anthes" Syphon is unconditionally guaranteed to discharge automatically, is practically indestructible, and has no moving parts to wear out, or get out of order.

WRITE FOR BULLETINS AND BLUEPRINTS.

THE McCLARY MANUFACTURING COMPANY

HEAD OFFICES AND FACTORIES AT LONDON, ONT.

DISTRIBUTING WAREHOUSES: LONDON, ONT., TORONTO, ONT., MONTREAL, QUE., WINNIPEG, MAN.,
VANCOUVER, B.C., ST. JOHN, N.B., HAMILTON, ONT., CALGARY, ALTA.,
SASKATOON, SASK., EDMONTON, ALTA.

ELECTRIC RANGES.

FOR HOMES AND APARTMENT HOUSES.

One Broiling and Baking Oven, with two Elements. One Warming Closet complete with Element. Cooking Surface with two 9" elements and two 6" elements. Heating capacities as follows:—



No. 518 E.S.

OVEN—Broiling Element.....1300 Watts.
LOWER Element.....1300 Watts.
WARMING CLOSET Element.....600 Watts.
9" SURFACE Elements.....1500 Watts.
6" SURFACE Elements.....850 Watts.

PROTECTED ELEMENTS.—An exclusive feature—Coils protected from oxidation by a special formula cement mixture, also proof against carelessness and ignorance. Heats as rapidly as ordinary types and holds the heat longer.

OVEN.—Seamless welded and nicked. Round cornered and washable. Without cracks, joints or crevices; fumes or liquids cannot permeate insulation. Conceded by experts this perfect sanitary construction stands far superior to any other electric Oven manufactured.

OVEN INSULATION— $1\frac{3}{4}$ " mineral wool between outer and inner bodies of oven—Magnesia block $1\frac{1}{2}$ " thick in the door—thus practically operates on fireless cooker principle.

OVEN ELEMENTS—Highest grade resistance wire, porcelain supported throughout—no mica construction.

CLEANING—Racks swing on pivots, rack holders removable—interior surface is therefore clear for cleaning purposes.

OVEN TERMINAL—Monel wire insulated with porcelain beads, eliminating corrosion from acids and fumes, also not effected by intense heat of oven.

PILOT LAMPS—Indicate whether current is on or off oven.

HOUSE WIRING—The Range is adapted for 3 wire 110-220 volt system. Also suitable for alternating or direct, current 110 volt if specified.

RANGE CONNECTION—Slate terminal block for main connections placed where easily accessible through outside. Sliding panel. Provision made for entrance to body of Range by either conduit or porcelain bushings. Neutral wire throughout has red colored insulation to distinguish. When range is required to be moved disconnection is made by disconnecting slate terminal block—no soldered joints to tamper with.

NOTE: If two wires used, please specify, as change in wiring is necessary—this adjustment made without additional cost.
PANEL CONSTRUCTION—Fuse block and switches mounted on separate panel unit. By removal of four bolts switches available for inspection and repairs.

SURFACE ELEMENTS—Held in position by centre bolt upon removal of which elements can be lifted up for inspection and repairs.

THERMOMETERS—Mercury or Compensating Thermometers—both efficient. Former supplied at extra charge.

SWITCHES—Marked with number corresponding to element.

BODY—Front and Cooking Top Cast-iron. Remainder of Body Armco Iron, black japanned.

White Enamelled Broiling Pan. Three heat standard switches. Maximum capacity 68 amperes. Size of Oven 18 x 18 x 15 inches.

ONE REGISTER (PIPELESS) FURNACE.

MAIN FABRIC—Weighty refined cast-iron with close grained surface. Careful distribution of iron ensures extra thickness at vital parts. Exceptional resistance to sulphur fumes and gases. Parts carefully assembled—dust and gas tight construction. All cast-iron—no steel.

FIREPOT—In two pieces with famous cup joints. Sides almost perpendicular prevent dead ashes accumulating—assures freer distribution of heat.

DOVE AND RADIATOR—Each cast in one piece guarantees a solid construction. Carries heat units in long travel. Radiator easy to clean through large clean out door.

ASH PIT—Roomy, gives clear space for passage of air upwards—creates brighter fire and better draft control. Ash Pan of Steel fitted with two bail handles.

FEED DOOR—Spacious door simplifies firing with coal and large chunks of wood.

AIR DRAFT—Special construction for soft coal use, carries from outside through air blast ring into interior a current of air which is heated in its passage and in its heated state is forced through small holes around firepot and flows over the top of the live coals, igniting the gasses arising therefrom.

DUST FLUE—Carries the dust from ash pit to chimney and prevents it escaping into basement or rooms above.

REGISTER—One large register combines warm air outlet and cool air inlet. Black japanned—attractive. Will resist weight of 1,500 lbs.

WATER PAN—At correct height for refilling with ease. Its moisture humidifies the warmed air passing upwards and makes it healthy and invigorating.

GRATES—In four pieces—each piece three sided. Crush clinkers with ease. The Sofco Sunshine will last a lifetime adapted for burning hard and soft coal, coke, wood, lignite and any other combustible fuel which may be available locally.

Equipped with Poker, Shovel and regulating chains for operating drafts from room above.

No.	DIAM. OF FIREPOT	SMOKE PIPE	CAPACITY IN CUBIC FEET	SHIPPING WEIGHT
91	19"	8"	15,000	1,075 lbs.
93	21 $\frac{1}{2}$ "	9"	25,000	1,400 "

SEE ALSO OUR ADVERTISEMENT PAGES 148 AND 149.

SOFCO SUNSHINE ONE-REGISTER (PIPELESS) SYSTEM.



WARDEN KING, LIMITED

MADE IN CANADA.

EXECUTIVE OFFICES AND WORKS:
BENNETT AVE., MAISONNEUVE,
MONTREAL, QUE.

TORONTO BRANCH:
136 SIMCOE STREET.

SALES OFFICE AND CITY WAREHOUSE:
151 CRAIG STREET WEST,
MONTREAL, QUE.

PRODUCTS.

CAST IRON FLANGED FITTINGS (STANDARD AND EXTRA HEAVY), CAST IRON SOIL PIPE (STANDARD AND EXTRA HEAVY), CAST IRON CESSPOOLS, STABLE GUTTERS, SINK TRAPS, WHEEL GUARDS, MANHOLE COVERS, Etc., Etc.

CAST IRON FLANGED FITTINGS.

STANDARD AND EXTRA HEAVY.

Standard for working pressure up to 125 lbs. Extra Heavy for working pressure up to 250 lbs.



ELBOW WITH BASE.

STRAIGHT TEE.

REDUCING TEE.
ALL SIZES FROM 1 1/4" TO 24" DIAMETER.

BRANCH.

ELBOW, 90°.

CAST IRON SOIL PIPE AND FITTINGS.

MEDIUM AND EXTRA HEAVY.

SINGLE HUB PIPE, FLAT BEAD.
SIZES FROM 2" TO 8" DIAMETER.DOUBLE HUB PIPE, FLAT BEAD.
SIZES FROM 2" TO 8" DIAMETER.QUARTER BENDS.
SIZES FROM 2" TO 8" DIAMETER.LONG QUARTER BENDS.
4" DIAMETER, 10" TO 36" IN THE CLEAR."TY" BRANCHES.
SIZES FROM 2" x 2" TO 8" x 8".DOUBLE "TY" BRANCHES.
4" ONLY, WITH 2" SIDE OUTLET.TRAP SCREW FERRULES
WITH IRON BODY AND
BRASS COVERS.
SIZES 2" TO 8" DIAMETER.DOUBLE HUBS.
SIZES FROM 2" TO 8"
DIAMETER.CONOLLY SADDLE HUBS.
SIZES FROM 2" x 2" TO 6" x 4".PALMER BACK WATER TRAP.
SIZES FROM 3" TO 8" DIAMETER.HALF "S" OR "P" TRAPS, WITH
HANDHOLE AND COVER.
SIZES FROM 2" TO 8" DIAMETER.

WARDEN KING, LIMITED

MADE IN CANADA.

EXECUTIVE OFFICES AND WORKS:
BENNETT AVE., MAISONNEUVE,
MONTREAL, QUE.

TORONTO BRANCH:
136 SIMCOE STREET.

SALES OFFICE AND CITY WAREHOUSE:
151 CRAIG STREET WEST,
MONTREAL, QUE.

PRODUCTS.

The "DAISY" BOILER is over thirty years old, and there are over 60,000 in use.

"DAISY"
BOILER.

The "Daisy" Boiler of to-day is constructed practically on the same lines as those first put out in 1885. It is manufactured in the largest and best equipped plant in Canada, and the best material is used in every part of it. Its durability is proved by the fact that many of those which were first placed in operation are still giving perfect satisfaction.

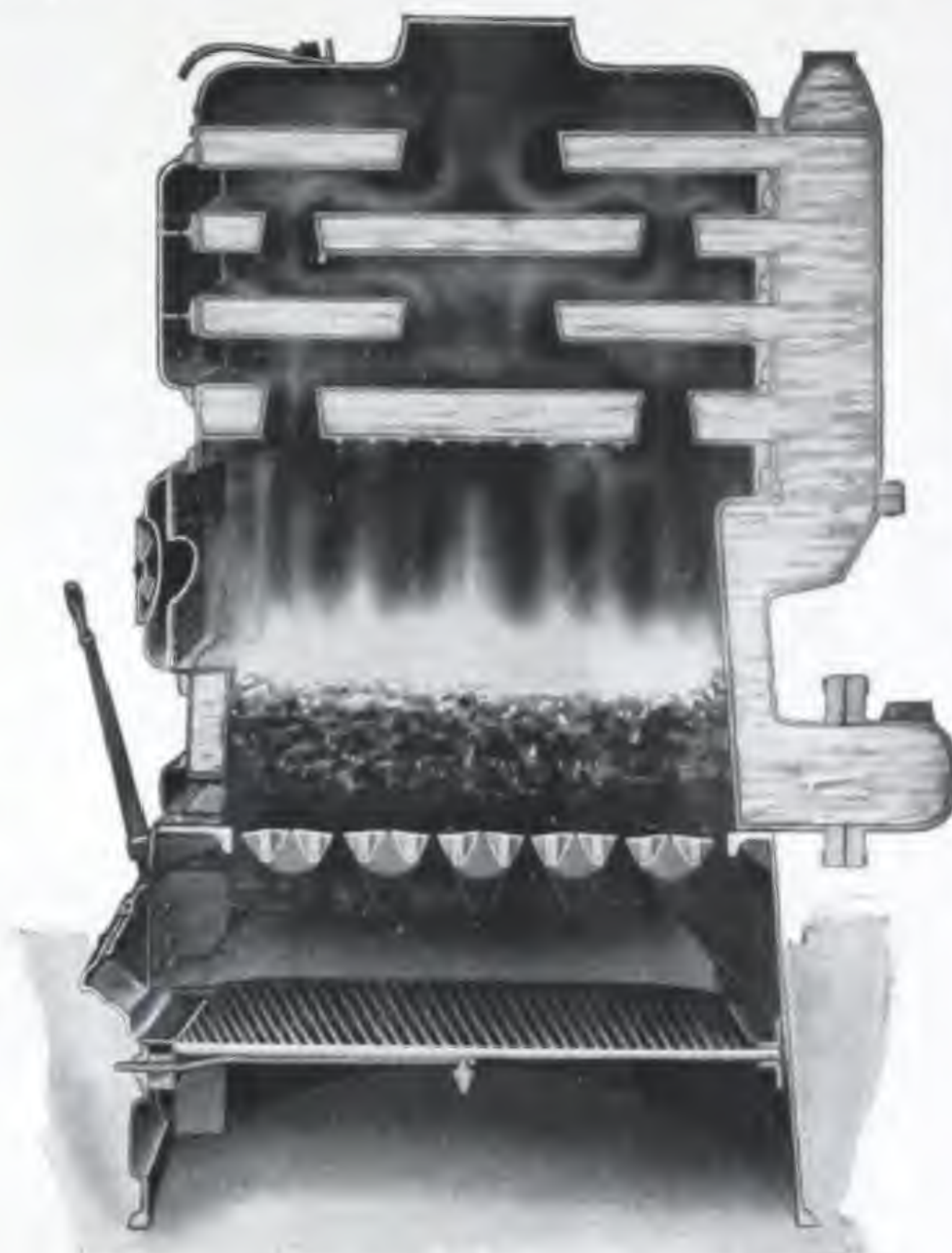
The "Daisy" is easy to clean and easy to operate.



FIG. A.



FIG. B.



FIRE-POT.

The Fire-Pot (Fig. B) is deep and all gases are consumed in the combustion chambers, consequently a high temperature of water is maintained on minimum fuel consumption. On the inside of the fire-pot are vertical ribs to permit the air to rise freely through the coal at the outside edges of the fire, keeping it burning evenly and preventing the accumulation of ashes near the water in fire-pot.

FIRST
SECTION.

The First Section of the "Daisy" (Fig. A) is directly over the fire-pot, and receives at right angles direct currents of gases of the most intense heat. In order to absorb all the heat possible we have increased the water capacity of this section, enlarged the waterways and cast raised rings on the under side, thereby increasing the heating surface and retarding the flames of the gases until the water has absorbed the greatest possible amount of heat.

WATER-POST.

The Water-Post is the connecting passage between the different water sections of the boiler, and possesses exclusive features. Its interior is divided by a partition, which separates the flow and return openings. The water rising from the fire-pot enters one side of this casting and passes into the large openings of each section simultaneously, thus insuring positive and continuous circulation. The "Daisy" water-post admits of one or more sections being shut off, the use of the others being continued, so that in case of accident any of the sections may be detached and replaced without disturbing the piping.

MADE IN CANADA.

COMBUSTION
CHAMBER
AND FLUES.

The Combustion Chamber and Flues are so proportioned and arranged that the combustion of the gases commencing in the fire-pot is completed before they escape to the chimney.

NOTE.

When desired, two or more "Daisy" Boilers may be connected in series, and under this arrangement they may be used singly or together.

CAPACITIES, DIMENSIONS AND PRICES.

Boiler Number.	Price.	Gross Rating.	Net Rating.	Height to Top of Headers in Inches.	Diameter of Smoke Pipe in Inches.	Diameter of Base Ring in Inches.	Diameter of Fire Pot Bottom in Inches.	Depth of Fire Pot in Inches.	No. and Size of Mains Flow and Return in Inches.	Size of Expansion Pipe in Inches.	Shipping Weight.
	Low Base.	Square Feet.	Square Feet.	Low Base.							Low Base.
0	\$ 226.00	300	200	46	7	27	17	15	4-2	1	760
1	268.00	375	250	50	7	27	17	15	4-2	1	830
1½	287.00	450	300	53	7	27	17	15	4-2	1	900
2	320.00	550	365	52	7	31	20	16	4-2	1	1,100
2½	356.00	625	420	54	7	31	20	16	4-2	1	1,225
3	382.00	750	500	52	8	34	21	16	4-2	1	1,300
3½	425.00	875	585	55	8	34	21	16	4-2	1	1,435
4	462.00	1,025	685	55	8	36	24	16	4-2	1	1,600
4½	498.00	1,125	750	58	8	36	24	16	4-2	1	1,765
5	550.00	1,250	835	56	10	39	26	16	6-2	1	1,945
5½	590.00	1,400	935	60	10	39	26	16	6-2	1	2,160
6	654.00	1,500	1,000	58	10	41	28	17	7-2	1	2,350
6A	706.00	1,650	1,100	65	10	41	28	17	7-2	1	2,615
6½	775.00	1,875	1,250	62	10	42	31	17	6-2-2-2	1	2,560
6½A	840.00	2,025	1,350	69	10	42	31	17	6-2-2-2	1	2,860
7	880.00	2,250	1,500	65	12	45	34	18	9-2-2-2	1	2,990
7½	945.00	2,650	1,765	72	12	45	34	18	9-2-2-2	1	3,330
8	1,052.00	3,000	2,000	66	12	50	39	18	11-2-2-2	1	3,800
8½	1,210.00	3,450	2,300	73	12	50	39	18	11-2-2-2	1	4,250
9	1,300.00	4,000	2,665	69	12	52	41	18	11-2-2-2	1	4,400
9½	1,500.00	4,500	3,000	77	12	52	41	18	11-2-2-2	1	4,950
10	2,200.00	6,000	4,000	Special	12	Special	Special	Special	Special	2	7,275

"VIKING" BOILERS FOR STEAM AND HOT WATER.

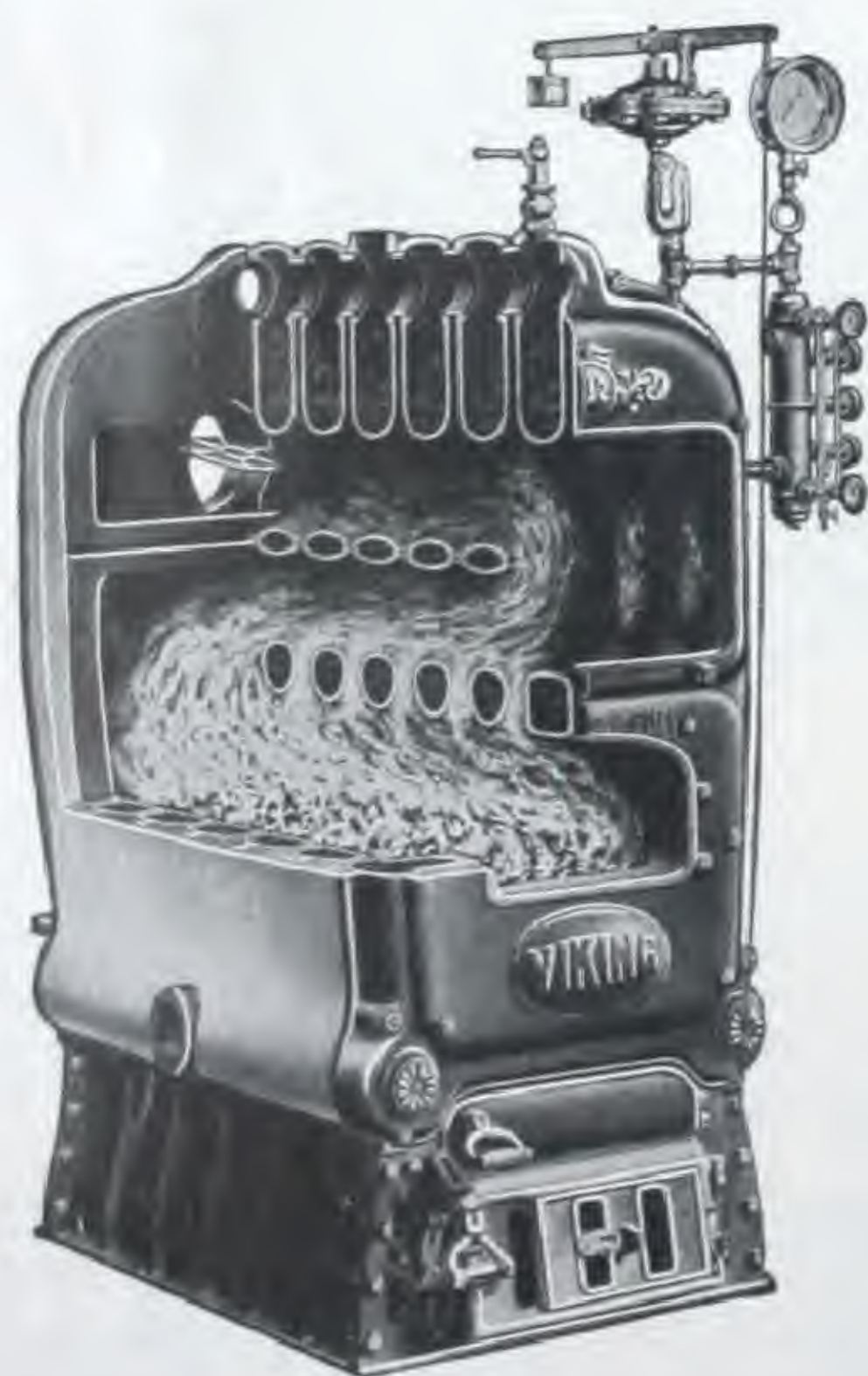


FIG. A.



FIG. B.

"VIKING"
BOILERS.

"Viking" Boilers, for steam and hot water, are noted for their prompt response to a quickened fire. Note the ample height of the combustion chamber above the fire, also the extent and arrangement of the interior surfaces to insure the maximum fuel heat being absorbed.

"Viking" Boilers are especially designed for deep, slowly-burning fires, fourteen to sixteen inches thick and more, consequently an effective fire is easily maintained all night or during the day with the least possible attention; coal burns slowly and completely, without clinkers and with greatest economy. All our fire-boxes are proportioned for moderate consumption.

REGULATOR.

An improved sensitive diaphragm Regulator (Fig. A) is furnished with all steam "Vikings." The diaphragm is unusually large and responds quickly to the slightest change of boiler pressure, opening draft and damper when the pressure falls and closing them when it rises. The pressure to be carried is regulated by the counterweight. With adequate draft and fuel and when connected with our improved balance check-damper (Fig. B), this regulator will automatically control and maintain steam pressure.

CONSTRUCTION.

Sections are accurately reamed, connected by tapered push-nipples, then drawn together and held permanently in place by iron bolts.

HYDROSTATIC TEST.

75 lbs. per square inch.

ADVANTAGES.

Easy to operate.

Easy to clean.

Honestly made.

Hard Coal, Soft Coal, Coke or Wood may be used.

Made in four series comprising twenty-seven regular sizes.

The "Viking" water-line area is about 50 per cent. in excess of its grate area—result, "Dry Steam."

We would specially draw your attention to the large Steam Dome above water line, ensuring a steady and ample supply of steam.

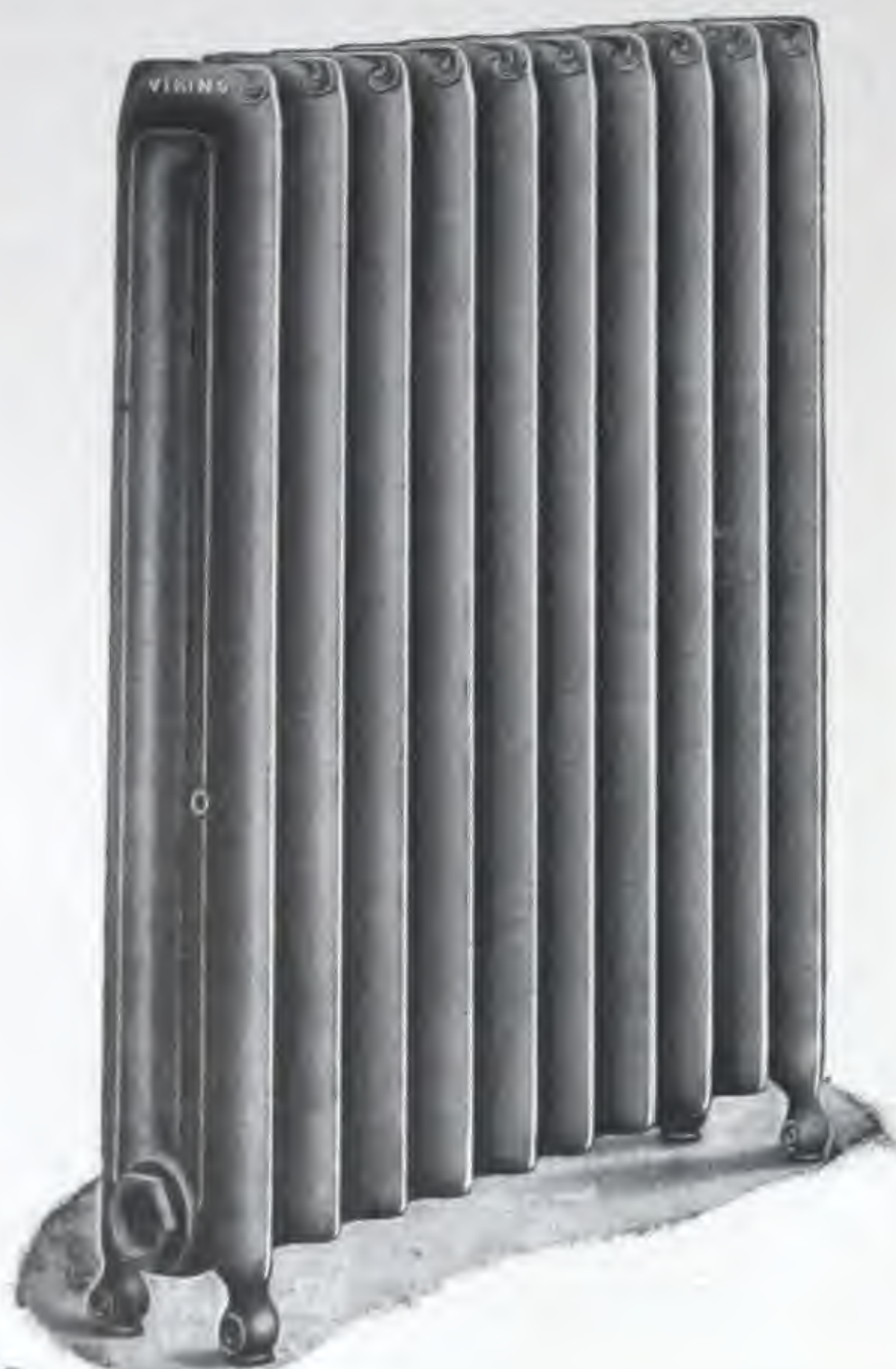
RATINGS.

Dimensions, Capacities, Prices, etc. The following ratings are gross and include mains, risers and branches.

Series and Number	Measurements of Fire Box at Top in inches	Fire Area and diameter of equivalent round grate		Principal Dimensions in Inches			Size of Smoke Outlet	Steam				Hot Water			
		Square Inches	Equivalent round grate	Height	Width	Length		Regular Tappings flow and return	Gross Capacity Square Ft.	Height of Water Line	List Price	Regular Tappings flow and return	Gross Capacity Square Ft.	Size of Expansion Pipe	List Price
15-4	17 x 18	306	19 $\frac{1}{2}$	57	28	31	7 ins.	1-4 in.	300	48 ins.	\$215.00	1-4 in.	500	1 in.	\$190.00
5	17 x 24	408	22 $\frac{1}{2}$	57	28	37	7 ins.	1-4 in.	425	48 ins.	255.00	1-4 in.	700	1 in.	230.00
6	17 x 30	510	25 $\frac{1}{2}$	57	28	43	7 ins.	2-4 in.	550	48 ins.	295.00	2-4 in.	900	1 in.	270.00
7	17 x 36	612	27 $\frac{1}{2}$	57	28	49	7 ins.	2-4 in.	675	48 ins.	337.50	2-4 in.	1100	1 in.	312.50
20-4	22 x 18	396	22 $\frac{1}{2}$	65	33	31	9 ins.	2-4 in.	500	55 ins.	275.00	2-4 in.	825	1 $\frac{1}{4}$ in.	250.00
5	22 x 24	528	26	65	33	37	9 ins.	2-4 in.	600	55 ins.	312.50	2-4 in.	1000	1 $\frac{1}{4}$ in.	287.50
6	22 x 30	660	29	65	33	43	9 ins.	2-4 in.	800	55 ins.	375.00	2-4 in.	1325	1 $\frac{1}{4}$ in.	350.00
7	22 x 36	792	31 $\frac{1}{2}$	65	33	49	9 ins.	2-4 in.	1000	55 ins.	425.00	2-4 in.	1650	1 $\frac{1}{4}$ in.	400.00
8	22 x 42	924	34 $\frac{1}{2}$	65	33	55	9 ins.	2-4 in.	1200	55 ins.	475.00	3-4 in.	2000	1 $\frac{1}{4}$ in.	450.00
9	22 x 48	1056	36 $\frac{1}{2}$	65	33	61	9 ins.	2-4 in.	1400	55 ins.	525.00	3-4 in.	2300	1 $\frac{1}{4}$ in.	500.00
10	22 x 54	1148	38 $\frac{1}{2}$	65	33	67	9 ins.	2-4 in.	1600	55 ins.	575.00	3-4 in.	2600	1 $\frac{1}{4}$ in.	550.00
11	22 x 60	1320	41	65	33	73	9 ins.	2-4 in.	1800	55 ins.	625.00	3-4 in.	2900	1 $\frac{1}{2}$ in.	600.00
30-5	32 x 24	768	31 $\frac{1}{2}$	70	43	37	14 ins.	2-4 in.	1000	57 ins.	425.00	2-4 in.	1650	1 $\frac{1}{2}$ in.	400.00
6	32 x 30	960	35	70	43	43	14 ins.	2-4 in.	1350	57 ins.	512.50	2-4 in.	2250	1 $\frac{1}{2}$ in.	487.50
7	32 x 36	1152	38 $\frac{1}{2}$	70	43	49	14 ins.	3-4 in.	1700	57 ins.	600.00	3-4 in.	2800	1 $\frac{1}{2}$ in.	575.00
8	32 x 42	1344	41 $\frac{1}{2}$	70	43	55	14 ins.	3-4 in.	2100	57 ins.	700.00	3-4 in.	3400	1 $\frac{1}{2}$ in.	675.00
9	32 x 48	1536	44 $\frac{1}{2}$	70	43	61	14 ins.	3-4 in.	2400	57 ins.	775.00	4-4 in.	4000	1 $\frac{1}{2}$ in.	750.00
10	32 x 54	1728	46 $\frac{1}{2}$	70	43	67	14 ins.	3-4 in.	2700	57 ins.	850.00	4-4 in.	4500	1 $\frac{1}{2}$ in.	825.00
11	32 x 60	1920	49 $\frac{1}{2}$	70	43	73	14 ins.	4-4 in.	3000	57 ins.	925.00	4-4 in.	5000	1 $\frac{1}{2}$ in.	900.00
12	32 x 66	2112	51 $\frac{1}{2}$	70	43	79	14 ins.	4-4 in.	3300	57 ins.	1000.00	4-4 in.	5500	1 $\frac{1}{2}$ in.	975.00
13	32 x 72	2304	54 $\frac{1}{2}$	70	43	85	14 ins.	4-4 in.	3600	57 ins.	1075.00	4-4 in.	6000	1 $\frac{1}{2}$ in.	1050.00
40-5	42 x 32	1344	41 $\frac{1}{2}$	80	53	40	18 ins.	1-6 in.	2100	64 $\frac{1}{2}$ ins.	700.00	1-6 in.	3500	2 in.	687.50
6	42 x 40	1680	46 $\frac{1}{2}$	80	53	48	18 ins.	1-6 in.	2600	64 $\frac{1}{2}$ ins.	825.00	2-6 in.	4400	2 in.	787.50
7	42 x 48	2016	50 $\frac{1}{2}$	80	53	56	18 ins.	1-6 in.	3100	64 $\frac{1}{2}$ ins.	950.00	2-6 in.	5400	2 in.	912.50
8	42 x 56	2352	54 $\frac{1}{2}$	80	53	64	18 ins.	2-6 in.	3700	64 $\frac{1}{2}$ ins.	1100.00	2-6 in.	6400	2 in.	1062.50
9	42 x 64	2688	58 $\frac{1}{2}$	80	53	72	18 ins.	2-6 in.	4300	64 $\frac{1}{2}$ ins.	1250.00	2-6 in.	7425	2 in.	1212.50
10	42 x 72	3024	62	80	53	80	18 ins.	2-6 in.	4950	64 $\frac{1}{2}$ ins.	1412.50	3-6 in.	8550	2 in.	1375.00
11	42 x 80	3360	65	80	53	88	18 ins.	2-6 in.	5850	64 $\frac{1}{2}$ ins.	1637.50	3-6 in.	9675	2 in.	1600.00
12	42 x 88	3696	68 $\frac{1}{2}$	80	53	96	18 ins.	2-6 in.	6550	64 $\frac{1}{2}$ ins.	1812.50	3-6 in.	10800	2 in.	1775.00
13	42 x 96	4032	72	80	53	104	18 ins.	2-6 in.	7250	64 $\frac{1}{2}$ ins.	1975.00	4-6 in.	11925	2 in.	1925.00

"VIKING" RADIATORS.

MADE IN CANADA.



TWO COLUMN.

Number of Sections.	*Length 2 1/2 in. per Section.	HEATING SURFACE.											
		45 in. in Height.		38 in. in Height.		32 in. in Height.		30 in. in Height.		26 in. in Height.		23 in. in Height.	
		5 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	4 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	3 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	3 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	2 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	2 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.
2	5	10	30	8	24	6	20	6	18	5	16	4	12
3	7 1/2	15	45	12	36	9	30	9	27	7 1/2	24	5 1/2	18
4	10	20	60	16	48	12	40	12	36	10	32	7 1/2	24
5	12 1/2	25	75	20	60	15	50	15	45	13	40	11	36
6	15	30	90	24	72	18	60	18	54	16	48	14	42
7	17 1/2	35	105	28	84	21	70	21	63	18 1/2	56	16 1/2	48
8	20	40	120	32	96	24	80	24	72	21	64	18 1/2	56
9	22 1/2	45	135	36	108	27	90	27	81	24	72	21	64
10	25	50	150	40	120	30	100	30	90	26 1/2	80	23 1/2	70
11	27 1/2	55	165	44	132	33	110	33	99	29	88	25 1/2	77
12	30	60	180	48	144	36	120	36	108	32	96	28	84
13	32 1/2	65	195	52	156	39	130	39	117	34 1/2	104	30 1/2	91
14	35	70	210	56	168	42	140	42	126	37	112	32 1/2	98
15	37 1/2	75	225	60	180	45	150	45	135	40	120	35	105
16	40	80	240	64	192	48	160	48	144	43 1/2	128	37 1/2	112
17	42 1/2	85	255	68	204	51	170	51	153	45 1/2	136	39 1/2	119
18	45	90	270	72	216	54	180	54	162	48	144	42	126
19	47 1/2	95	285	76	228	57	190	57	171	50 1/2	152	44 1/2	133
20	50	100	300	80	240	60	200	60	180	53 1/2	160	46 1/2	140
21	52 1/2	105	315	84	252	63	210	63	189	56	168	49	147
22	55	110	330	88	264	66	220	66	198	58 1/2	176	51 1/2	154
23	57 1/2	115	345	92	276	69	230	69	207	61 1/2	184	53 1/2	161
24	60	120	360	96	288	72	240	72	216	64	192	56	168
25	62 1/2	125	375	100	300	75	250	75	225	66 1/2	200	58 1/2	175
Price per Sq. Ft.	Water	1.00	...	1.00	...	1.10	...	1.15	...	1.20	...	1.26	...
	Steam	...	...	...	...	...	...	...	...	...	...	...	...

THREE COLUMN.

Number of Sections.	*Length 3 1/2 in. per Section.	HEATING SURFACE.											
		44 in. in Height.		38 in. in Height.		32 in. in Height.		26 in. in Height.		22 in. in Height.		18 in. in Height.	
		6 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	5 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	4 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	3 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	3 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	2 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.
2	5	12	36	10	30	9	27	7	22	6	18	4	13
3	7 1/2	18	54	15	45	13 1/2	40	11 1/2	33	9	27	6	20
4	10	24	72	20	60	18	54	15	45	12	36	9	27
5	12 1/2	30	90	25	75	22 1/2	67 1/2	18 1/2	56 1/2	15	45	11 1/2	33
6	15	36	108	30	90	27	81	22 1/2	67 1/2	18 1/2	54	13 1/2	40
7	17 1/2	42	126	35	105	31 1/2	94 1/2	26 1/2	78 1/2	21	63	15 1/2	47 1/2
8	20	48	144	40	120	36	108	30	90	24	72	18	54
9	22 1/2	54	162	45	135	40	120	33 1/2	101 1/2	27	81	20 1/2	60
10	25	60	180	50	150	45	135	37 1/2	112 1/2	30	90	22 1/2	67 1/2
11	27 1/2	66	198	55	165	49 1/2	148 1/2	41 1/2	123 1/2	33	99	24 1/2	74 1/2
12	30	72	216	60	180	54	162	45	135	36	108	27	81
13	32 1/2	78	234	65	195	58 1/2	175 1/2	48 1/2	146 1/2	39	117	29 1/2	87 1/2
14	35	84	252	70	210	63	189	52 1/2	157 1/2	42	126	31 1/2	94 1/2
15	37 1/2	90	270	75	225	67 1/2	202 1/2	56 1/2	168 1/2	45	135	33 1/2	101 1/2
16	40	96	288	80	240	72	216	60	180	48	144	36	108
17	42 1/2	102	306	85	255	76 1/2	229 1/2	63 1/2	191 1/2	51	153	38 1/2	114 1/2
18	45	108	324	90	270	81	243	67 1/2	202 1/2	54	162	40 1/2	121 1/2
19	47 1/2	114	342	95	285	85 1/2	256 1/2	71 1/2	213 1/2	57	171	43 1/2	128 1/2
20	50	120	360	100	300	90	270	75	225	60	180	45	135
21	52 1/2	126	378	105	315	94 1/2	283 1/2	78 1/2	236 1/2	63	189	47 1/2	141 1/2
22	55	132	396	110	330	99	297	82 1/2	247 1/2	66	198	49 1/2	148 1/2
23	57 1/2	138	414	115	345	103 1/2	310 1/2	86 1/2	258 1/2	69	207	51 1/2	155 1/2
24	60	144	432	120	360	108	324	90	270	72	216	54	162
25	62 1/2	150	450	125	375	112 1/2	337 1/2	93 1/2	281 1/2	75	225	56 1/2	168 1/2
Price per Sq. Ft.	Water	1.00	...	1.00	...	1.10	...	1.20	...	1.30	...	1.40	...
	Steam	...	...	...	...	...	...	...	...	...	...	...	...

FOUR COLUMN.

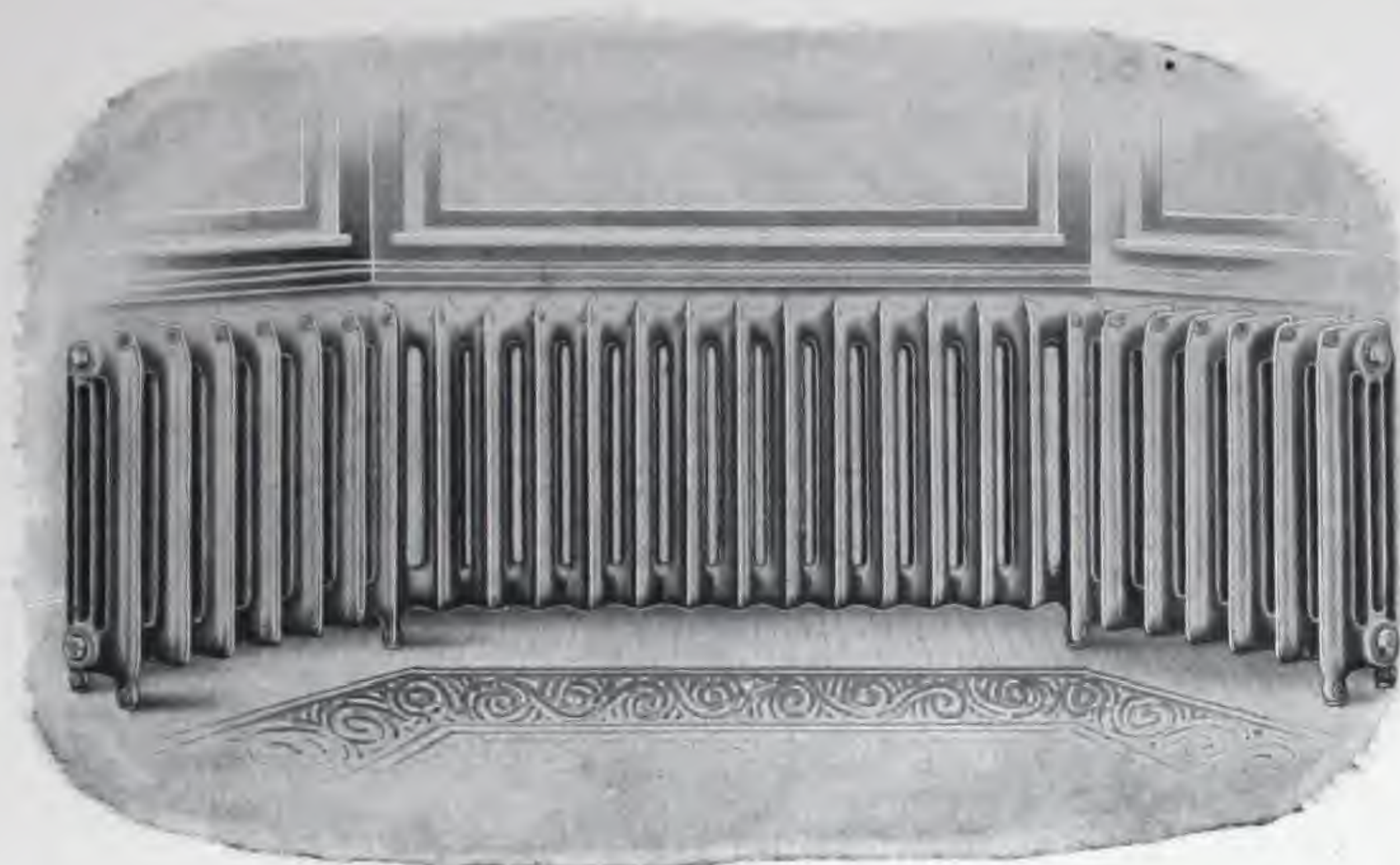
Number of Sections.	*Length 4 1/2 in. per Section.	HEATING SURFACE.											
		42 in. in Height.		38 in. in Height.		32 in. in Height.		26 in. in Height.		20 in. in Height.		16 in. in Height.	
		9 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	8 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	6 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	5 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	4 Sq. Ft. per Section.	Equivalent 1 in. Pipe.	2 1/2 Sq. Ft. per Section.	Equivalent 1 in. Pipe.
2	8 1/2	19	58	16	48	13 1/2	40	10 1/2	32	8	24	5	15
3	12 1/2	29	87	24	72	20 1/2	60	16 1/2	48	12	36	7 1/2	22 1/2
4	16 1/2	38	116	32	96	26 1/2	80	21 1/2	64	16	48	10	30
5	20 1/2	48	145	40	120	33 1/2	100	26 1/2	80	20	60	12 1/2	37 1/2
6	24 1/2	58	174	48	144	40 1/2	120	32 1/2	96	24	72	15 1/2	45 1/2
7	28 1/2	67	203	56	168	46 1/2	140	37 1/2	112	28	84	17 1/2	52 1/2
8	33 1/2	77	232	64	192	53 1/2	160	42 1/2	128	32	96	20 1/2	60 1/2
9	37 1/2	87	261	72	216	60 1/2	180	48 1/2	144	36	108	22 1/2	67 1/2
10	41 1/2	96	290	80	240	66 1/2	200	53 1/2	160	40	120	25 1/2	75 1/2
11	45 1/2	106	319	88	264	73 1/2	220	58 1/2	176	44	132	27 1/2	82 1/2
12	49 1/2	116	348	96	288	80 1/2	240	64 1/2	192	48	144	30 1/2	90 1/2
13	53 1/2	125	377	104	312	86 1/2	260	69 1/2	208	52	156	32 1/2	97 1/2
14	57 1/2	135	406	112	336	93 1/2	280	74 1/2	224	56	168	35 1/2	105 1/2
15	61 1/2	145	435	120	360	100 1/2	300	80 1/2	240	60	180	37 1/2	112 1/2
16	66	154	464	128	384	106 1/2	320	85 1/2	256	64	192	40 1/2	120 1/2
17	70	164	493	136	408	113 1/2	340	90 1/2	272	68	204	43 1/2	127 1/2
18	74	174	522	144	432	120 1/2	360	96 1/2	288	72	216	45 1/2	135 1/2
19	78 1/2	183	551	152	456	126 1/2	380	101 1/2	304	76	228	47 1/2	143 1/2
20	82 1/2	193	580	160	480	133 1/2	400	106 1/2	320	80	240	50 1/2	150 1/2
21	86 1/2	203	609	168	504	140 1/2	420	112 1/2	336	84	252	52 1/2	157 1/2
22	90 1/2	213	638	176	528	146 1/2	440	117 1/2	352	88	264	55 1/2	165 1/2
23	94 1/2	222	667	184	552	153 1/2	460	123 1/2	368	92	276	57 1/2	173 1/2
24	99 1/2	232	696	192	576	160 1/2	480	128 1/2	384	96	288	60 1/2	180 1/2
25	103 1/2	241	725	200	600	166 1/2	500	133 1/2	400	100	300	62 1/2	187 1/2
Price per Sq. Ft.	Water	1.00	...	1.00	...	1.20	...	1.20	...	1.36	...	1.50	...
	Steam	...	...	...	...	...	...	...	...	...	...	...	...

*In estimating length of radiator allow 1/2 inch for each plug or bushing.

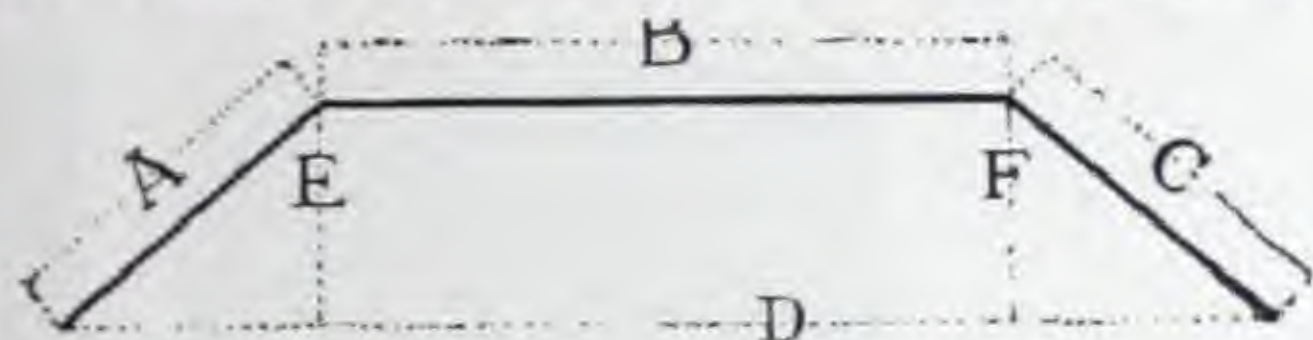
CONTINUED ON NEXT PAGE

"VIKING" WINDOW RADIATORS.

MADE IN CANADA.



ANGLES FOR WATER OR STEAM.



In ordering angle radiators, an exact template should be furnished. When this is not convenient, it will be necessary to have the above diagram.

Care must be taken to give the exact measurements as indicated by letters A, B, C, D, E and F. If twin tappings are required, show their location on the diagram.

CORNER.

WATER AND STEAM.

Orders for corner radiators must state the number of sections required on each side of corner section. All corner radiators for water are tapped single connection.

HIGH LEGS.

All direct radiators of the different heights are fitted on special orders with leg sections of any height ranging from the standard to 18 inches from floor to centre of bottom tappings.

WALL BRACKETS.

Wall brackets are furnished on special orders, for hanging two, three and four column radiators. Orders should plainly state where these brackets are intended to be used, so that the radiator may be supplied without legs.

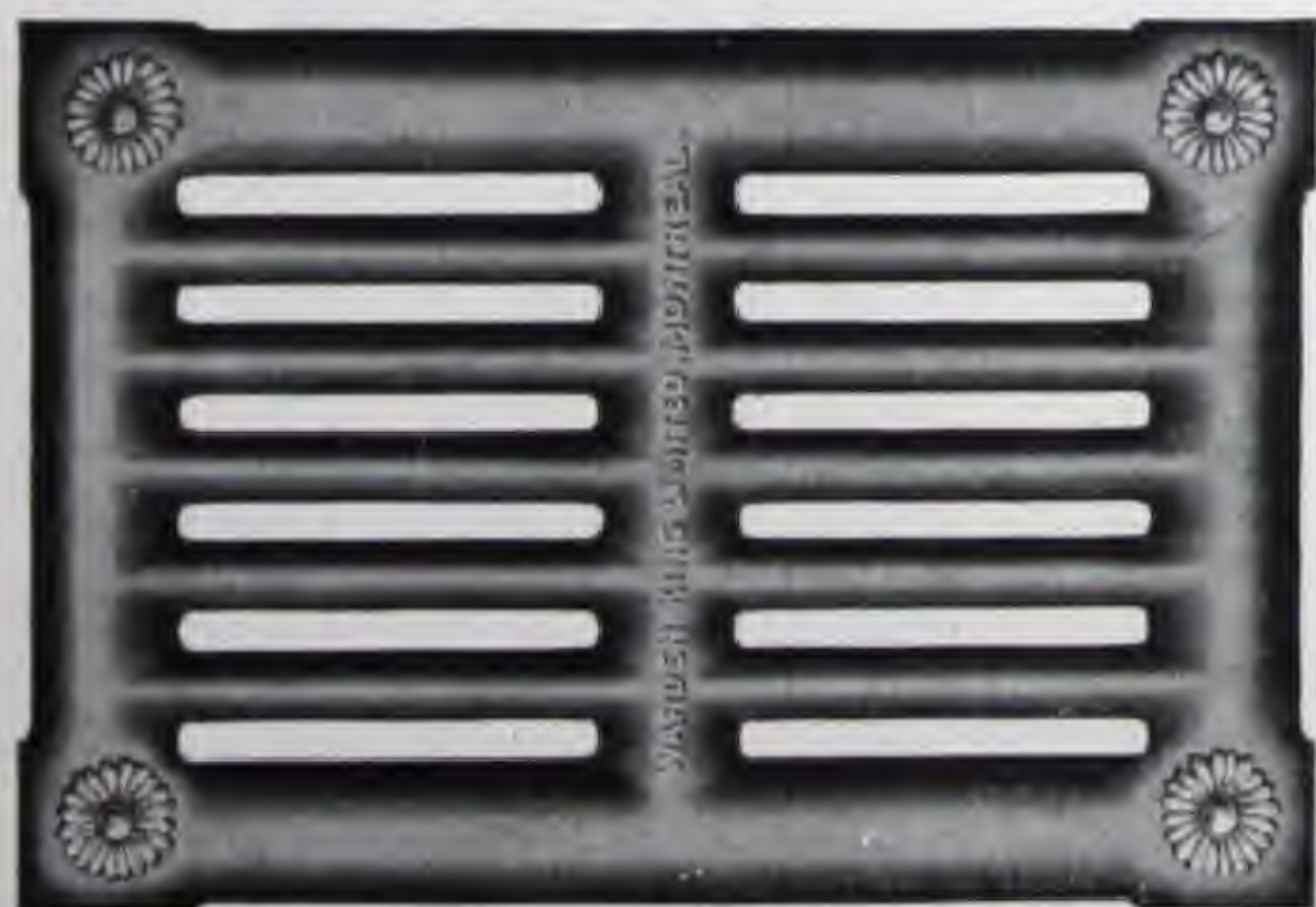
All direct radiators illustrated in this catalogue may be made up in angle, corner high leg, wall bracket, stairway or window styles.

PRICES OF SPECIALS.

These prices have to be added to the regular price of the different radiators:

Circular or Curved, per section	\$ 3.00
Angle or Corner, per section	15.00
High Legs, 4" to 6" inclusive, per leg section	30
High Legs, 6" to 9" inclusive, per leg section	60
High Legs, 9" to 15" inclusive, per leg section	1.20
Wall Hangers for top of radiator, each	.60
Wall Hangers for bottom of radiator, each	.90

"VIKING" WALL RADIATOR.



7-ft. Section
15 x 17.

9-ft. Section
13 x 24.

List Price, 9-ft. Section, \$1.05 per Sq. Ft.
List Price, 7-ft. Section, \$1.05 per Sq. Ft.

"VIKING" WINDOW RADIATORS.

LISTS, CAPACITIES AND DIMENSIONS.

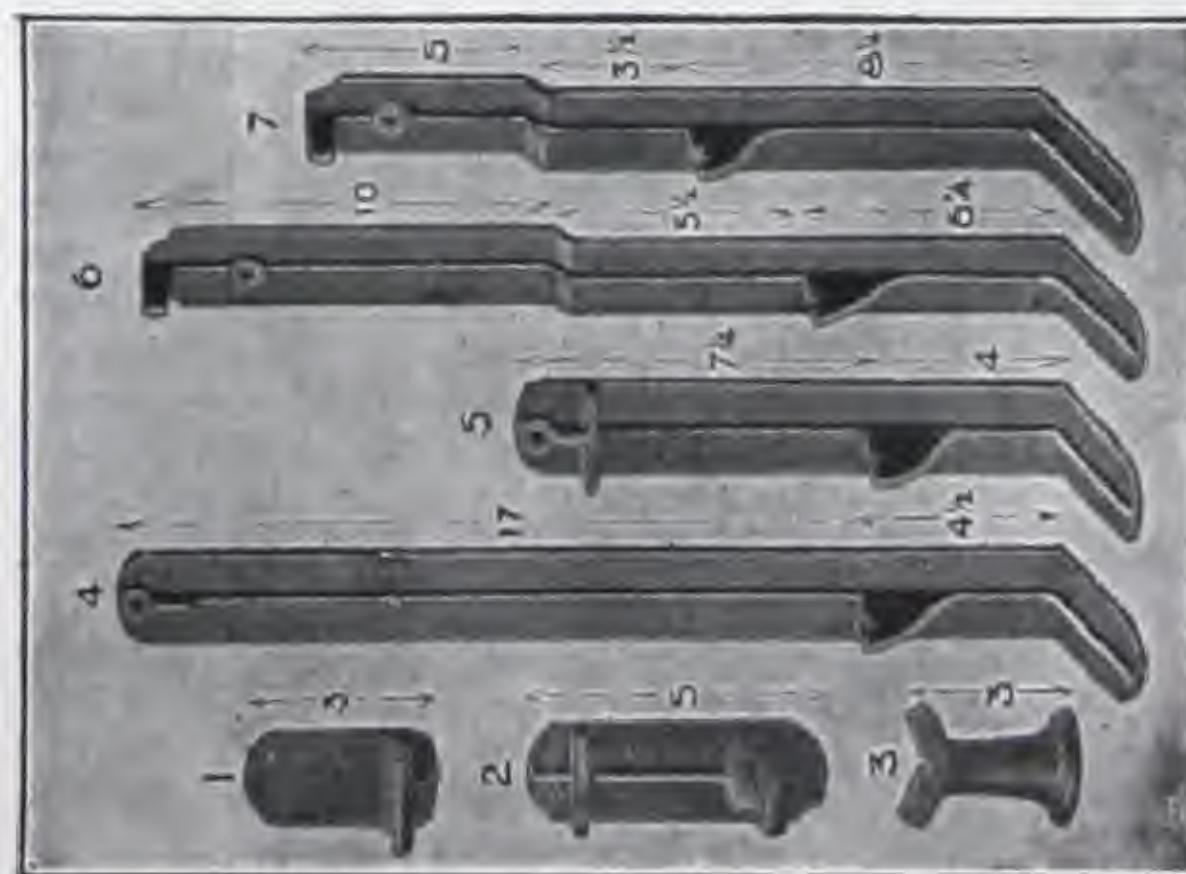
SIX COLUMN.

Number of Sections.	Length of Radiator in Inches.	HEATING SURFACE IN SQUARE FEET.			
		20 in. high 6 Sq. Ft. per Section.	18 in. high 6 Sq. Ft. per Section.	16 in. high 4 1/2 Sq. Ft. per Section.	14 in. high 4 1/2 Sq. Ft. per Section.
2	7	12	12	9 1/2	9 1/2
3	10	18	18	14	14
4	13	24	24	18 1/2	18 1/2
5	16	30	30	23 1/2	23 1/2
6	19	36	36	28	28
7	22	42	42	32 1/2	32 1/2
8	25	48	48	37 1/2	37 1/2
9	28	54	54	42	42
10	31	60	60	46 1/2	46 1/2
11	34	66	66	51 1/2	51 1/2
12	37	72	72	56	56
13	40	78	78	60 1/2	60 1/2
14	43	84	84	65 1/2	65 1/2
15	46	90	90	70	70
16	49	96	96	74 1/2	74 1/2
17	52	102	102	79 1/2	79 1/2
18	55	108	108	84	84
19	58	114	114	88 1/2	88 1/2
20	61	120	120	93 1/2	93 1/2
21	64	126	126	98	98
22	67	132	132	102 1/2	102 1/2
23	70	138	138	107 1/2	107 1/2
24	73	144	144	112	112
25	76	150	150	116 1/2	116 1/2
Price per Sq. Ft. . . .		Water.. \$1.36	\$1.40	\$1.50	\$1.55
		Steam..	.....	.....	.....

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

Length of radiator is estimated on the basis of 3 in. for each section, plus 1/2 inch on each end for plugs and bushings.

BRACKETS FOR WALL RADIATORS.



Other styles of Brackets to order. Also made with Ceiling Hangers to order.

TAYLOR-FORBES COMPANY, LIMITED

HEAD OFFICE

GUELPH, ONTARIO

TORONTO, ONT.:
TAYLOR-FORBES COMPANY, LIMITED,
1088 KING ST. WEST.

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T. M. HAYES,
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1114 BLANCHARD ST., VICTORIA, B.C.

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19 MOUNT ROYAL AVE.

QUEBEC, QUE.
MECHANICS' SUPPLY CO., LIMITED.

WINDSOR:
PIERCE, BUTLER & PIERCE,
MFG. CORPORATION.

CALGARY:
P. D. McLAREN,
LANCASTER BUILDING

SOVEREIGN RADIATORS.

COLONIAL PATTERN TWO LOOP.

LIST OF SIZES "COLONIAL" FOR STEAM AND HOT WATER.
EACH LOOP IS $7\frac{1}{4}$ INCHES WIDE AND $2\frac{1}{2}$ INCHES THICK ACROSS HUBS.

Number of Sections	Square Feet of Heating Surface.							
	Length in Inches Over All	45 in. 3 ft. per Section	38½ in. 4 ft. per Section	32½ in. 3½ ft. per Section	30 in. 3 ft. per Section	26½ in. 2½ ft. per Section	23 in. 2½ ft. per Section	20½ in. 2 ft. per Section
2	6	10	8	6½	6	5½	4½	4
3	8½	15	12	10	9	8	7	6
4	11	20	16	13½	12	10½	9½	8
5	13½	25	20	16½	15	13½	11½	10
6	16	30	24	20	18	16	14	12
7	18½	35	28	23½	21	18½	16½	14
8	21	40	32	26½	24	21½	18½	16
9	23½	45	36	30	27	24	21	18
10	26	50	40	33½	30	26½	23½	20
11	28½	55	44	36½	33	29½	25½	22
12	31	60	48	40	36	32	28	24
13	33½	65	52	43½	39	34½	30½	26
14	36	70	56	46½	42	37½	32½	28
15	38½	75	60	50	45	40	35	30
16	41	80	64	53½	48	42½	37½	32
17	43½	85	68	56½	51	45½	39½	34
18	46	90	72	60	54	48	42	36
19	48½	95	76	63½	57	50½	44½	38
20	51	100	80	66½	60	53½	46½	40
21	53½	105	84	70	63	56	49	42
22	56	110	88	73½	66	58½	51½	44
23	58½	115	92	76½	69	61½	53½	46
24	61	120	96	80	72	64	56	48
25	63½	125	100	83½	75	66½	58½	50



COLONIAL—PLAIN Water or Steam

EMPIRE PATTERN THREE LOOP.

LIST OF SIZES "EMPIRE" FOR STEAM AND HOT WATER.
EACH LOOP IS $8\frac{1}{4}$ INCHES WIDE AND $2\frac{1}{2}$ INCHES THICK ACROSS HUBS.

Number of Sections	Square Feet of Heating Space.					
	Length in Inches Over All	38½ in. 5 ft. per Section	32½ in. 4½ ft. per Section	26½ in. 3½ ft. per Section	22 in. 3 ft. per Section	18 in. 2½ ft. per Section
2	6	10	9	7.6	6	4½
3	8½	15	13.6	12.3	9	6½
4	11	20	18	15	12	9
5	13½	25	22.6	18.9	15	11½
6	16	30	27	22.6	18	13½
7	18½	35	31.6	26.3	21	15½
8	21	40	36	30	24	18
9	23½	45	40.6	33.9	27	20½
10	26	50	45	37.6	30	22½
11	28½	55	49.6	41.3	33	24½
12	31	60	54	45	36	27
13	33½	65	58.6	48.9	39	29½
14	36	70	63	52.6	42	31½
15	38½	75	67.6	56.3	45	33½
16	41	80	72	60	48	36
17	43½	85	76.6	63.9	51	38½
18	46	90	81	67.6	54	40½
19	48½	95	85.6	71.3	57	42½
20	51	100	90	75	60	45
21	53½	105	94.6	78.9	63	47½
22	56	110	99	82.6	66	49½
23	58½	115	103.6	86.3	69	51½
24	61	120	108	90	72	54



EMPIRE—PLAIN, WATER OR STEAM

SOVEREIGN RADIATORS

MONARCH PATTERN FOUR LOOP

LIST OF SIZES "MONARCH" FOR STEAM AND HOT WATER.
EACH LOOP IS 8½ INCHES WIDE AND 4 INCHES THICK ACROSS HUBS.



MONARCH—PLAIN, WATER OR STEAM

Number of Sections.	Length Inches Overall.	Square Feet of Heating Surface.					
		42½ in. 9½ ft. per Section.	38½ in. 8 ft. per Section.	32½ in. 6½ ft. per Section.	26½ in. 5 ft. per Section.	20½ in. 4 ft. per Section.	16½ in. 2½ ft. per Section.
2	9	19½	16	13	10	8	5
3	13	29	24	19½	15	12	7½
4	17	38½	32	26	20	16	10
5	21	48½	40	32½	25	20	12½
6	25	58	48	39	30	24	15
7	29	67½	56	45½	35	28	17½
8	33	77½	64	52	40	32	20
9	37	87	72	58½	45	36	22½
10	41	96½	80	65	50	40	25
11	45	106½	88	71½	55	44	27½
12	49	116	96	78	60	48	30
13	53	125½	104	84½	65	52	32½
14	57	135½	112	91	70	56	35
15	61	145	120	97½	75	60	37½
16	65	154½	128	104	80	64	40
17	69	164½	136	110½	85	68	42½
18	73	174	144	117	90	72	45
19	77	183½	152	123½	100	76	47½
20	81	193½	160	130	105	80	50
21	85	203	168	136½	110	84	52½
22	89	212½	176	143	115	88	55
23	93	222½	184	149½	120	92	57½
24	97	232	192	156	125	96	60

SOVEREIGN WALL RADIATORS

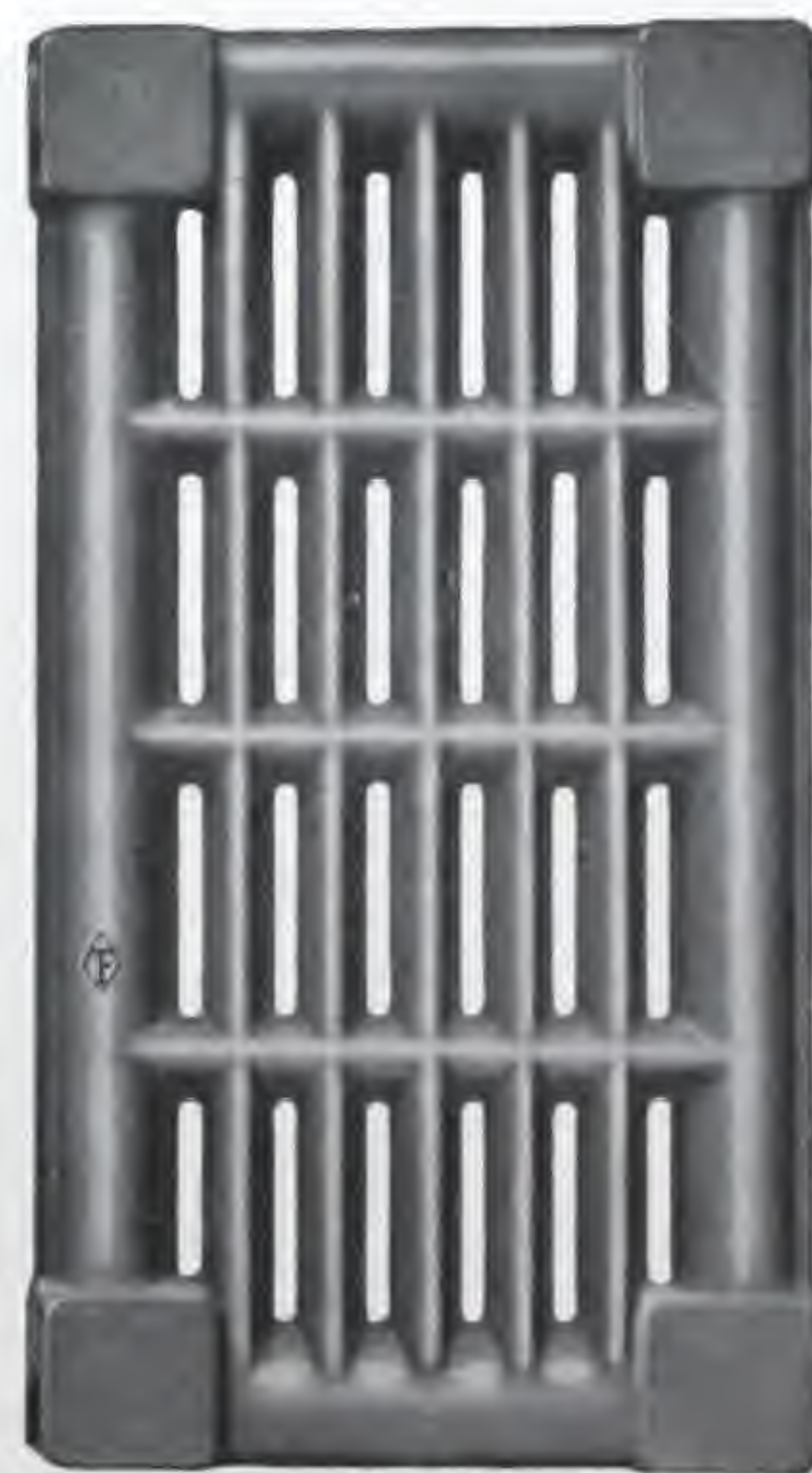
FOR WATER AND STEAM.



6-FOOT SECTION.
15-in. wide x 15-in. long.



9-FOOT SECTION.
15-in. wide x 22 in. long.



12-FOOT SECTION.
15-in. wide x 28 in. long.

The 6- and 9-foot sections may be built into any combination of sizes and styles, vertical or horizontal. The 12-foot section is built vertical only.

SOVEREIGN HOSPITAL RADIATORS.

PLAIN PATTERNS ONLY.

2, 3 AND 4 LOOPS WIDE.



FOR WATER OR STEAM.
TO ORDER ONLY

THE TABLES OF MEASUREMENTS COVER-
ING THESE RADIATORS ARE SO COMPRE-
HENSIVE THAT IT WILL BE NECESSARY TO
REFER TO OUR ENGINEERS' HAND BOOK
FOR DETAILS.

Hospital Radiators are Built With Sections Wide Apart to Permit of Easy Cleaning.

SOVEREIGN HOT BLAST HEATERS.

REGULAR SECTION—RATINGS AND FREE AREAS.

REGULAR 40" SECTION—10.75 SQUARE FEET.

HEIGHT, 41 $\frac{1}{2}$ ".WIDTH, 9 $\frac{1}{2}$ ".

Number of Loops in Stack	Square Feet of Heating Surface	*Equivalent in Lineal Feet 1-inch Pipe	5" Centres of Loops		5½" Centres of Loops		4½" Centres of Loops		Actual Weight of Stack in Pounds	Approximate Weights
			Standard 44% of Face		52% of Face		37% of Face			
			Net Air Space in Square Feet	† Width of Stack in Inches	Net Air Space in Square Feet	† Width of Stack in Inches	Net Air Space in Square Feet	† Width of Stack in Inches		
7	75.25	226	4.34	35	5.12	38	3.67	32	594	7.92 lbs. per sq. ft. actual. 9 lbs. per sq. ft. shipping weight
8	86.00	258	4.96	40	5.85	43	4.20	37	670	
9	96.75	290	5.58	45	6.57	48	4.72	42	728	
10	107.50	323	6.20	50	7.29	54	5.25	46	851	
11	118.25	355	6.82	55	8.02	59	5.77	51	936	
12	129.00	387	7.44	60	8.74	65	6.30	55	1022	
13	139.75	419	8.06	65	9.47	70	6.82	60	1167	
14	150.50	452	8.68	70	10.19	75	7.35	65	1193	
15	161.25	484	9.30	75	10.91	81	7.87	69	1278	

REGULAR 50" SECTION—13.5 SQUARE FEET.

HEIGHT, 50 $\frac{1}{2}$ ".WIDTH, 9 $\frac{1}{2}$ ".

7	94.5	284	5.37	35	6.35	38	4.55	32	717	7.62 lbs. per sq. ft. actual. 9 lbs. per sq. ft. shipping weight
8	108.0	324	6.14	40	7.25	43	5.20	37	810	
9	121.5	365	6.91	45	8.15	48	5.85	42	923	
10	135.0	405	7.68	50	9.05	54	6.50	46	1026	
11	148.5	446	8.45	55	9.95	59	7.15	51	1129	
12	162.0	486	9.22	60	10.85	65	7.80	55	1232	
13	175.5	527	9.99	65	11.75	70	8.45	60	1335	
14	189.0	567	10.76	70	12.65	75	9.10	65	1436	
15	202.5	608	11.53	75	13.55	81	9.75	69	1539	

REGULAR 60" SECTION—16 SQUARE FEET.

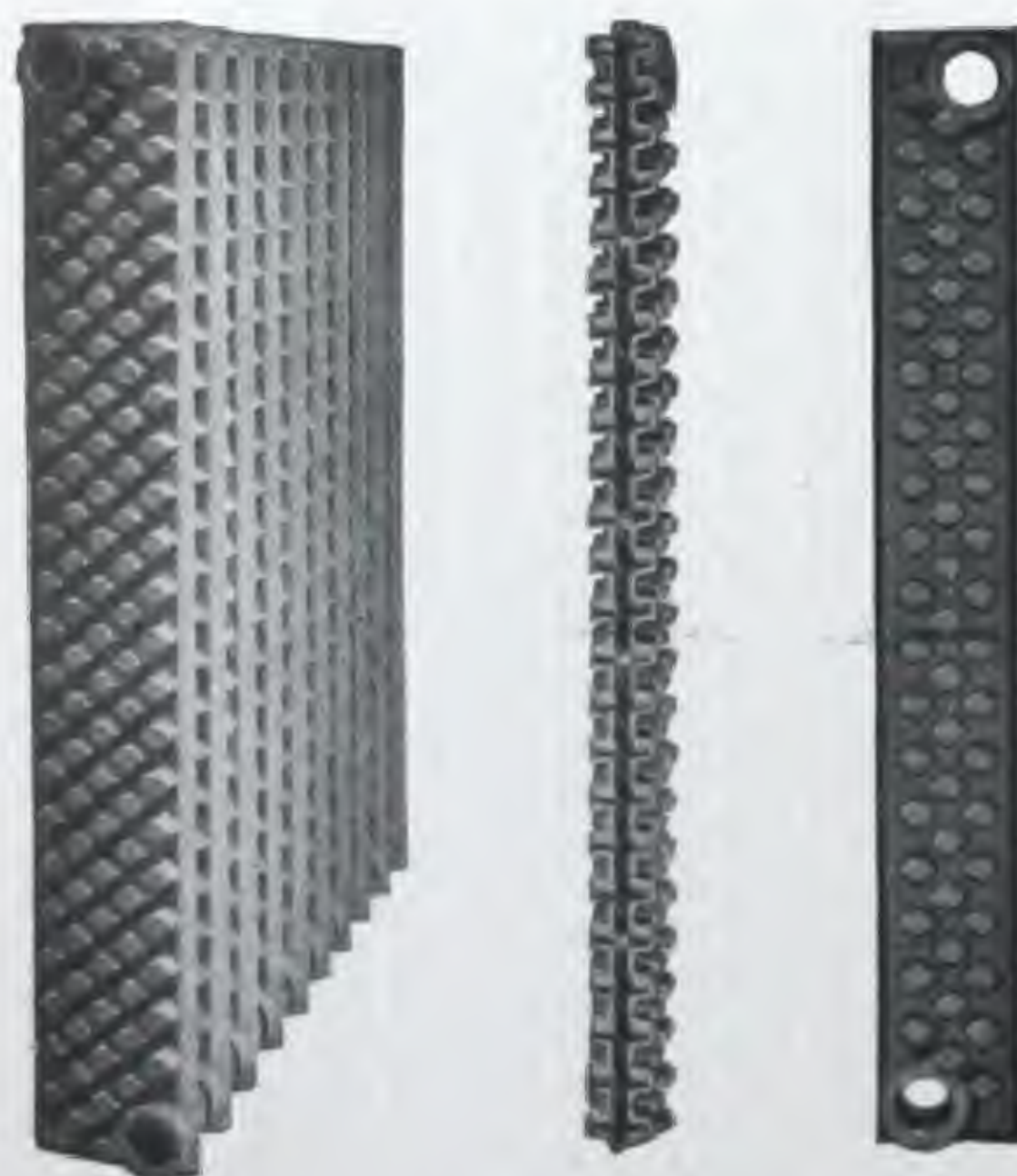
HEIGHT, 60 $\frac{1}{2}$ ".WIDTH, 9 $\frac{1}{2}$ ".

7	112.0	336	6.45	35	7.62	38	5.47	32	864	7-74 lbs. per sq. ft. actual, 9 lbs. per sq. ft. shipping weight
8	128.0	384	7.37	40	8.70	43	6.25	37	988	
9	144.0	432	8.29	45	9.77	48	7.03	42	1112	
10	160.0	480	9.21	50	10.85	54	7.81	46	1238	
11	176.0	528	10.13	55	11.93	59	8.59	51	1362	
12	192.0	576	11.05	60	13.00	65	9.37	55	1486	per sq. ft. shipping weight
13	208.0	624	11.97	65	14.08	70	10.15	60	1610	
14	224.0	672	12.89	70	15.15	75	10.93	65	1734	
15	240.0	720	13.81	75	16.23	81	11.71	69	1858	

* NOTE.—The actual length of one inch Pipe per square foot of outside surface is 2.9 lineal feet, but is nominally figured at 3 lineal feet as shown in the third column of the above table.

† NOTE.—Add to the width of stack 2 $\frac{1}{2}$ " for staggering of stacks.

Write for further details of Blast Radiators.



SOVEREIGN HOT WATER BOILERS

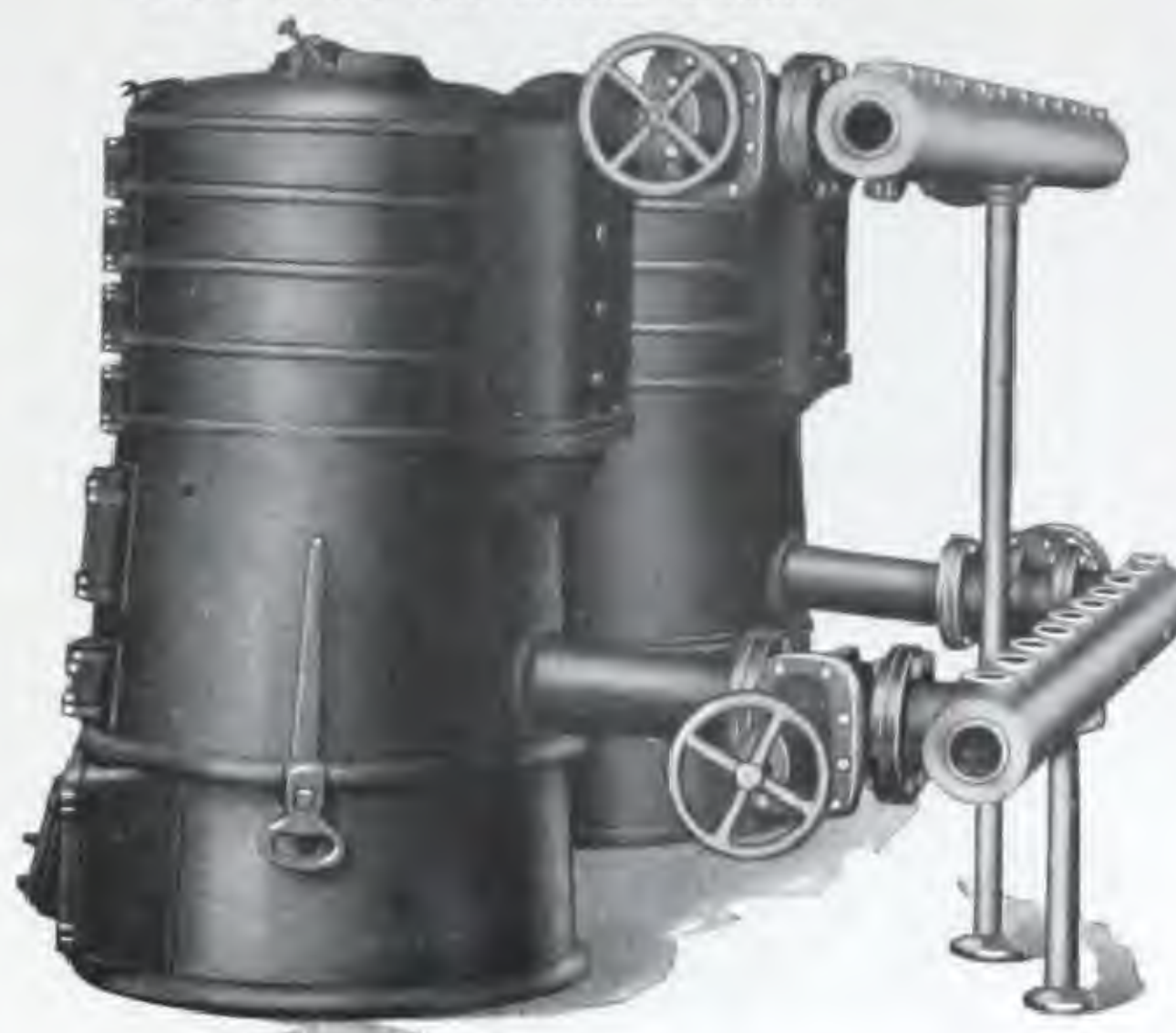


Made Low Base unless specially ordered otherwise. 19 sizes.

SPECIAL FEATURES:

Large Deep Fire Pot.
Large First Section.
Separate Clean-out Doors.
Large Water Post.
Flared Sections.

FOR SOFT OR HARD COAL.



Showing arrangement of Twin, Triple and Quadruple Headers for Sovereign Boilers.

WE DESIGNED THESE BOILERS—WE DID NOT COPY ANY OTHERS.

LIST OF SIZES AND CAPACITIES.

Size or Number.	Number of Sections.	Net Capacity of Radiation not including Mains.	Gross Capacity of Radiation not including Mains.	List Price, Low Base.	Height of Boiler Low Base, Inches.	Inside Diam. Fire Pot, Inches.	Depth Firepot, Inches.	Diameter Smoke Pipe, Inches.	Tapped Regular Openings.		Single Openings Return and Flow, Inches.	Recommended Size of Chimney Flue.	
									Flow, Inches.	Return, Inches.		Round Flue.	Square Flue.
0	3	200	300	\$226.00	46	16 1/2	17 3/4	7	3-2	4-2	3 1/2	7	8 1/2 x 8 1/2
00	4	227	340	247.00	50 1/2	16 1/2	17 3/4	7	3-2	4-2	3 1/2	7	8 1/2 x 8 1/2
1	5	250	375	268.00	54 1/4	16 1/2	17 3/4	7	3-2	4-2	3 1/2	7	8 1/2 x 8 1/2
1 1/2	4	300	450	287.00	52	19 1/2	18 3/4	7	4-2	5-2	4	8	8 1/2 x 8 1/2
2	5	365	550	320.00	56 1/4	19 1/2	18 3/4	7	4-2	5-2	4	8	8 1/2 x 8 1/2
2 1/2	4	420	625	356.00	53	21 1/2	18 3/4	8	4-2	5-2	4	8	8 1/2 x 8 1/2
3	5	500	750	382.00	57 1/2	21 1/2	18 3/4	8	4-2	5-2	4	9	8 1/2 x 10
3 1/2	4	585	875	425.00	55	24 1/2	19 1/4	8	6-2	7-2	5	9	8 1/2 x 10
4	5	685	1025	462.00	60	24 1/2	19 1/4	8	6-2	7-2	5	9	8 1/2 x 10
4 1/2	4	750	1125	498.00	56	26 1/2	19 3/4	10	6-2	7-2	5	10	8 1/2 x 12 1/2
5	5	835	1250	550.00	61	26 1/2	19 3/4	10	6-2	7-2	5	10	8 1/2 x 12 1/2
5 1/2	4	935	1400	590.00	61 1/4	28 1/2	20 1/4	10	8-2	9-2	6	10	8 1/2 x 12 1/2
6	5	1000	1500	654.00	66	28 1/2	20 1/4	10	8-2	9-2	6	10	8 1/2 x 12 1/2
6A	4	1100	1650	706.00	62	30 1/2	20 3/4	10	8-2	9-2	6	11	8 1/2 x 12 1/2
6 1/2	5	1250	1875	775.00	66 3/4	30 1/2	20 3/4	12	8-2	9-2	6	12	12 1/2 x 12 1/2
6 1/2 A	4	1350	2025	840.00	63 3/4	32 1/2	21 1/4	12	9-2	10-2	6	12	12 1/2 x 12 1/2
7	5	1500	2250	880.00	68 3/4	32 1/2	21 1/4	12	9-2	10-2	6	12	12 1/2 x 12 1/2
7 1/2	4	1765	2650	945.00	63 3/4	36	21 1/4	12	9-2	10-2	6	12	12 1/2 x 12 1/2
8	5	2000	3000	1,052.00	68 3/4	36	21 1/4	12	9-2	10-2	6	12	12 1/2 x 12 1/2

WESTERN JUNIOR BOILERS

WESTERN JUNIOR STEAM BOILER

REGISTERED AND APPROVED BY ALL PROVINCIAL
GOVERNMENTS

WESTERN JUNIOR HOT WATER BOILER



RATINGS FOR WESTERN JUNIOR WATER BOILERS.

No. of Boiler.	Capacity of Radiation Sq. Ft. not including Mains.	List Price.	Height of Boiler to Top of Outlet Inches.	Outside Diam. Inches.	Inside Diam. of Firepot, Inches.	Tappings, Regular.		Diam. of Smoke Pipe, Inches.
						Flow, Inches.	Return, Inches.	
1	210	\$226.00	48 1/4	23 1/2	16	2-2	2-2	8
2	310	287.00	52	26	19	2-2 1/2	2-2 1/2	8
3	400	356.00	53 1/2	28	20 1/2	2-3	2-3	9
4	600	425.00	58 1/2	30 3/4	24	2-3	2-3	9
4 1/2	700	462.00	59 1/4	33 1/2	26	2-3	2-3	9
5	840	550.00	59 1/4	35 1/4	28	2-4	2-4	10
6	1100	706.00	60 1/2	38 1/2	30 1/2	2-4	2-4	10



RATINGS FOR WESTERN JUNIOR STEAM BOILERS.

Capacity of Radiation Sq. Ft. not including Mains.	List Price.	Height of Boiler to Top of Outlet, Inches.	Height of Water Line, Inches.	Outside Diam. Inches.	Inside Diam. of Firepot, Inches.	Tappings, Regular.		Diam. of Smoke Pipe, Inches.
						Flow, Inches.	Return, Inches.	
225	\$185.00	48 1/4	44 1/4	23 1/2	16	2-2	2-2	8
300	205.00	52	46	26	19	2-2 1/2	2-2 1/2	8
400	235.00	53 1/2	48 1/4	28	20 1/2	2-3	2-3	9
500	275.00	58 1/2	53	30 3/4	24	2-3	2-3	9
600	312.50	59 1/4	54 1/4	33 1/2	26	2-3	2-3	9
700	337.50	59 1/4	55 1/4	35 1/4	28	2-4	2-4	10
950	412.50	60 1/2	55 1/4	38 1/2	30 1/2	2-4	2-4	10

RATINGS

The foregoing steam boiler ratings are based on a standard of two (2) pounds pressure at the boiler, and the water ratings are based on a standard of water at a temperature of 180 F. as it leaves the boiler.

All our ratings are direct radiation, and, further, provide that, in estimating the size of boiler required, all piping (mains and risers, flow and return) shall be figured as radiating surface, in addition to the cast iron direct radiation to be used.

The surface in mains, if not properly covered, requires more boiler capacity than the same amount of direct radiation.

It is good practice to use a boiler with reserve capacity, and the surface in mains, as well as the radiators, should be figured on above basis, or due allowance made for other temperatures and pressure as well as loss of heat in the mains in determining required capacity.

When a pipe coil or cast-iron section is introduced into the fire-pot, or a steam coil placed in a tank for the purpose of heating water for domestic use, additional capacity should be provided for in estimating size steam or water boiler required at the rate of 1 1/4 square feet of direct radiation for steam and 2 square feet of direct radiation for water for each gallon of water to be thus heated per hour.

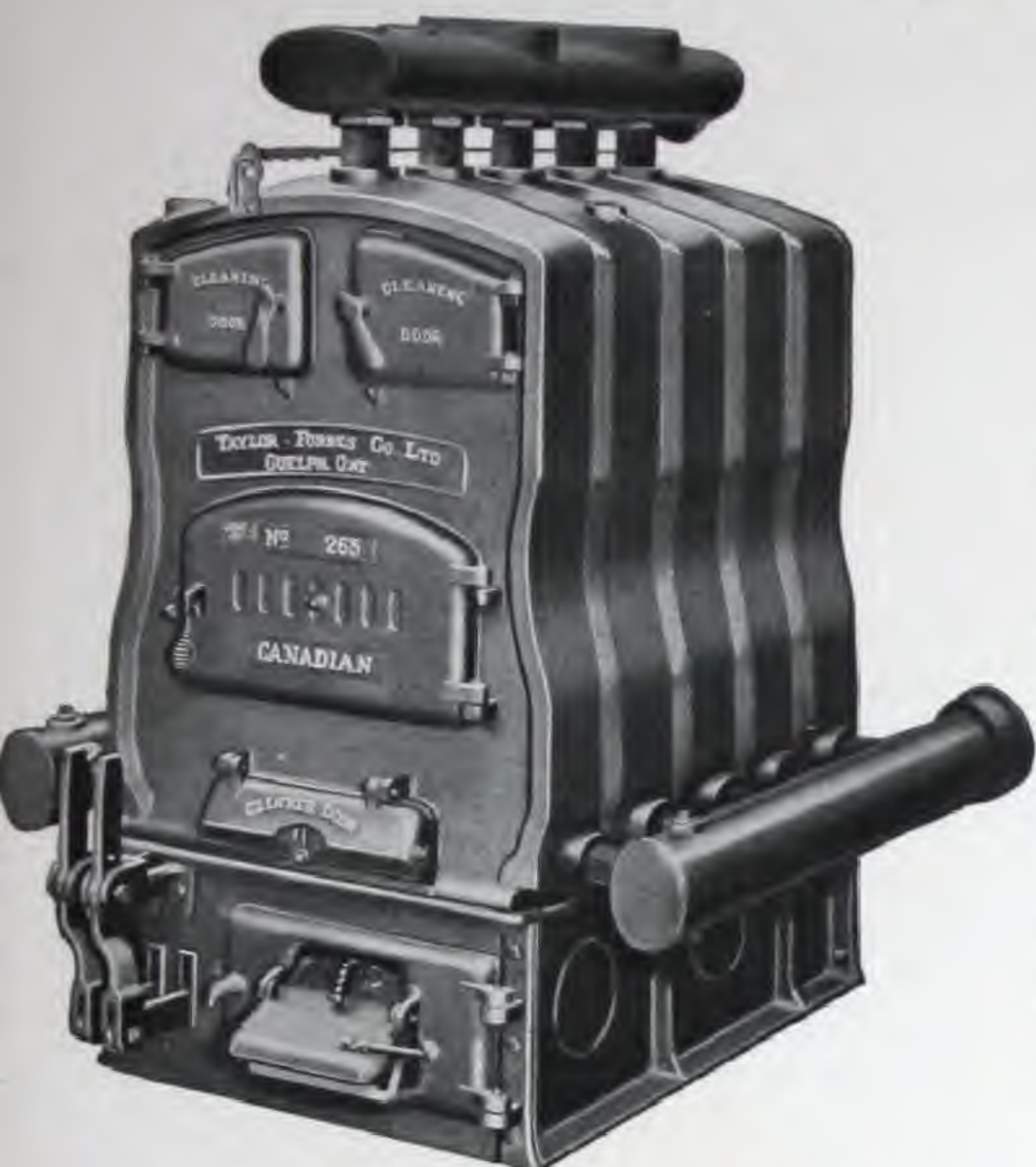
Our ratings are based on the assumption that hard coal is to be used for fuel, and that boilers without a jacket shall be covered with a non-conducting material.

CANADIAN WATER AND STEAM BOILERS

REGISTERED AND APPROVED BY ALL PROVINCIAL GOVERNMENTS

CANADIAN HOT WATER BOILER.

DIMENSIONS AND TAPPINGS.



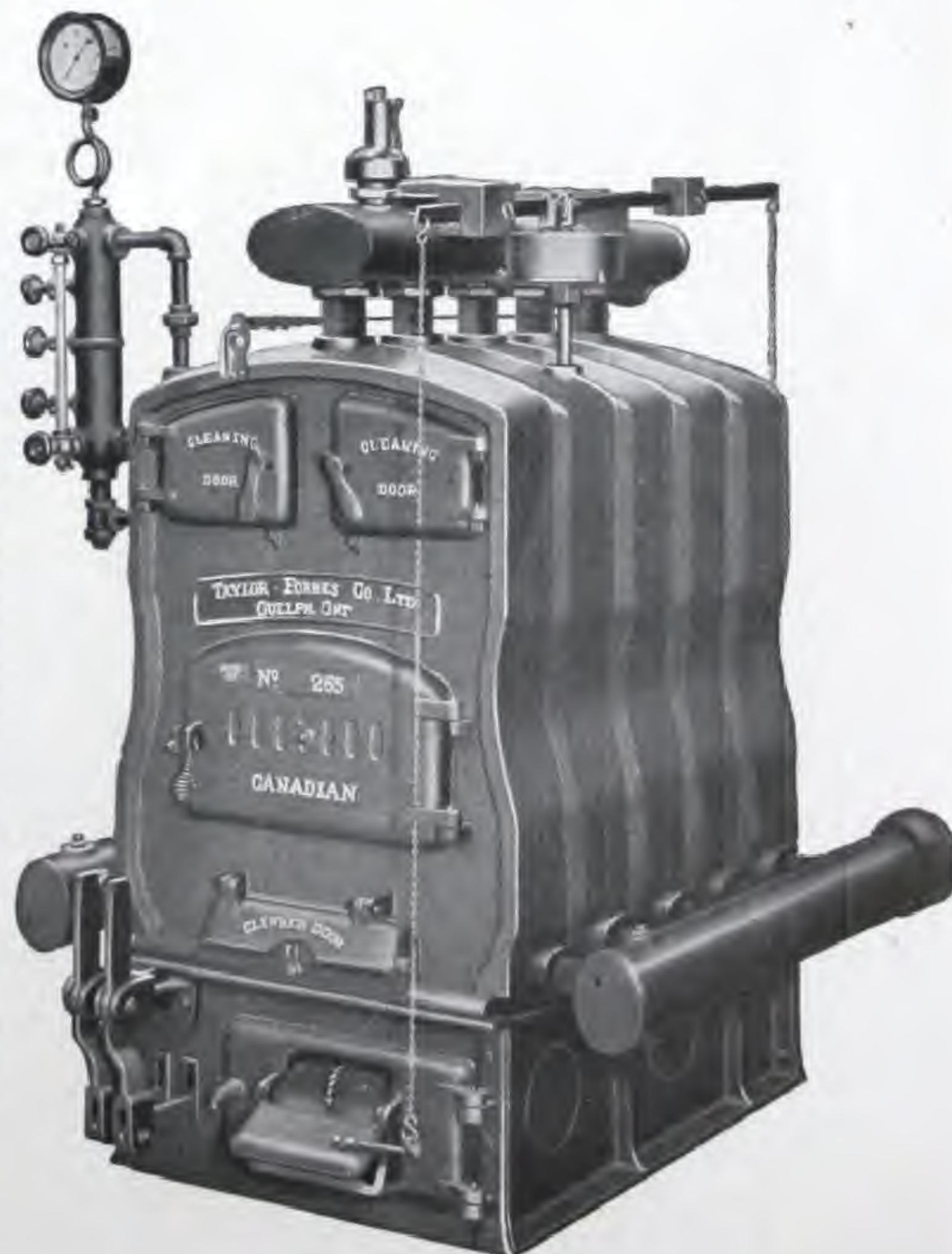
No. of Boiler.	No. of Sections.	Size of Fire Chamber, Inches.	Area of Grate, Inches.	Height of Boiler, Inches.	Length of Boiler, Inches.	Width of Boiler, Inches.	Height of Water Line, Inches.	Tap-pings, Regular.		Size of Smoke Pipe, Inches.	Size of Chimney Flue Recommended.	Capacity Radiation Sq. Ft. not including Mains.	List Price.
								Flow, Inches.	Return, Inches.				
W-215	5	23 1/2 x 31 3/4	652	60	55	45	44	2-3	2-3	10	12 1/2 x 12 1/2	1325	\$350.00
W-216	6	23 1/2 x 39 3/4	815	60	63	45	44	2-3	2-3	10	12 1/2 x 12 1/2	1650	400.00
W-217	7	23 1/2 x 47 3/4	978	60	71	45	44	2-3	2-3	10	12 1/2 x 12 1/2	2000	450.00
W-265	5	29 1/2 x 31 3/4	800	65 1/2	55	53	51	2-3	2-3	10	12 1/2 x 12 1/2	1750	437.50
W-266	6	29 1/2 x 39 3/4	1000	65 1/2	63	53	51	2-4	2-4	12	12 1/2 x 12 1/2	2250	487.50
W-267	7	29 1/2 x 47 3/4	1200	65 1/2	71	53	51	2-4	2-4	12	12 1/2 x 17	2700	562.50
W-268	8	29 1/2 x 55 3/4	1400	65 1/2	79	53	51	2-4	2-4	12	12 1/2 x 17	3150	625.00
W-325	5	36 x 31 3/4	992	68 1/2	55	61	53	2-4	2-4	14	12 1/2 x 17	2325	500.00
W-326	6	36 x 39 3/4	1240	68 1/2	63	61	53	2-4	2-4	14	12 1/2 x 17	2900	600.00
W-327	7	36 x 47 3/4	1488	68 1/2	71	61	53	2-5	2-5	14	12 1/2 x 17	3475	687.50
W-328	8	36 x 55 3/4	1736	68 1/2	79	61	53	2-5	2-5	14	17 x 17	4050	762.50
W-329	9	36 x 63 3/4	1984	68 1/2	87	61	53	2-5	2-5	14	17 x 17	4625	837.50
W-3210	10	36 x 71 3/4	2232	68 1/2	95	61	53	2-5	2-5	14	17 x 17	5200	925.00
W-405	5	43 1/2 x 31 3/4	1248	71	55	69	54	2-5	2-5	14	12 1/2 x 17	3150	625.00
W-406	6	43 1/2 x 39 3/4	1560	71	63	69	54	2-5	2-5	14	12 1/2 x 17	3975	775.00
W-407	7	43 1/2 x 47 3/4	1872	71	71	69	54	2-5	2-5	14	17 x 17	4800	862.50
W-408	8	43 1/2 x 55 3/4	2184	71	79	69	54	2-5	2-5	14	17 x 17	5625	1,037.50
W-409	9	43 1/2 x 63 3/4	2496	71	87	69	54	2-6	2-6	16	17 x 21	6450	1,150.00
W-4010	10	43 1/2 x 71 3/4	2808	71	95	69	54	2-6	2-6	16	17 x 21	7275	1,212.50
W-4011	11	43 1/2 x 79 3/4	3120	71	103	69	54	2-6	2-6	16	17 x 21	8100	1,350.00
W-466	6	53 x 40	1840	82	60	84	63	2-5	2-5	16	17 x 17	5200	925.00
W-467	7	53 x 48	2208	82	68	84	63	2-6	2-6	18	17 x 21	6275	1,087.50
W-468	8	53 x 56	2500	82	76	84	63	2-6	2-6	18	17 x 21	7350	1,250.00
W-469	9	53 x 64	2944	82	84	84	63	2-6	2-6	18	21 x 21	8425	1,462.50
W-4610	10	53 x 72	3312	82	92	84	63	2-8	2-8	20	21 x 21	9500	1,575.00
W-4611	11	53 x 80	3680	82	100	84	63	2-8	2-8	20	21 x 25 1/2	10575	1,775.00
W-4612	12	53 x 88	4048	82	108	84	63	2-8	2-8	20	21 x 25 1/2	11650	1,925.00
W-4613	13	53 x 96	4416	82	116	84	63	2-8	2-8	20	21 x 25 1/2	12725	2,037.50

This is the only type of Boiler on the market that can be repaired without disconnecting or taking down the whole boiler.

CANADIAN STEAM BOILER.

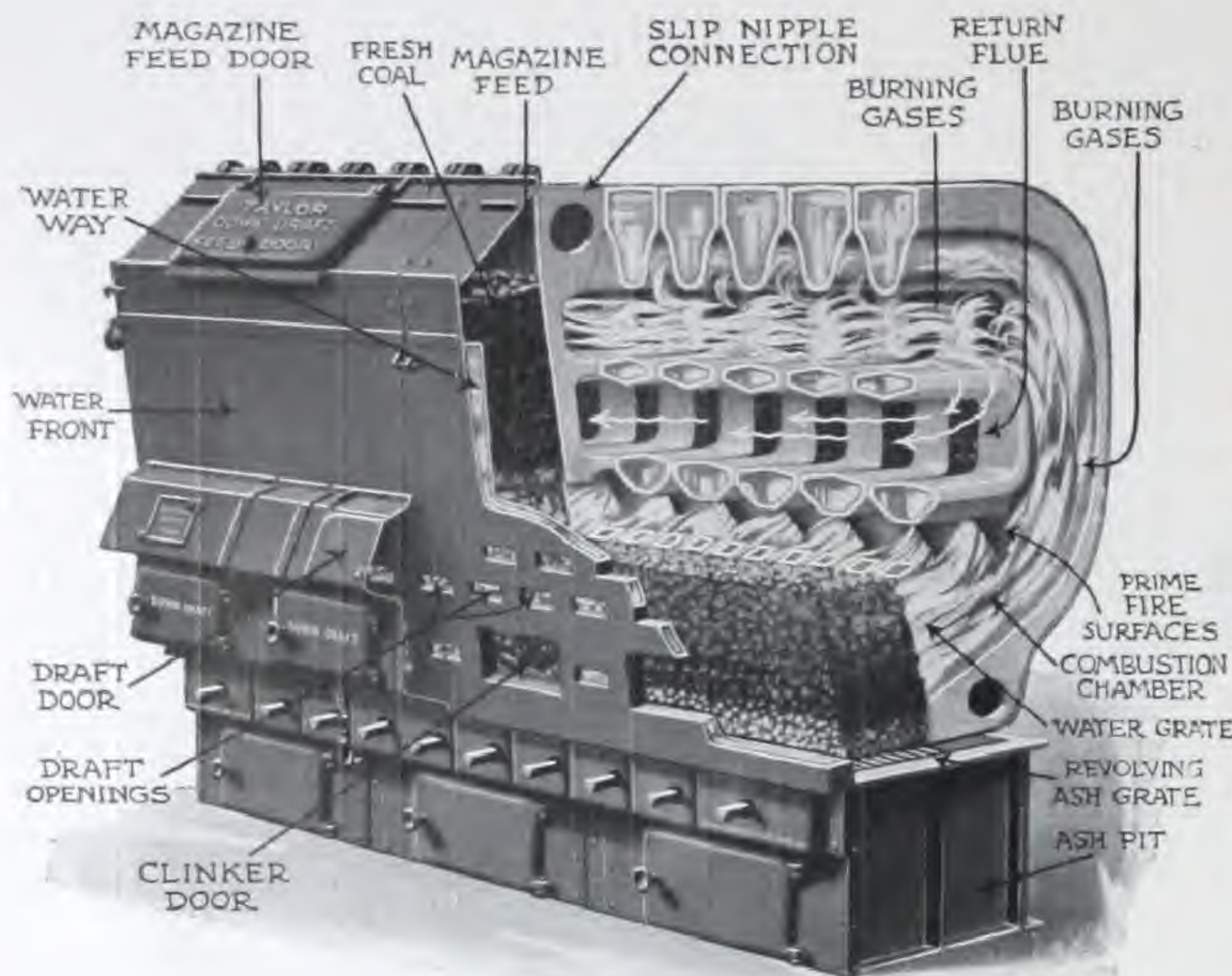
DIMENSIONS AND TAPPINGS.

No. of Boiler.	No. of Sections.	Size of Fire Chamber, Inches.	Area of Grate, Inches.	Height of Boiler, Inches.	Length of Boiler, Inches.	Width of Boiler, Inches.	Height of Water Line, Inches.	Tap-pings, Regular.		Size of Smoke Pipe, Inches.	Size of Chimney Flue Recommended.	Capacity Radiation Sq. Ft. not including Mains.	List Price.
								Flow, Inches.	Return, Inches.				
215	5	23 1/2 x 31 3/4	652	60	55	45	44	2-2 1/2	2-2 1/2	10	12 1/2 x 12 1/2	800	\$375.00
216	6	23 1/2 x 39 3/4	815	60	63	45	44	2-2 1/2	2-2 1/2	10	12 1/2 x 12 1/2	1000	425.00
217	7	23 1/2 x 47 3/4	978	60	71	45	44	2-2 1/2	2-2 1/2	10	12 1/2 x 12 1/2	1200	475.00
265	5	29 1/2 x 31 3/4	800	65 1/2	55	53	51	2-2 1/2	2-2 1/2	10	12 1/2 x 12 1/2	1150	462.50
266	6	29 1/2 x 39 3/4	1000	65 1/2	63	53	51	2-2 1/2	2-2 1/2	12	12 1/2 x 12 1/2	1350	512.50
267	7	29 1/2 x 47 3/4	1200	65 1/2	71	53	51	2-3	2-2 1/2	12	12 1/2 x 17	1625	587.50
268	8	29 1/2 x 55 3/4	1400	65 1/2	79	53	51	2-3	2-2 1/2	12	12 1/2 x 17	1900	650.00
325	5	36 x 31 3/4	992	68 1/2	55	61	53	2-3	2-2 1/2	14	12 1/2 x 17	1400	525.00
326	6	36 x 39 3/4	1240	68 1/2	63	61	53	2-3	2-2 1/2	14	12 1/2 x 17	1800	625.00
327	7	36 x 47 3/4	1488	68 1/2	71	61	53	2-4	2-3	14	12 1/2 x 17	2150	712.50
328	8	36 x 55 3/4	1736	68 1/2	79	61	53	2-4	2-3	14	17 x 17	2450	787.50
329	9	36 x 63 3/4	1984	68 1/2	87	61	53	2-4	2-3	14	17 x 17	2800	875.00
3210	10	36 x 71 3/4	2232	68 1/2	95	61	53	2-4	2-3	14	17 x 17	3200	975.00
405	5	43 1/2 x 31 3/4	1248	71	55	69	54	2-4	2-3	14	12 1/2 x 17	1900	650.00
406	6	43 1/2 x 39 3/4	1560	71	63	69	54	2-4	2-3	14	12 1/2 x 17	2550	812.50
407	7	43 1/2 x 47 3/4	1872	71	71	69	54	2-4	2-3	14	17 x 17	2900	900.00
408	8	43 1/2 x 55 3/4	2184	71	79	69	54	2-4	2-3	14	17 x 17	3600	1,075.00
409	9	43 1/2 x 63 3/4	2496	71	87	69	54	2-5	2-4	16	17 x 21	4050	1,187.50
4010	10	43 1/2 x 71 3/4	2808	71	95	69	54	2-5	2-4	16	17 x 21	4500	1,300.00
4011	11	43 1/2 x 79 3/4	3120	71	103	69	54	2-5	2-4	16	17 x 21	4950	1,412.50
466	6	53 x 40	1840	82	60	84	63	2-4	2-3	16	17 x 17	3250	989.50
467	7	53 x 48	2208	82	68	84	63	2-5	2-4	18	17 x 21	3800	1,125.00
468	8	53 x 56	2500	82	76	84	63	2-5	2-4	18	17 x 21	4450	1,287.50
469	9	53 x 64	2944	82	84	84	63	2-5	2-4	18	21 x 21	5400	1,525.00
4610	10	53 x 72	3312	82	92	84	63	2-6	2-4	20	21 x 21	5850	1,637.50
4611	11	53 x 80	3680	82	100	84	63	2-6	2-4	20	21 x 25 1/2	6650	1,837.50
4612	12	53 x 88	4048	82	108	84	63	2-6	2-4	20	21 x 25 1/2	7250	1,987.50
4613	13	53 x 96	4416	82	116	84	63	2-6	2-4	20	21 x 25 1/2	7700	2,100.00



TAYLOR DOWN DRAFT STEAM AND WATER BOILERS

TAYLOR DOWN DRAFT WATER BOILER



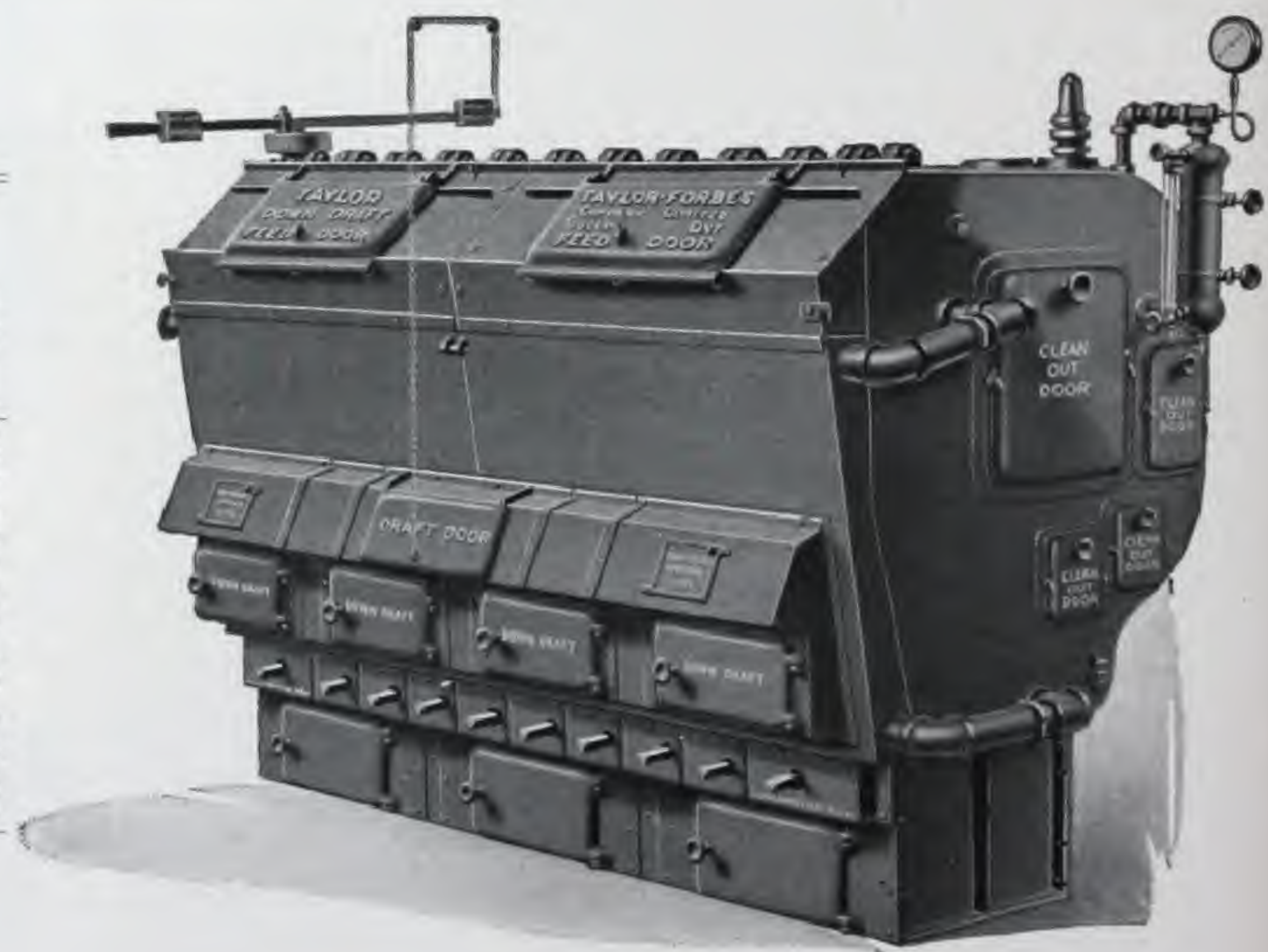
DIMENSIONS AND CAPACITIES.

Boiler Number.	No. of Sections.	Total Length, Inches.	No. and Size of Outlets, Inches.	No. and Size of Returns, Inches.	Diameter of Smoke Pipe, Inches.	Size Chimney Flue Inches.		Minimum Height of Chimney, Feet.	Rating.	List Price.
						Brick Unlined	Round Tile Inside Measurement is Commercial Size.			
W- 844	4	50	2-4	2-4	10	12½x12½	14	35	1500	PRICES ON APPLICATION
W- 845	5	57	2-4	2-4	10	12½x12½	14	40	2050	
W- 846	6	64	2-4	2-4	10	12½x17½	16	40	2650	
W- 847	7	71	3-4	3-4	10	12½x17½	16	45	3200	
W- 848	8	78	3-4	3-4	12	17½x17½	18	45	3900	
W- 849	9	85	3-4	3-4	12	17½x17½	18	50	4625	
W-8410	10	92	3-4	3-4	12	17½x21	20	50	5450	
W-8411	11	100	4-4	4-4	12	17½x21	20	55	6275	
W-8412	12	108	4-4	4-4	12	17½x21	20	60	7100	

TAYLOR DOWN DRAFT STEAM BOILER

DIMENSIONS AND CAPACITIES.

Boiler Number.	No. of Sections.	Total Length, Inches.	No. and Size of Outlets, Inches.	No. and Size of Returns, Inches.	Diameter of Smoke Pipe, Inches.	Size Chimney Flue, Inches.		Minimum Height of Chimney, Feet.	Rating.	List Price.
						Brick Unlined.	Round Tile Inside Measurement is Commercial Size.			
S- 844	4	55	2-4	2-4	10	12½x12½	14	35	900	PRICES ON APPLICATION
S- 845	5	62	2-4	2-4	10	12½x12½	14	40	1250	
S- 846	6	69	2-4	2-4	10	12½x17½	16	40	1600	
S- 847	7	76	3-4	3-4	10	12½x17½	16	45	1950	
S- 848	8	83	3-4	3-4	12	17½x17½	18	45	2350	
S- 849	9	90	3-4	3-4	12	17½x17½	18	50	2800	
S-8410	10	98	3-4	3-4	12	17½x21	20	50	3300	
S-8411	11	105	4-4	4-4	12	17½x21	20	55	3800	
S-8412	12	112	4-4	4-4	12	17½x21	20	60	4300	



TANK HEATERS

TAYLOR TANK HEATER.
FOR HOT WATER.

DIMENSIONS AND PRICE LIST.

No. of Boiler.	Heat- ing Capa- city.	Tank Capa- city.	Height of Heater, Inches.	Outside Diam. Inches.	Size of Grate, Inches.	Tappings.		Diam. of Smoke Pipe, Inches.	List Price.
						Flow, Inches.	Return, Inches.		
210	450	675	45½	23	20	3	3	7	\$245.00
				23	20	3	3	7	260.00

IMPROVED GIANT STEAM BOILER.
FOR ANY KIND OF FUEL.

DIMENSIONS AND PRICE LIST

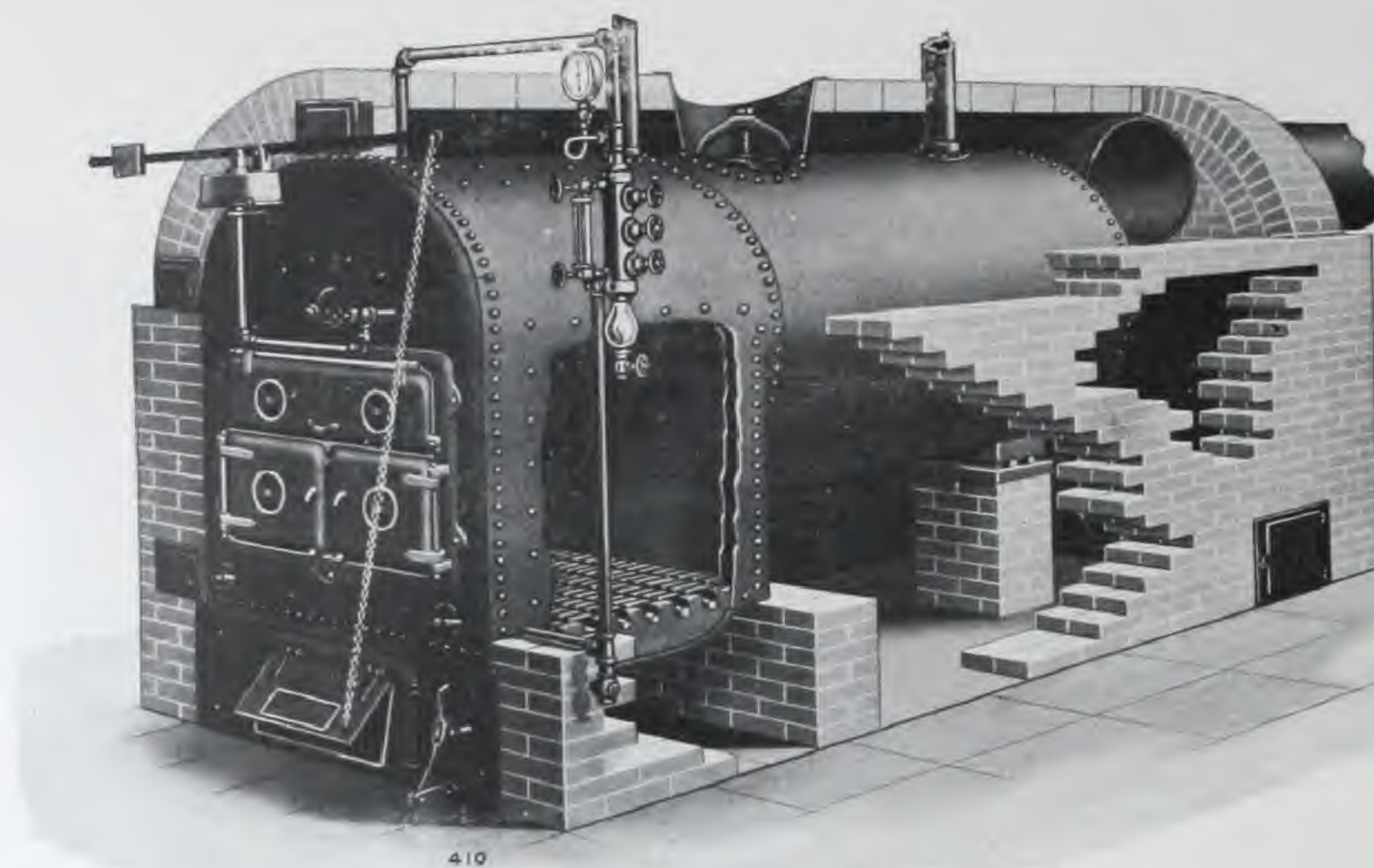
No. of Boiler.	Heat- ing Capa- city.	Height of Boiler, Inches.	Outside Diam. Inches.	Size of Grate, Inches.	Tappings.		Diam. of Smoke Pipe, Inches.	List Price.
					Flow, Inches.	Return, Inches.		
125	100	44½	15	12	2	2	6	\$200.00
165	175	49½	19	16	2½	2½	6	270.00
205	275	52½	23	20	3	3	7	350.00

ADANAC TANK AND LAUNDRY HEATER.

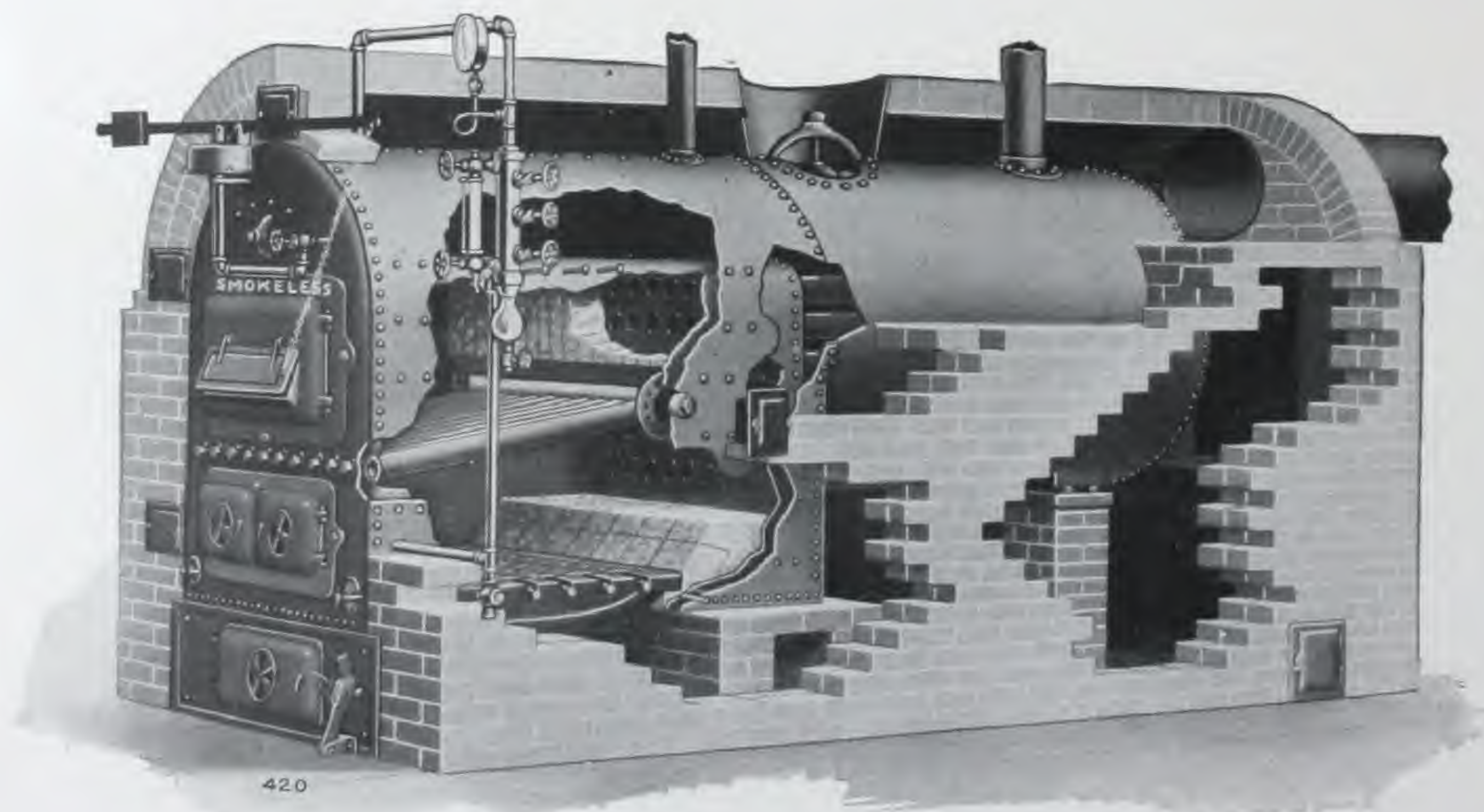


No. of Boiler.	Tank Capacity Gallons.	Height of Heater, Inches.	Size of Top, Inches.	Extreme Front to Rear Measurement, Inches.	Size of Grate, Inches.	Size of Outlet, Inches.	Size of Inlet, Inches.	Size of Smoke Pipe, Inches.	List Price.
9	55	23¼	15x21½	20¼	8	1-1	1-1	6	\$30.50

TAYLOR-FORBES FIREBOX HEATING BOILERS.



STANDARD TYPE (BRICK SET)

SMOKELESS TYPE (BRICK SET)
SPECIAL CATALOGUE SUPPLIED ON REQUEST.

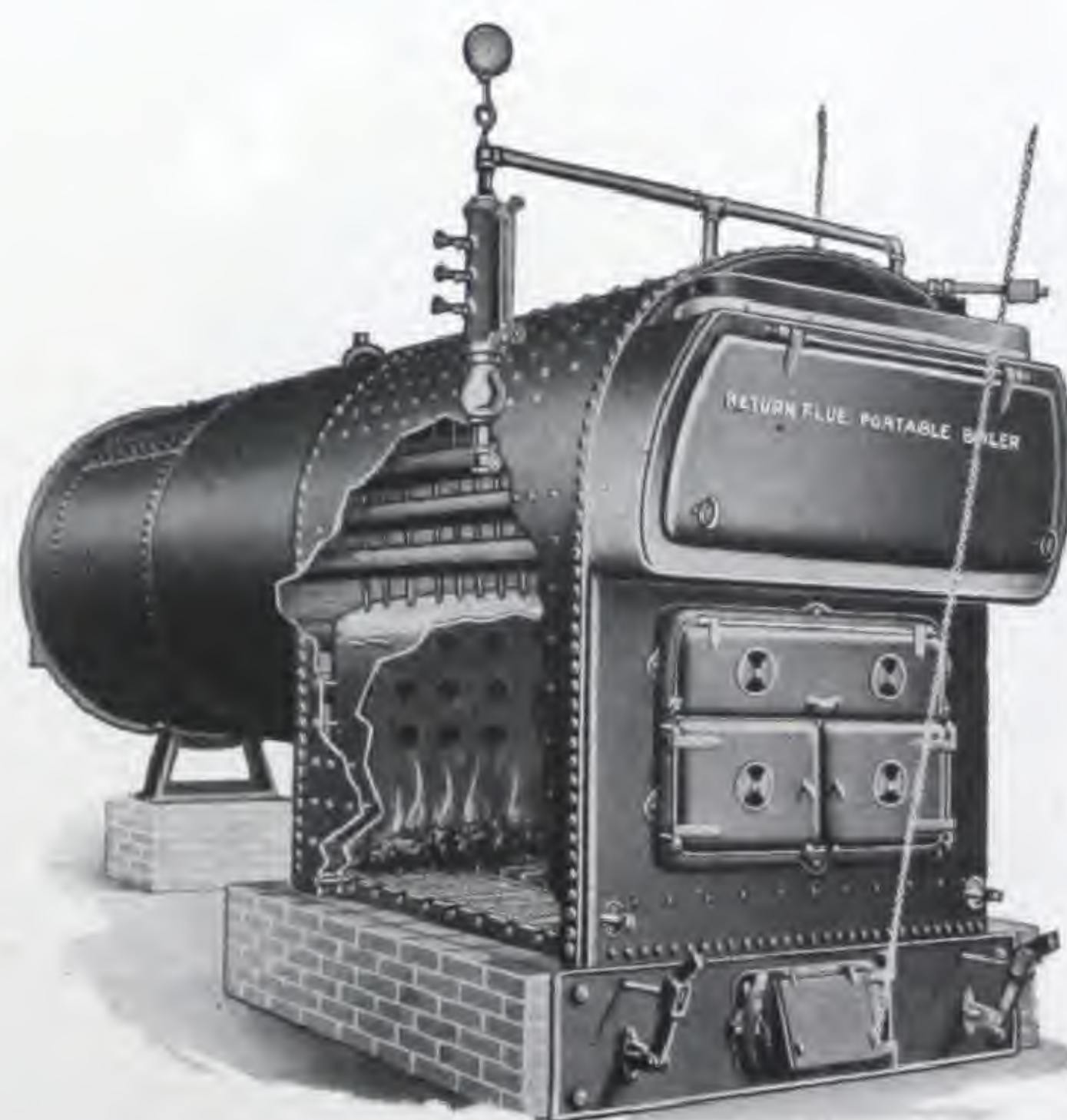
TAYLOR-FORBES PORTABLE FIREBOX HEATING BOILERS



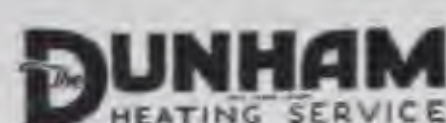
STANDARD TYPE (PORTABLE)

BOILERS NO. 407, 408 AND 409
ARE FURNISHED WITH CAST IRON
ASH PIT

BOILERS NO. 307, 308 AND 309
ARE FURNISHED WITH CAST IRON
ASH PIT



SMOKELESS TYPE (PORTABLE)
SPECIAL CATALOGUE SUPPLIED ON REQUEST.



C. A. DUNHAM COMPANY LIMITED

1523-41 DAVENPORT ROAD,
TORONTO, ONT.

BRANCH SALES OFFICES:

OTTAWA—BOOTH BUILDING.
HALIFAX—MCCURDY BUILDING.
WINNIPEG—TRIBUNE BUILDING.
CALGARY—514 MCLEAN BLOCK.

LONDON—233A REGENT STREET, W.I.
PARIS—64 RUE DE ROCHER.

TORONTO—229 COLLEGE ST.
VANCOUVER—STANDARD BANK BLDG.
MONTREAL—NEW BIRKS BLDG.
ST. JOHNS, NFLD.—406 WATER ST.



Several hundred installations, comprising Educational Institutions, Provincial and Dominion Government Buildings, Industrial Plants, Hospitals, Hotels and Residences, make up the scope of Dunham Systems. Particulars gladly supplied on request.

OUR AIM is three-fold: to provide first an Organization, second a Service, and third a Product, all of which will stand for and be recognized as the highest in the art of heating.

ORGANIZATION: Our Company and the Organization within it is the largest engaged exclusively in the manufacture and sale of Heating Specialties and Systems.

SERVICE: "Better and more economical heating," has been the slogan that has built our Service Department. To assist clients in the proper and best application of our products, we have a Service Department made up of a corps of Engineers as well as many Branch Sales Offices whose duty it is to keep in touch with every Dunham installation and to assist clients and customers in securing the greatest efficiency and satisfaction from Dunham Heating. Through our Branch Sales Offices and Service Department we make inspection of Dunham Heating Systems and furnish suggestions for operating, to secure best results.

We suggest that clients advise us when contemplating the use of Dunham Systems, that we may effectively render this service. We will check plans and specifications free of charge, or we will prepare heating plans and specifications of Dunham Systems for a nominal charge.

PRODUCTS.

PRODUCT: The Dunham Products are the leaders of their kind and all Dunham Specialties are made of the highest grades of suitable materials, by specially trained workmen in one of the most modern equipped plants in Canada. They are all made to a high standard and so proven by tests before shipment.

Specialties for use in connection with the Dunham Systems of Heating, known according to its several adaptable forms as follows:—The Dunham Home Heating System, the Dunham Return System and the Dunham Vacuum System, all two-pipe systems; and the Dunham Air Line System, a one-pipe system.

These Specialties are: The Dunham Radiator Trap; Dunham Drip Traps; Dunham Blast Trap; Dunham Packless Radiator Valve; Dunham Air Eliminator; Dunham Return Trap; Dunham Oil Separator; Dunham Suction Strainer; Fisher Reducing Pressure Valve and Vacuum Pump Governor; Dunham Air Line Valve; Dunham Return Pumps.

THE CONSULTING ENGINEER.

This is an age of specialization and a great need for economy in operation of all mechanical equipment in buildings. The most successful architects are recognizing the value of the services of reputable Consulting Engineers to handle their mechanical problems, among which might be mentioned power plant apparatus both steam and electrical, heating and ventilating equipment, plumbing and electric wiring.

The service rendered by Consulting Engineers is valuable and the fees charged are reasonable. Our organization has no service to offer outside the scope of heating, but we are ready at all times to co-operate with Consulting Engineers, Architects and Contractors, to furnish special details and information instructive as to the best way of installing and using Dunham products.

DUNHAM RADIATOR TRAP.

The simplicity of the Dunham Radiator Trap is very apparent. It comprises a body, a cover, and the thermostatic disc which is secured in the cover. There are no loose parts, no sliding contacts, and no guide or pin to obstruct the valve opening. There is a flat valve and seat with liberal valve opening. The position and design of the valve is such that it is self-cleaning. The action of the disc is positive, and the valve seats squarely, like a globe valve, the tightest of all types of valves, and one presenting little opportunity for uneven wear. The body is standardized, also the cover and disc, thus giving the further advantages of interchangeable parts.

The function of the Dunham Radiator Trap is to conserve heat, and thus fuel, by keeping radiation and piping at the point of maximum efficiency. To do this the working part of the trap, the Dunham Thermostatic Disc, must be and always is fully exposed to the actual conditions within the radiation, and it therefore responds instantly to any change taking place therein, automatically releasing air and water of condensation, and closing to prevent waste of unused steam. It not only saves steam, but clears the space which should be occupied by steam from air and water—enemies of high efficiency.

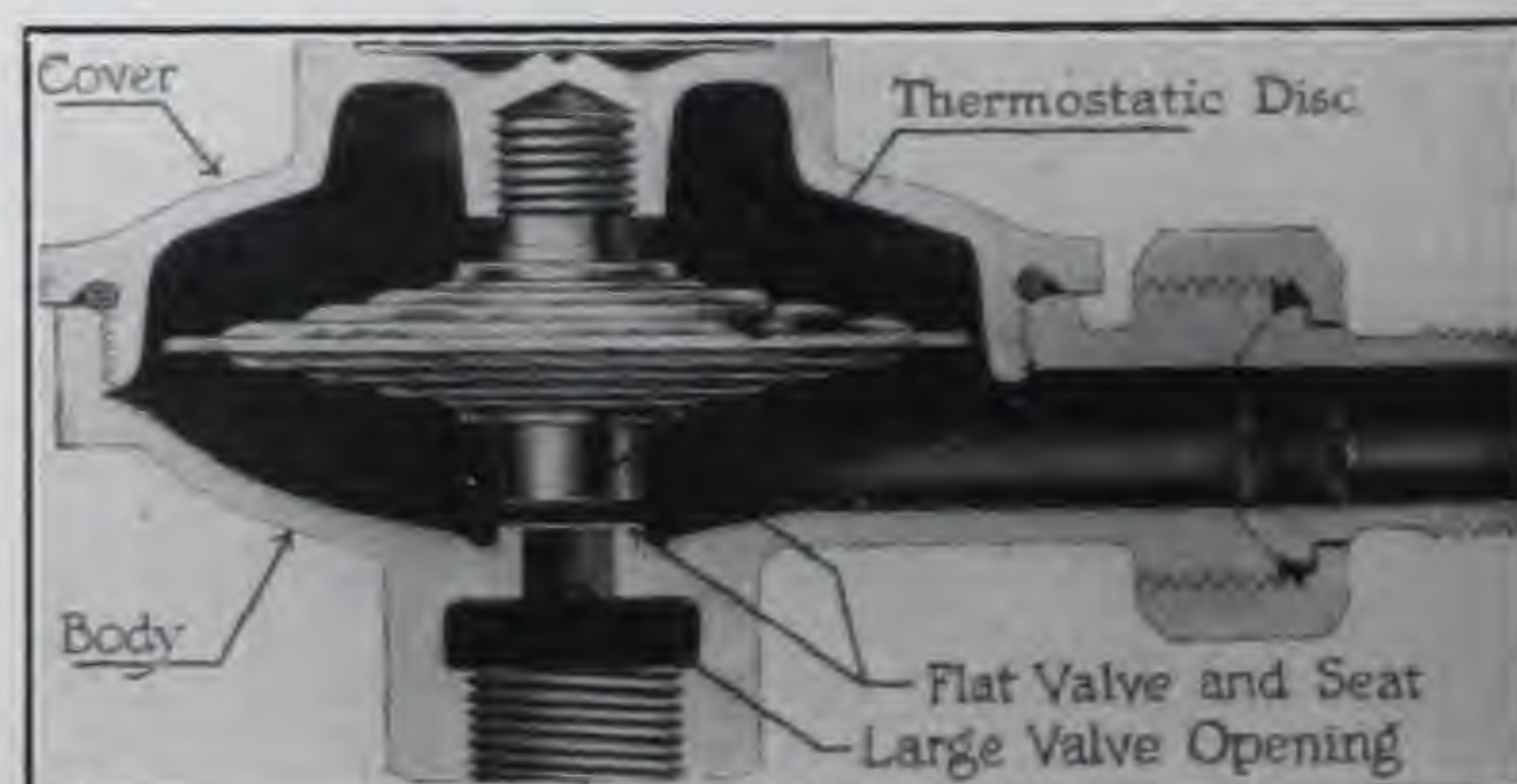
This trap was the first of its kind to be a commercial success, and it has maintained its leadership since 1903. It has therefore stood the test of time. It is made in 5 sizes, and for steam pressures not to exceed 10 lbs. gauge.

See Dunham Bulletin No. 101 for full description and application.

CAPACITIES

DUNHAM RADIATOR AND DRIP TRAPS.
FOR PRESSURES NOT EXCEEDING 10 LBS. GAUGE.

Size.	Pipe Connections.	Weight.	Cap. Sq. Ft. Radiation.
No. 1...	1/2"	26 oz.	100
No. 2...	1/2"	46 oz.	350
No. 3...	3/4"	53 oz.	400
No. 4...	3/4"	12 1/2 lbs.	1500
No. 5...	1"	21 lbs.	3000



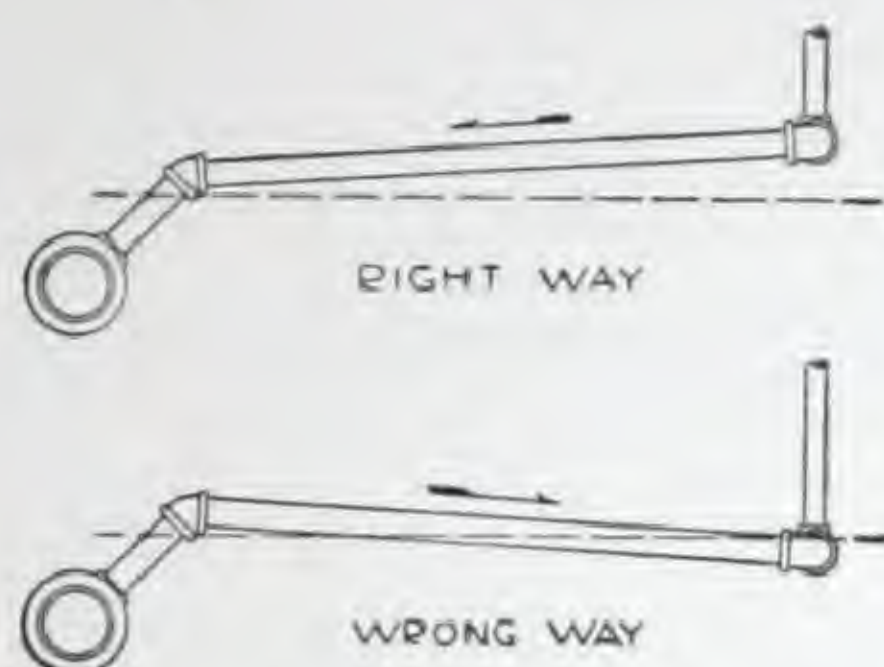
RADIATOR CONNECTIONS.

The size of radiator connections for Dunham Systems is shown here—when supply is at top of Radiator:—

Sq. Ft. Radiation.	Inlet.	Return.
1 to 40	$\frac{1}{2}$ "	$\frac{1}{2}$ "
41 to 100	$\frac{3}{4}$ "	$\frac{1}{2}$ "
101 to 180	1"	$\frac{1}{2}$ "
181 to 250	$1\frac{1}{4}$ "	$\frac{1}{2}$ "

SPRING CONNECTIONS.

The importance of having proper grade in spring connections between steam main and riser and between riser and radiator cannot be impressed too strongly. Care must be used to avoid pockets when expansion in risers occur, if free, unobstructed circulation is to take place. See detail below.



DUNHAM BLAST TRAP.

The Dunham Blast Trap, shown here, is a trap of capacity large enough to drain Blast Heating Coils. Thousands of them are in use in all parts of the country. This trap operates upon precisely the same principle as the Dunham Radiator Trap. In fact, it is a large Dunham Radiator Trap with body made of cast iron, instead of bronze. The working parts are made of the same material as the working parts of the Dunham Radiator Trap.

CAPACITIES.

FOR PRESSURES NOT EXCEEDING 10 LBS. GAUGE.

No.	Size.	Pipe Connection.	Capacity Sq. Ft. of Direct Rad.	Weight, Pounds.
6	$\frac{3}{4}$ "	$\frac{3}{4}$ "	1,500	12 $\frac{1}{2}$
7	1"	1"	3,000	21

Be sure and reduce blast surface to equivalent direct radiation, by multiplying the actual surface of the coil by a factor ranging from 3 to 9, depending upon the temperature and volume of the air that is blown over the coils.

These traps can be installed either angle or straightway. Only made for pressures up to 10 lbs.

See Dunham Bulletin No. 102 for full description.

DUNHAM AIR LINE SERVICE VALVE.

Principle of operation is identical, and design similar, to the Dunham Radiator Trap. Its efficiency is high, and service in connection with air line systems is invaluable. This is for one-pipe steam system using a Dunham air line valve on each radiator in place of the usual sputtering air valve, with a system of air line piping which may discharge the air by gravity or be attached to a suitable air line vacuum pump. This system is particularly adaptable in making old one-pipe heating systems more efficient. It is easily and cheaply installed, and insures the quick removal of air from the radiators. Valves can be furnished with $\frac{1}{8}$ " radiator connection.

See Dunham Bulletin No. 107 for description and application.

DUNHAM PACKLESS RADIATOR VALVE.

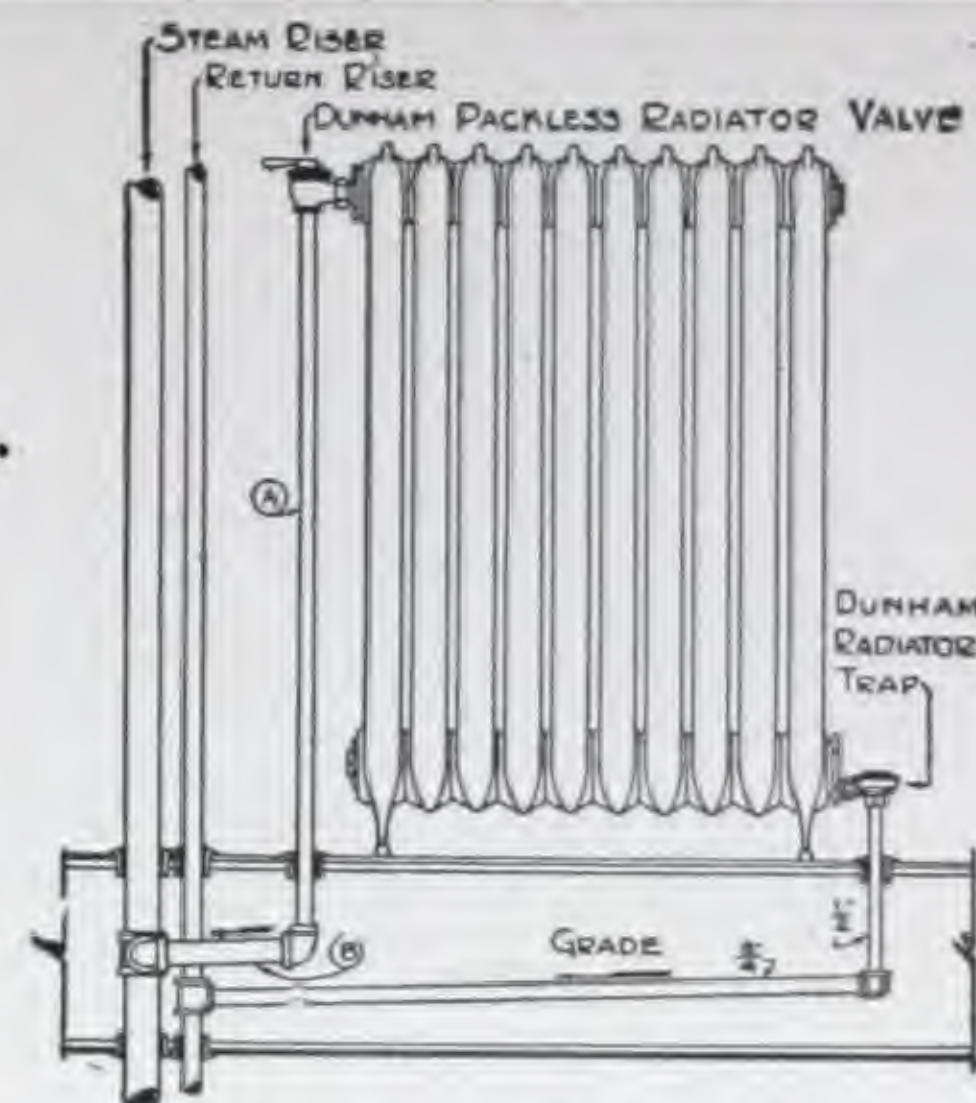
This is a bona-fide packless radiator valve and not one dependent upon springs and packing rings. The Dunham disc makes this possible. It has a low bonnet and stem and unusual lines, making it attractive in appearance. The valve can be opened or closed in seven-eighths of a turn. It is made only in the angle pattern for use in a top radiator connection. Sizes and capacity for direct cast iron radiation: $\frac{1}{2}$ "—40 ft.; $\frac{3}{4}$ "—41 to 100 ft.; 1"—101 to 180 ft.; $1\frac{1}{4}$ "—181 to 250 ft. Packless valves are required in all vacuum heating work.

See Dunham Bulletin No. 104 for description.

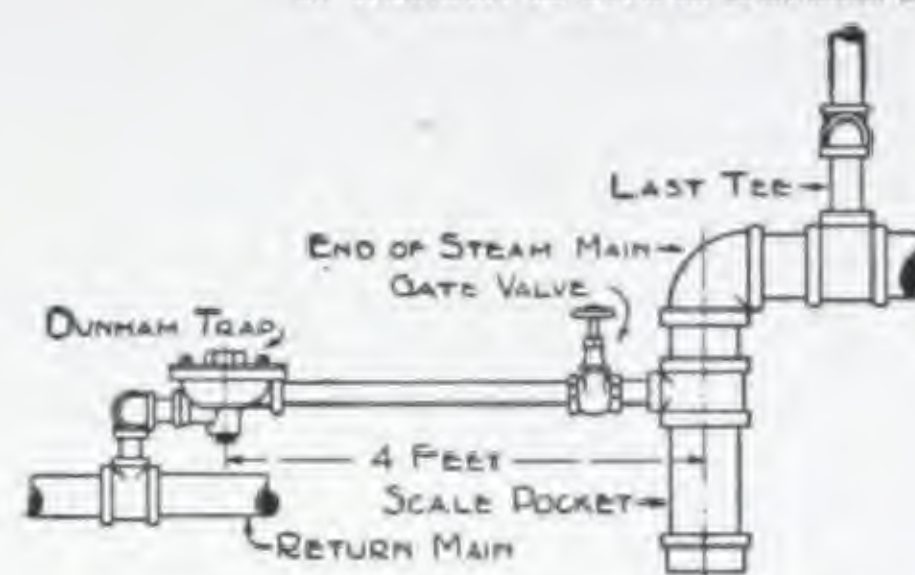
USING DUNHAM PRODUCTS.

The Dunham system of heating may be further described in its several adaptable forms to peculiar conditions by the following sub-names: The Dunham Home Heating System, as its name implies, for the home or small building. The Dunham Return System, for the medium size building, the apartment house, the small school, factory, and church, also for changing over and increasing the efficiency of old one-pipe and two-pipe gravity steam jobs. The Dunham Vacuum System for still larger buildings of all types, for groups of buildings, factories, schools, colleges, hospitals, and for municipal or central heating plants.

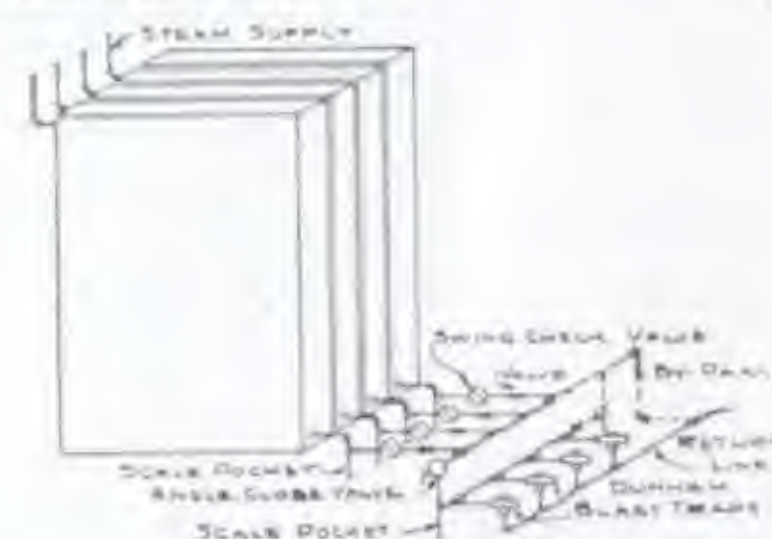
Each of these several designs are complete two-pipe systems, the great efficiency of which is made possible by the use of the Dunham Radiator Trap, which is installed at the discharge or return outlet of each radiator or pipe coil, where it stands guard against the waste of steam and constantly relieves the radiation of the enemies of heating efficiency—air and water.



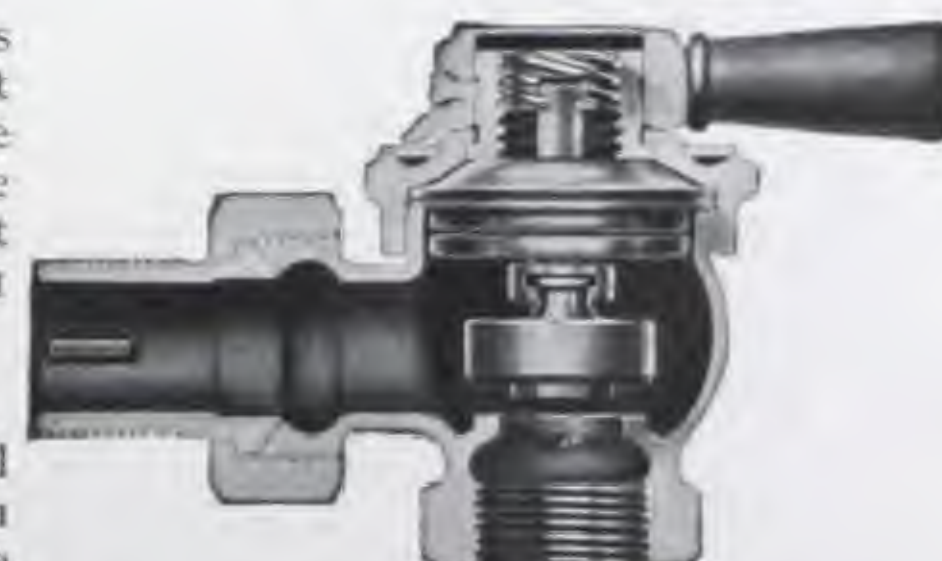
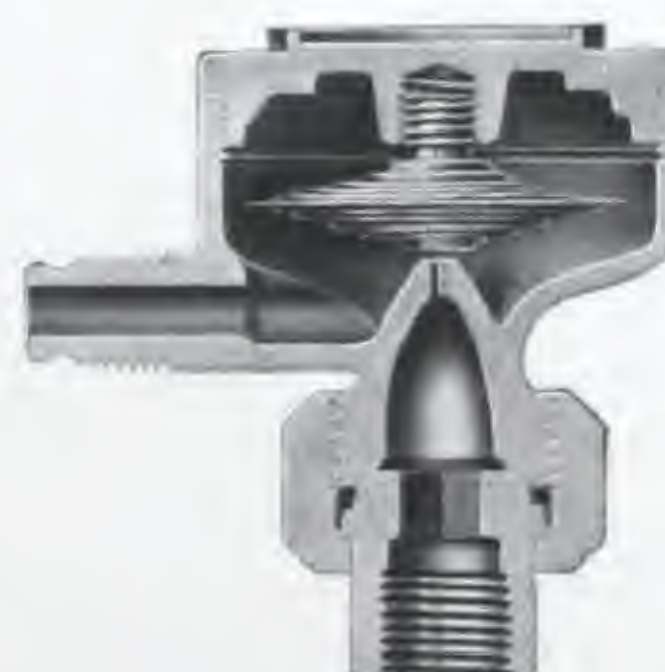
DETAIL No. 1.—Showing Top Supply Connection to Radiator as used in Dunham System of Heating.



DETAIL No. 2.—Showing method of Draining End of Steam Main when Return Line is below Steam Main.



DETAIL No. 3.—Showing Method of Applying Dunham Blast Traps to Blast Heaters.



DUNHAM HOME HEATING SYSTEM.

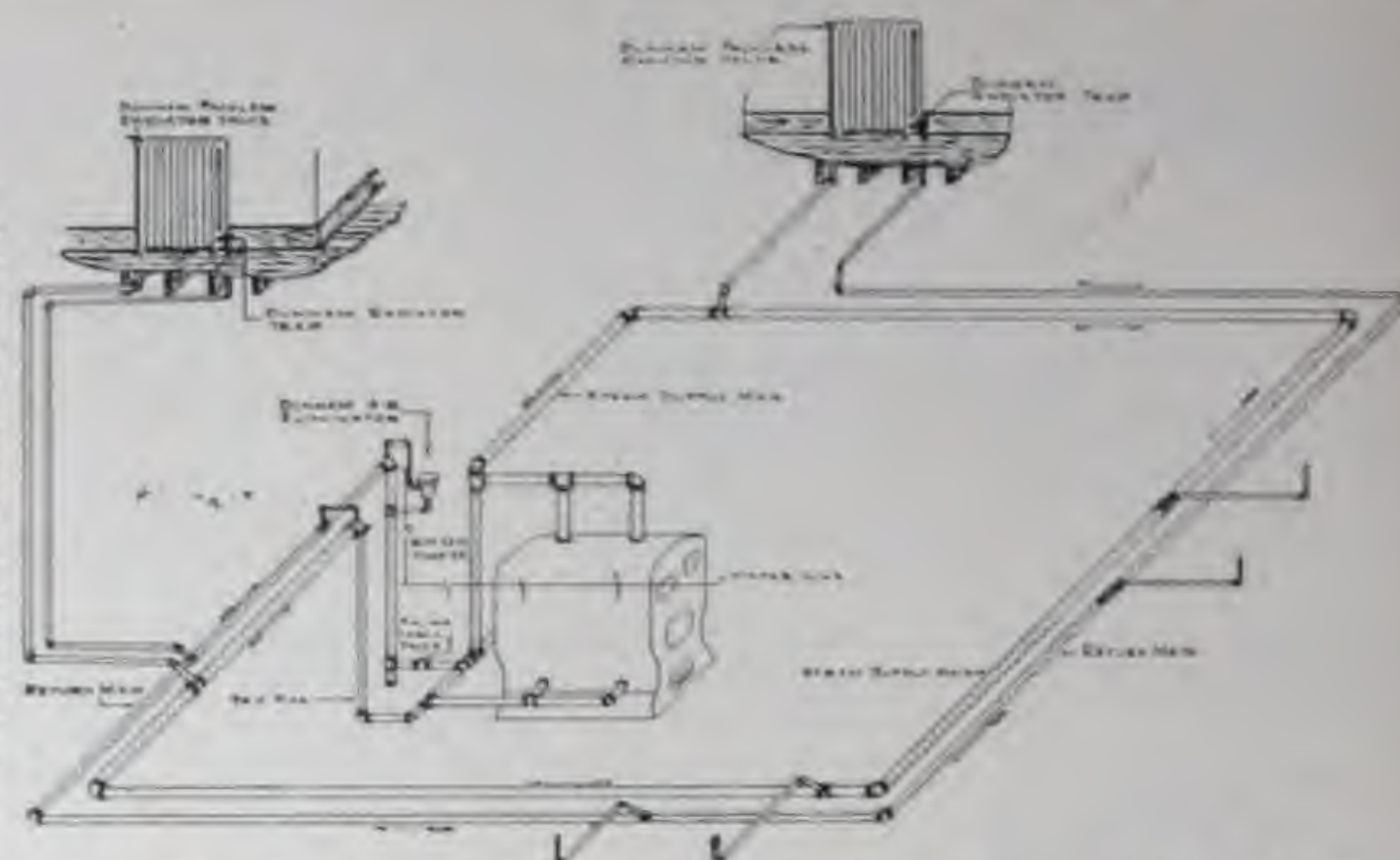
No system could be more simple in arrangement and design, or more easy or efficient in operation. Steam at a pressure not exceeding 8 oz. is used: it leaves the boiler and passes through liberal sized, though not large, steam piping and through Dunham Packless Radiator Valves to each radiator, where it is retained by the Dunham Radiator Trap until it has given off its heat, when, as water, it passes through the trap together with the air (no sputtering, leaky, "abominable" air valves are used on the radiators) and back to the boiler through the return piping, the air being freed through the Dunham Air Eliminator, and the water returning back into the boiler without the use of any mechanical device.

The end of each steam main is vented through a Dunham No. 1 Radiator Trap into the return piping and is dripped through a wet drip line directly back to the boiler. All radiators used shall be of hot water pattern with top inlet and bottom outlet connections.

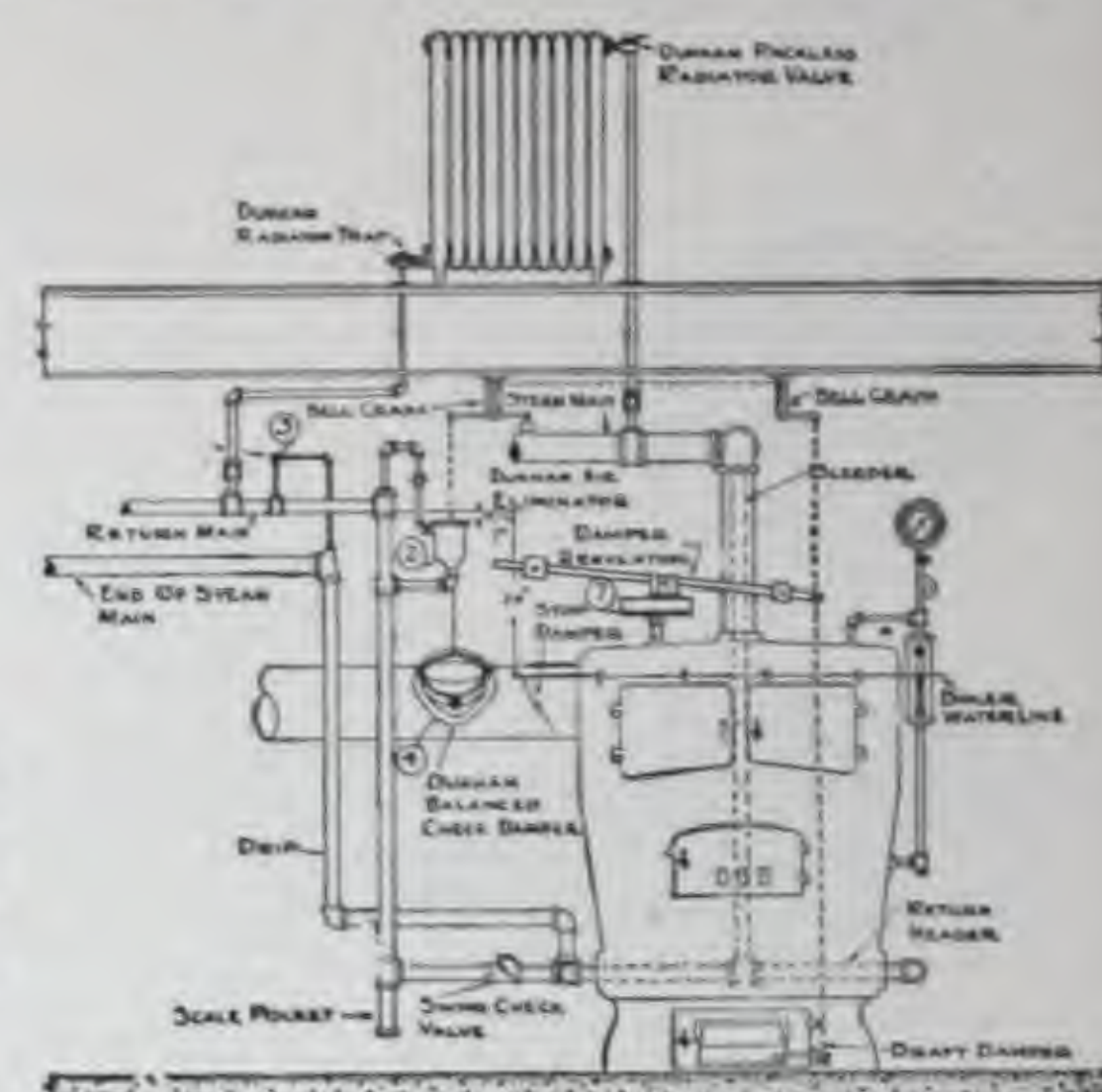
The high efficiency of operation is obtainable because of the opportunities for effective steam distribution, and this is assisted by the Dunham Damper Regulator effectively controlling the steam pressure on the boiler.

Specify the Dunham Home Heating System using Dunham Packless Radiator Valves and Dunham Radiator Traps in supply and return connection to and from each radiator, Dunham Air Eliminator to release the air, and Dunham Damper Regulator to control dampers: each and all to be installed in accordance with instructions and standard detail drawings to be supplied by the C. A. Dunham Co. Ltd.

See Dunham Bulletin No. 108 for full description and application.



DETAIL No. 8.—Showing Typical Piping Plan of Dunham Home Heating System.



DETAIL No. 9.—Showing Typical Boiler Piping and Connections, Dunham Home Heating System.

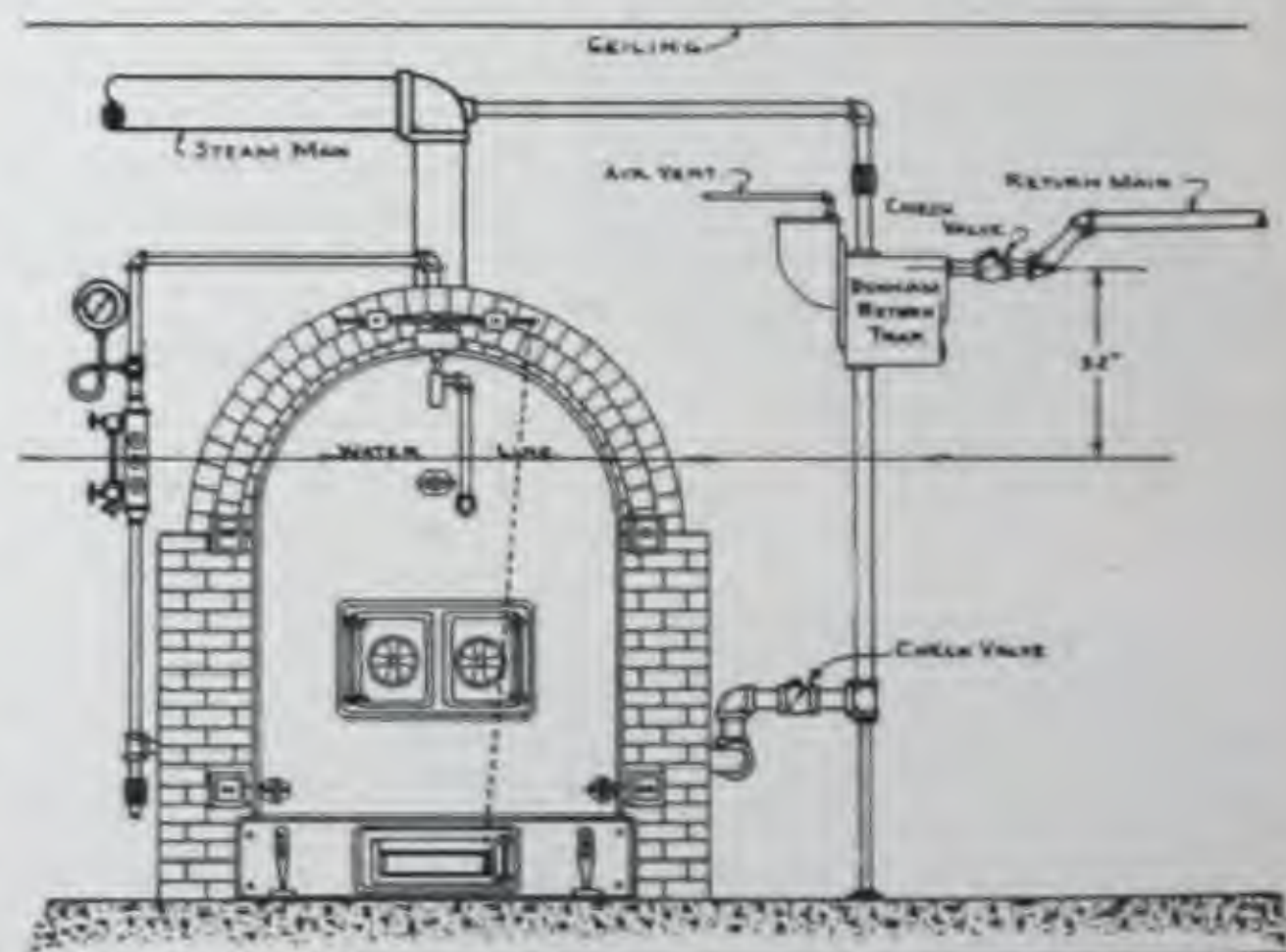
HOW TO SPECIFY.**DUNHAM RETURN SYSTEM.**

This system comprises the simplicity in arrangement and design now so well known in the Home Heating System, and it is accompanied by the same opportunity for maximum efficiency. It differs from the Home Heating System in that it makes use of the Dunham Return Trap, or a Dunham Automatic Return Pump to replace the Air Eliminator, which introduces the added feature of a positive automatic return of water to the boiler when desired to raise steam pressure.

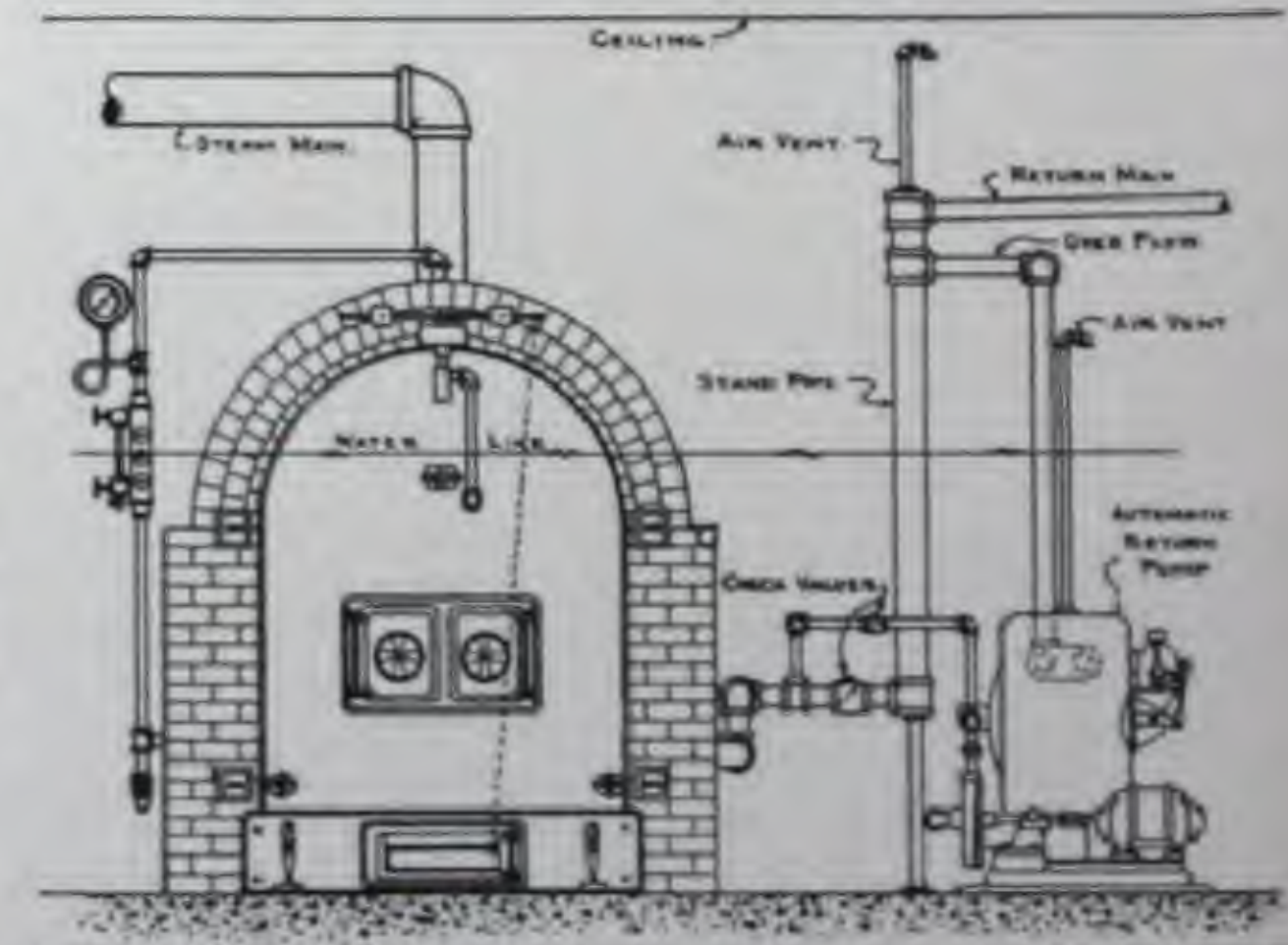
The feature of a positive return under varying steam pressures makes this Dunham system particularly adaptable to apartment houses, small hotels and medium-sized commercial buildings, schools and churches. Above all, however, this system makes possible the modernizing of old one-pipe and two-pipe gravity flow systems, materially increasing their efficiency by the introduction of the Dunham Radiator Trap at each radiator, insuring a positive circulation without loss of steam, and permitting the removal of all sputtering, leaking air valves which are such trouble-makers in these old heating jobs. During these days when conservation of fuel is of such great importance, this system presents the greatest opportunity for the most efficient and effective use of steam for heating purposes, and therefore will be a fuel saver.

Specify the Dunham Return System using Dunham Packless Inlet Valves connected at top of hot water type radiators and Dunham Radiator Traps at return end of radiators and Dunham Return Trap or Return Pump for releasing air and returning water to the boiler: each and all to be installed in accordance with instructions and standard detail drawings to be supplied by the C. A. Dunham Co. Ltd.

See Dunham Bulletin No. 109 for full description and application.



DETAIL No. 6.—Showing typical Boiler Connections for Dunham Return System, using Dunham Return Trap.



DETAIL No. 7.—Showing typical Boiler Connections for Dunham Return System, using Condensation Pump.

HOW TO SPECIFY.

DUNHAM RETURN PUMP.

The function of the Dunham Return Pump is the automatic return of condensate from the heating system to the boiler.

The units are simple and fool-proof and embody best possible material and workmanship. They consist of a centrifugal pump direct connected to electric motor, mounted on cast iron base, with receiver equipped with float controlled switch for "stopping" and "starting" the motor.

The switch is enclosed, of sliding contact type, and controls motor selected for this particular service. It is approved by the Ontario Hydro Power Commission, Laboratory License No. 361. Standard units are equipped with motors 110-220 volts, single phase, alternating current. Motors for other current can be supplied to conform to specification.



SPECIFICATION.

Pump No.	Type.	Capacity Sq. Ft. Direct Radiation.	Motor. Single Phase.	Speed.	Max. Lbs. Discharge Pressure.
25	1" R.L.P.	1,000 to 16,000	1 H.P. 25 cycle	1450	18
26	1" R.L.P.	1,000 to 16,000	1 H.P. 60 cycle	1750	20
27	1 1/4" R.L.P.	16,000 to 30,000	1 1/2 H.P. 25 cycle	1450	18
28	1 1/4" R.L.P.	16,000 to 30,000	1 1/2 H.P. 60 cycle	1750	20

Ratings are based on 1/4 lb. of condensate per square foot of direct radiation when pump is operating against maximum discharge pressure.

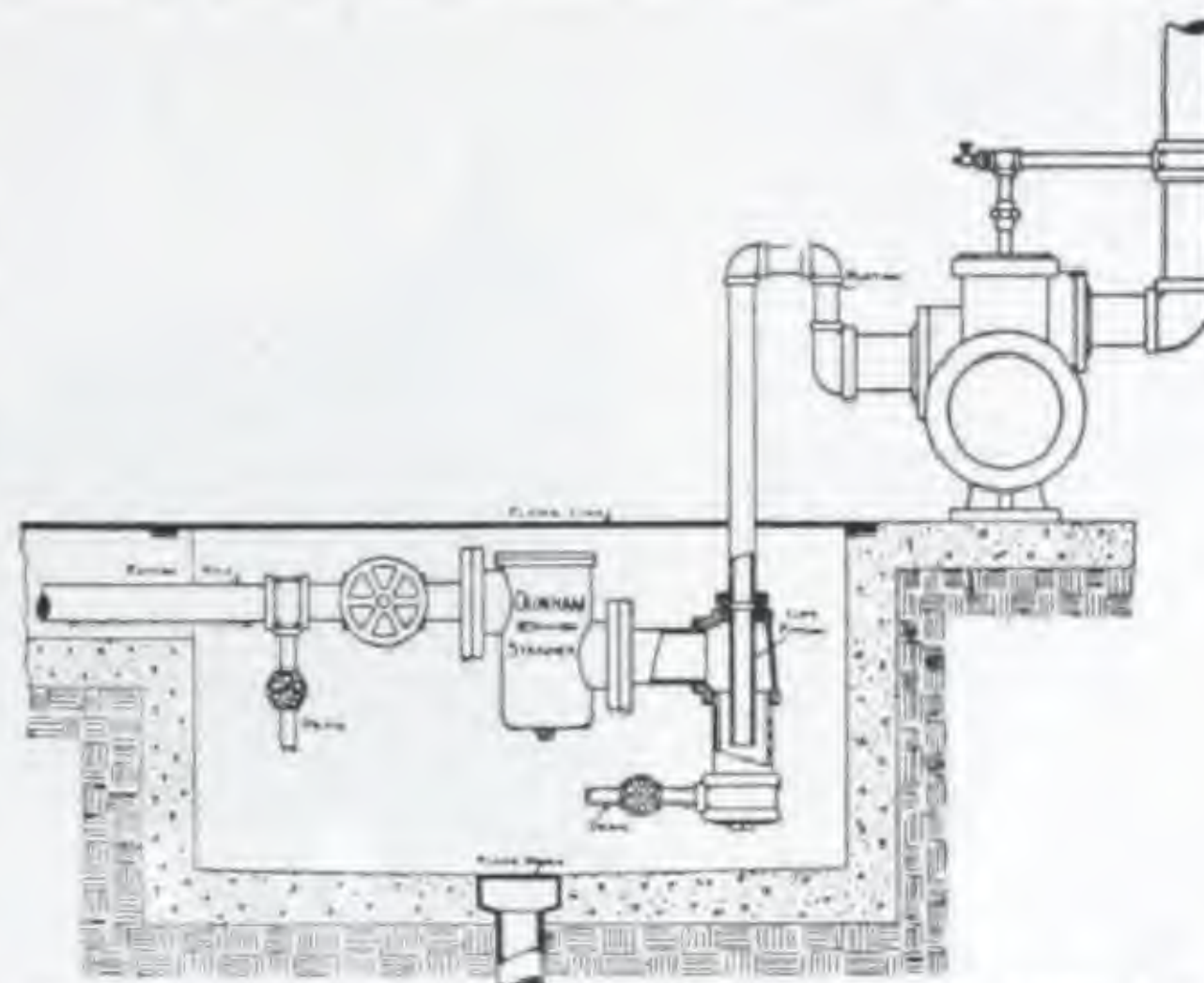
All units supplied complete with motors and arranged for cutting in directly across the line. Hand switch with fuses should be installed to cut off power from unit.

DUNHAM VACUUM SYSTEM.

Since 1903 the Dunham Vacuum System has been a leader, and it still stands at the front, easily maintaining its position because of the remarkable success as well as the high efficiency of the Dunham Radiator Trap and allied Dunham Specialties.

Simplicity again is the leading note of Dunham design. There is the system of steam mains and piping to supply all radiation, and the return piping to carry away the air and water of condensation. Steam may be supplied direct from boiler plant, or through pressure reducing valve where boiler pressure is too high (over 10 lbs. gauge) for direct service, or exhaust steam may be used, supplemented by live steam through a reducing valve.

The returns all converge and grade to the suction inlet of a vacuum pump, which may be either steam or motor driven, automatically controlled, and which may also act as a boiler feed pump. Where exhaust steam is used or where boiler pressure exceeds 10 lbs., the discharge from the vacuum pump should go to a freely vented automatic receiver of a boiler feed pump, the vacuum pump not being used directly to feed the boiler.

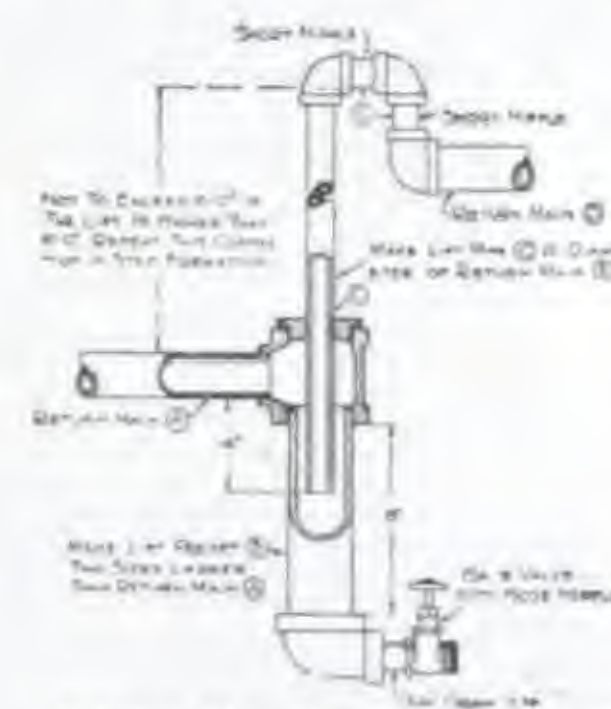


DETAIL NO. 10.—Showing Arrangement of Vacuum Pump when returns are below the pump.

HOW TO SPECIFY.

Specify the Dunham Vacuum System using Dunham Packless Radiator Valve and Dunham Radiator Trap in the supply (at top) and return (at bottom) connections to and from each radiator (of hot water type), Dunham No. 3, 4 or 5 Traps for dripping risers and mains. Dunham Blast Traps for all Blast Coils. Dunham Pressure Reducing Valves for reducing the steam pressure or automatically supplementing exhaust steam, Dunham Oil Separator for removing oil from exhaust steam, Dunham Strainer for keeping dirt and scale from vacuum pump. Dunham Vacuum Pump Governor for automatically starting and stopping the steam-driven vacuum pump to maintain desired amount of vacuum in return piping: each and all to be installed in accordance with instructions and standard detail drawings to be supplied by the C. A. Dunham Co. Ltd.

See Dunham Bulletin No. 110 for full description and application.



DETAIL NO. 11.—Showing Construction of Lift in a Vacuum Return Line.



GRAND TRUNK CENTRAL STATION, OTTAWA.



BURWASH HALL, TORONTO UNIVERSITY, TORONTO.

These installations, under necessity of greater economy and more satisfactory heating, have been changed from various types of systems to Dunham. Could there be a better testimonial for the quality of Dunham Heating which comes from the use of Dunham Products and Dunham Service? Complete information and closest co-operation given on request.

LA COMPAGNIE C. A. DUNHAM LIMITÉE

DESSINATEURS DES SYSTÈMES COMBINÉS POUR CHAUFFAGE ET VENTILATION,

904 NEW BIRKS BUILDING, MONTRÉAL, P.Q.

SUCURSALES:

HALIFAX.

OTTAWA.

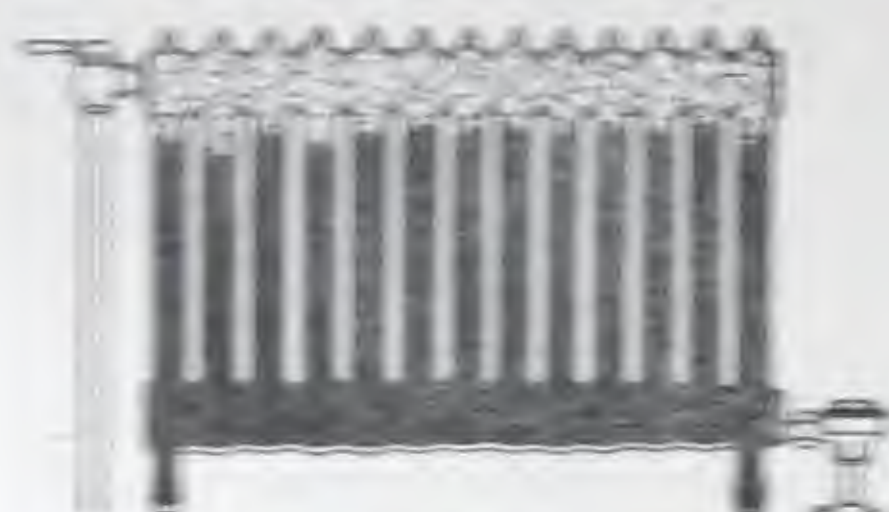
TORONTO.

WINNIPEG.

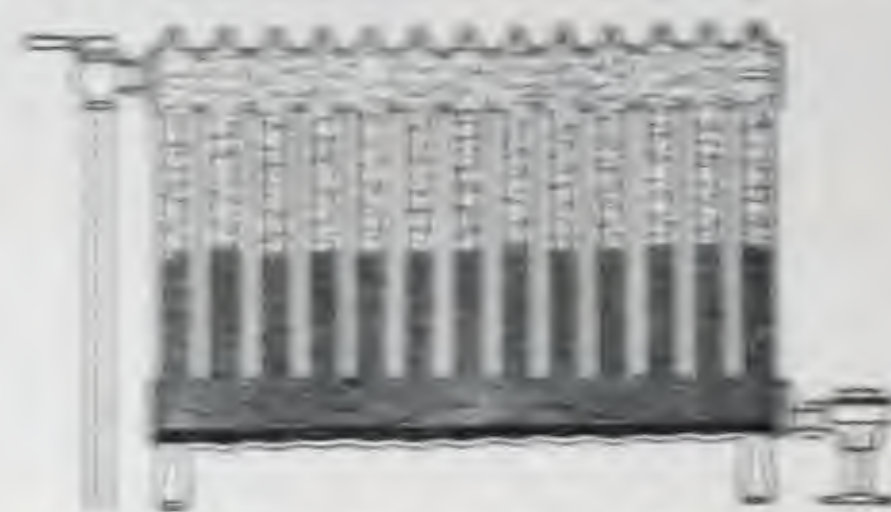
VANCOUVER.

CALGARY.

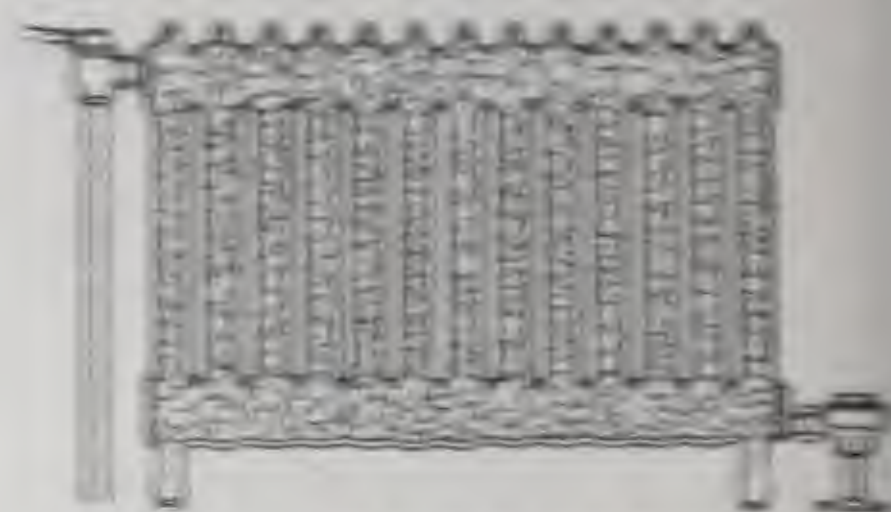
Les appareils Dunham sont de fabrication canadienne.



La vapeur entre et l'air passe à travers la trappe.



La vapeur pénètre de plus en plus, l'air et l'eau s'échappent par la trappe.



La vapeur remplit le radiateur et s'est accumulée par la trappe.

ÉCONOMIE.

Le Grand Hôtel, Québec.
Chauffé par le système Dunham.

jusqu'à condensation. Nos tuyaux sont plus petits que ceux des systèmes de chauffage à eau chaude. Les tuyaux et les radiateurs ne peuvent geler; on peut même fermer les radiateurs dans les chambres inoccupées sans aucun danger qu'ils gèlent, car la condensation quitte le radiateur aussitôt qu'il est fermé.

Les systèmes Dunham sont à deux tuyaux dont l'un alimente de vapeur les radiateurs; l'autre est un tuyau de retour. Une trappe Thermostatique Dunham est placée entre le radiateur et le tuyau de retour.

Les trappes Thermostatique Dunham permettent l'éjection de l'eau et de l'air du radiateur, tout en empêchant la vapeur de s'échapper.

Le système de chauffage par le vide Dunham fonctionne parfaitement avec une pression d'une livre et même d'une demi-livre de vapeur. C'est un système idéal pour les édifices publics, hôpitaux, écoles et autres édifices se servant d'un système central de chauffage.

Le système de chauffage par vaporisation de Dunham fonctionne avec quelques onces de vaporisation—c'est un système parfait pour résidences privées, bureaux, églises, etc.

Les systèmes Dunham peuvent combiner le chauffage et la ventilation. Ils sont en conséquence hautement recommandés pour les écoles, collèges, convents, salles publiques, clubs, théâtres, églises et hôpitaux.

La Compagnie C. A. Dunham Limitée possède des ramifications dans sept grands centres canadiens, ce qui permet d'assurer l'installation parfaite des systèmes Dunham et leurs inspections régulières subséquentes.

Notre personnel d'ingénieurs experts fournira tous les renseignements que vous puissiez désirer concernant les divers appareils Dunham et vous avisera sur le type de chauffage qui répondra le mieux à vos besoins; que la construction à chauffer soit une résidence, une école ou un édifice public.

Il faut économiser le combustible—et cependant notre climat rigoureux exige une chaleur comparativement élevée durant les longs mois d'hiver.

La seule solution parfaite à ce problème du chauffage, c'est d'employer l'un des systèmes de Dunham, à basse pression de vapeur, car ils sont à la fois hygiéniques et économiques, et de plus, ils sont installés partout pour un prix très accessible.

Ces systèmes ne possédant aucunes soupapes d'air sur les radiateurs et les tuyaux, le danger constant que l'eau puisse couler et endommager l'aménagement se trouve par le fait même éliminé. Un autre des grands avantages offerts par les systèmes Dunham, c'est leur fonctionnement tout à fait silencieux—le bruit dans les tuyaux est entièrement supprimé.

La circulation se fait rapidement avec une température uniforme, et une très douce chaleur.

Toute la vapeur est conservée dans les radiateurs.

L'Hotel Dominion, Montréal.
Chauffé par le système Dunham.TRAPPES THER-
MOSTATIQUE
DUNHAM.SYSTEMES DE
CHAUFFAGE PAR
LE VIDE
DUNHAM.SYSTEME DE
CHAUFFAGE PAR
VAPORISATION
DE DUNHAM.

SERVICE.

FONCTIONNEMENT.

MISE EN MARCHÉ.

La Trappe Dunham donne au radiateur son maximum d'efficacité calorifique: elle permet à l'air et à l'eau de s'échapper du radiateur alors que seule y reste la vapeur.

Lorsque la Trappe Dunham est installée, le Disque Thermostatique est sujet aux mêmes conditions de pression et de température que l'intérieur du radiateur et son travail se fait dans ces conditions.

En pénétrant dans un radiateur froid, la vapeur chasse l'air froid à travers la Trappe dans le tuyau de retour. En chauffant le radiateur, la vapeur perd de sa chaleur et de ce fait, se recondense à l'état d'eau. L'eau plus lourde que la vapeur, coule au fond du radiateur, revient au Trappe et de là, dans le tuyau de retour.

Après avoir chassé l'air la vapeur remplit le radiateur et suit l'eau jusqu'au Trappe qui, au contact de la vapeur plus chaude que l'air et l'eau se ferme automatiquement. La chaleur de la vapeur vaporise le liquide contenu dans le disque et qui, en se gazéifiant, dilate celui-ci, fermant la valve qu'une puissante pression maintient sur son siège. La vapeur reste donc tout entière dans le radiateur.

Le radiateur complètement rempli de vapeur répand de la chaleur, condense la vapeur uniformément. L'eau coule régulièrement vers la Trappe qu'elle refroidit quelque peu, ce qui est suffisant pour le faire s'ouvrir et permettre à l'eau de passer.

MARCHE NORMALE.

Le contact alternatif de la vapeur et de l'eau aurait pour effet d'ouvrir et fermer la Trappe par saccades. En réalité l'ouverture et la fermeture se règlent lentement à la façon d'un thermomètre qui s'adapte à la température ambiante. L'écoulement d'eau devient alors continu et tel que l'eau ne reste pas en contact avec la surface radiante, mais que la vapeur ne peut passer.

INSTALLATION.

Les Trappes Dunham et le système de chauffage Dunham qui s'adapte si parfaitement à n'importe quel genre de bâtiment quelle que soit son importance, peuvent être installés par n'importe quel entrepreneur de chauffage compétent. Elles sont préconisées par les premières maisons spécialistes en matériel pour les installations de chauffage.

Il est important dans les installations comportant des Trappes Dunham de donner la pente nécessaire aux tuyauteries en général ainsi qu'aux tubes allant aux trappes. La tuyauterie doit être sans irrégularité de niveau et sans poches. L'efficacité des Trappes Dunham se maintient si cette règle est observée l'existence de poches d'eau rend la circulation de vapeur imparfaite.

EMPLACEMENT DES TRAPPES.

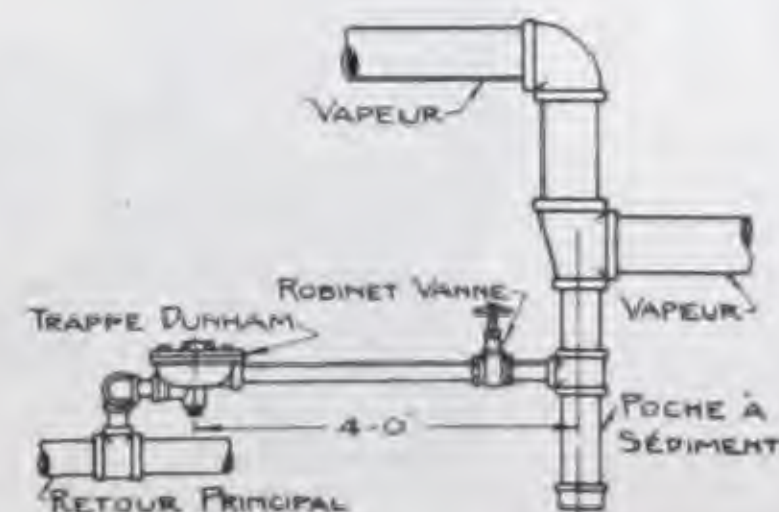
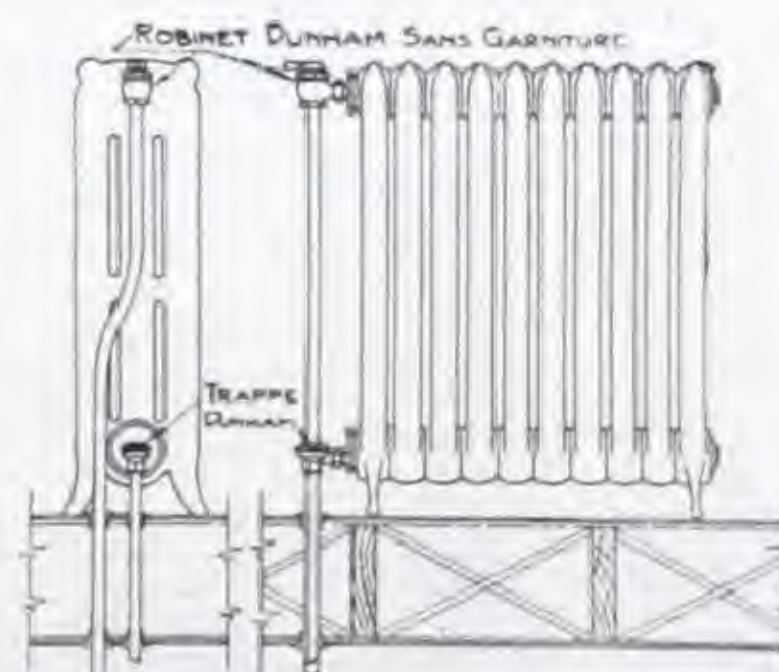
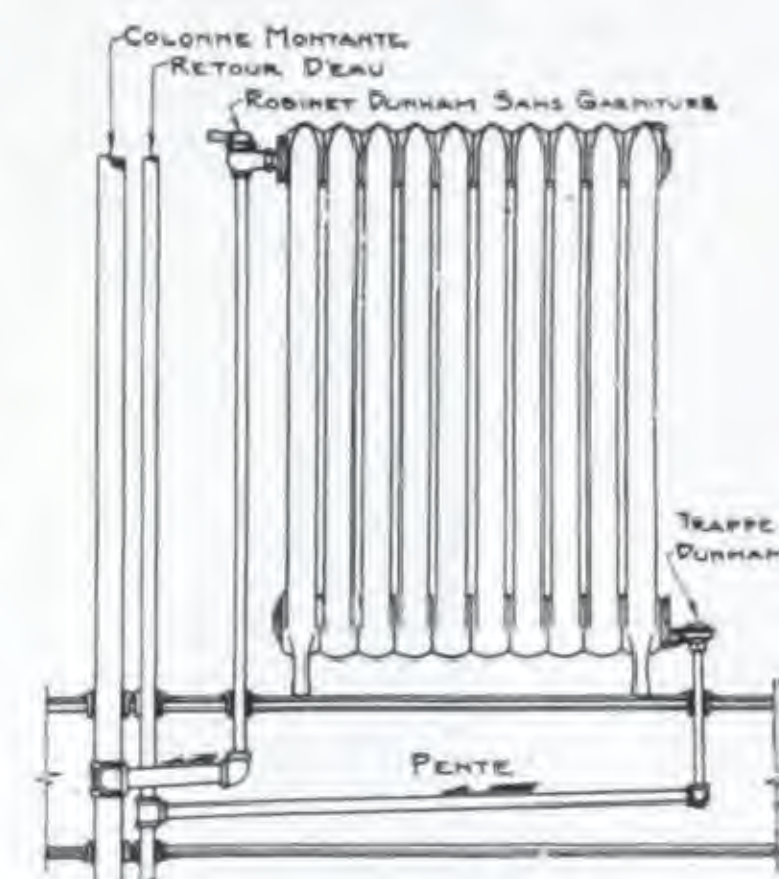
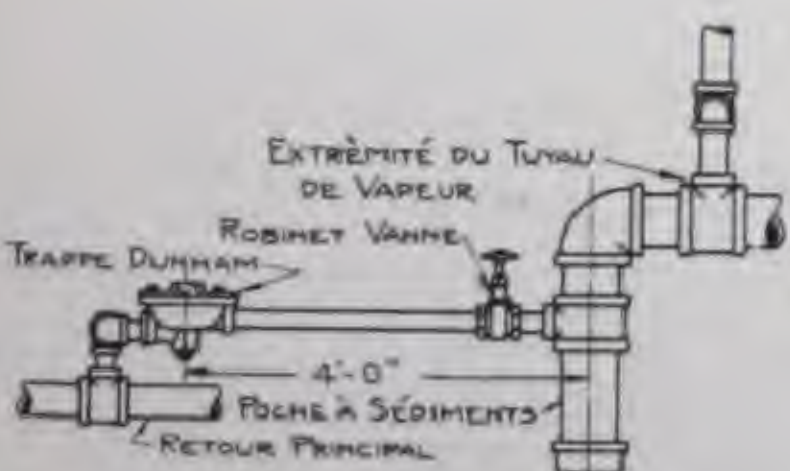
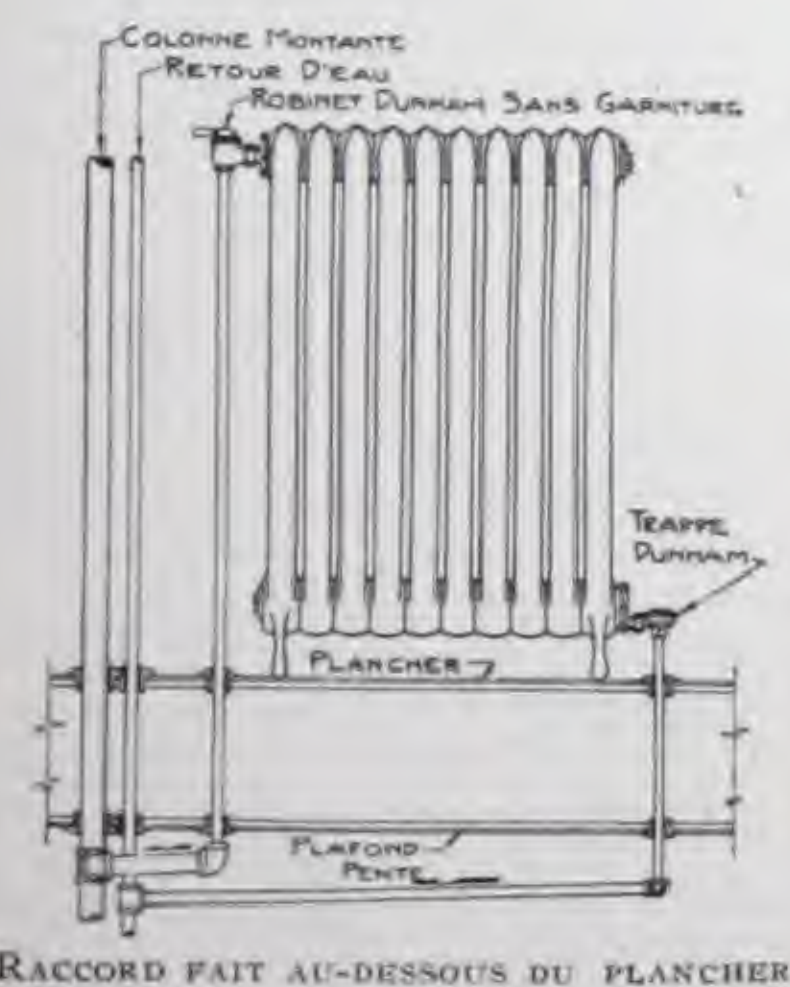
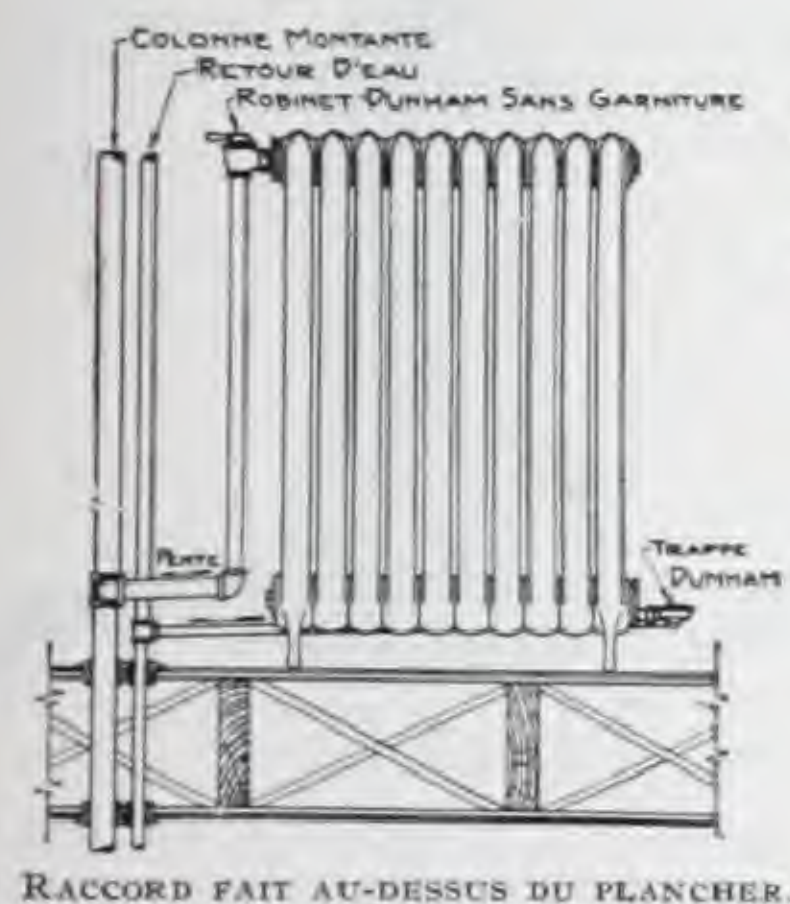
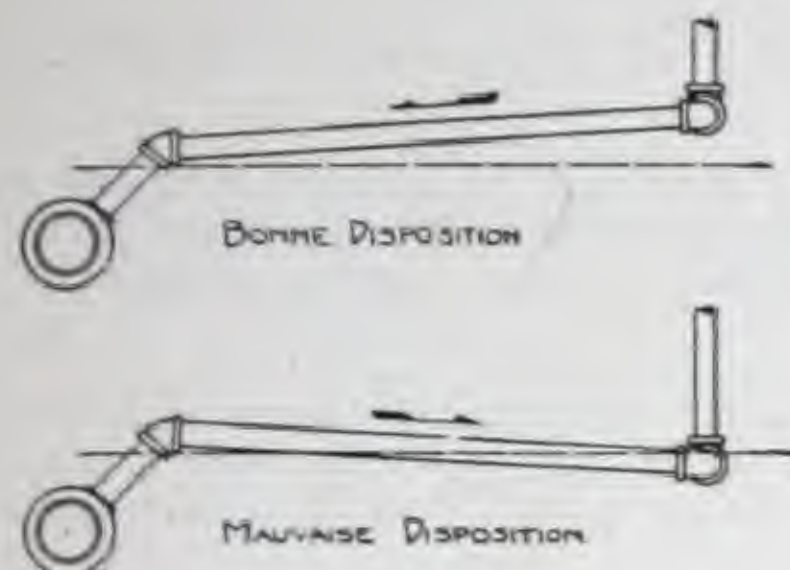
Les illustrations ci-contre montrent diverses méthodes d'installation des trappes sur les radiateurs. Les raccords de tuyauterie pouvant être faits au-dessus ou au-dessous du plancher ou dans son épaisseur même. Les trappes du modèle d'équerre avec les raccords appropriés sont préférables, quoique la Trappe Dunham puisse être livrée en modèle d'angle et en modèle droit, si c'est nécessaire. Les robinets d'admission seront montés de préférence à la partie supérieure des radiateurs qu'il est recommandable de choisir du type à eau chaude, c'est-à-dire à double connexion.

Dans le cas où il s'agit de purger des canalisations de vapeur vive, il est recommandé de monter l'appareil à l'extrémité d'un tuyau de 4 pied de longueur environ et d'aménager une poche à l'extrémité de la tuyauterie pouvant recueillir les impuretés. L'emploi d'une valve est également indiqué sur ce dernier dispositif.

Lorsque la trappe est employée à l'extrémité d'une canalisation principale, celle-ci devra être prolongée et munie d'une poche pour recueillir les impuretés. Les Trappes Dunham Nos. 4 et 5 sont généralement recommandées dans ce cas. Une montée ou dos d'âne dans une conduite principale est purgée comme il est montré ci-contre.

La colonne montante branchée sur une conduite principale se trouvant au-dessus exige une trappe particulier, celui-ci est alors installé comme le montre notre croquis. La Trappe No. 3 est préférable pour ce service à condition toutefois qu'il soit assez puissant.

Les Trappes Nos. 1 et 2 sont recommandées pour l'emploi sur radiateurs et ne sont pas conçus pour le service des tuyauteries d'écoulement ou des tuyauteries importantes.



HOFFMAN SPECIALTY CO., INC.

MANUFACTURERS OF VENTING DEVICES

MAIN OFFICE AND FACTORY:

BOSTON, MASS.

NEW YORK, N.Y.

WATERBURY, CONN.

CHICAGO, ILL.

LOS ANGELES, CAL.

PRODUCTS

STRAIGHT AIR VALVES, RETURN LINE VALVES, SIPHON AIR AND VACUUM VALVES, "AIR-LINE" VALVES, "QUICK-VENT" AIR VALVES, "QUICK-VENT-FLOW" AIR VALVES, "QUICK-VENT-FLOW" AIR AND VACUUM VALVES, TAPOR VALVES, EQUALIZING TAPOR, AIR SEPARATOR.

GUARANTEE

Upon request of the Architect we furnish the Owner a written guarantee covering the satisfactory operation of Hoffman Valves for a period of five (5) years from date of installation.

HOFFMAN VALVES

The design and construction of Hoffman valves are the result of over thirty years' experience in the heating business. We have devoted the last 16 years to the perfecting of dependable venting devices for low pressure steam heating systems, and through radical departures in valve design have been able to produce them. These devices are absolutely non-adjustable, therefore lead-proof, and perform automatically the functions for which they are designed.

Tests—All Hoffman valves are shipped ready to be put in place. They are thoroughly tested, accurately adjusted, and adjustment sealed before they leave the factory.

DETAILS

Every part of the Hoffman Valve is made of a composition alloy specially adapted for the particular requirements of the part. Valve Pins are of a special tough silver alloy. Diaphragms, phosphor bronze. Forged and Drawn Parts of a close grained composition that resists operating strains. All valves are heavily nickel-plated and present a neat, compact, serviceable appearance.

No. 1 HOFFMAN SIPHON AIR VALVE

Purpose—This valve is designed for use on gravity systems of steam heating.
Construction and Operation—The combined thermostatic member and float is a sealed metal chamber with a flexible diaphragm. It contains a volatile or heat sensitive fluid which vaporizes when the thermostat is in contact with steam, generating an internal vapor pressure which deflects the diaphragm and thereby closes the valve. The fluid is sealed in the float under a vacuum and is of such a nature that it is possible to keep the vent port either wide open or shut tightly with no intermediate position. Such positive action permits all air to escape from the radiator, for full vent port opening is maintained until steam reaches the valve when instantaneous closure is made.

The action of the fluid during venting period is as follows:—Air at a temperature of 180° or less has no effect on the fluid pressure. With temperatures above 180° vaporization commences, but as the vaporization takes place under a vacuum no internal pressure will be generated which will affect the diaphragm action until 205° is reached. At this point vapor pressure begins to exceed atmospheric pressure and with temperatures between 205° and 207° the internal vapor pressure forces the diaphragm outward thus instantly closing the vent port. The result of this sensitive valve action is that all air is vented from the radiator, whether cold or heated, through a wide open vent port. Premature closing with the resultant loss in heating efficiency is eliminated as well as the disagreeable hissing which occurs with a partly closed vent port. The Hoffman Valve is noiseless in operation.

The sensitiveness of the valve in distinguishing between live steam and heated air insures full efficiency of the radiator.

Another function of the float is to take care of any sudden charge of water within the radiator. The valve closes instantly against water leakage whenever water reaches it. When water in radiator drops away from valve, the siphon automatically discharges the water in the valve into the radiator without leakage, because the necessary replacing air flows into the valve through separate distinct channels as the water leaves the valve.

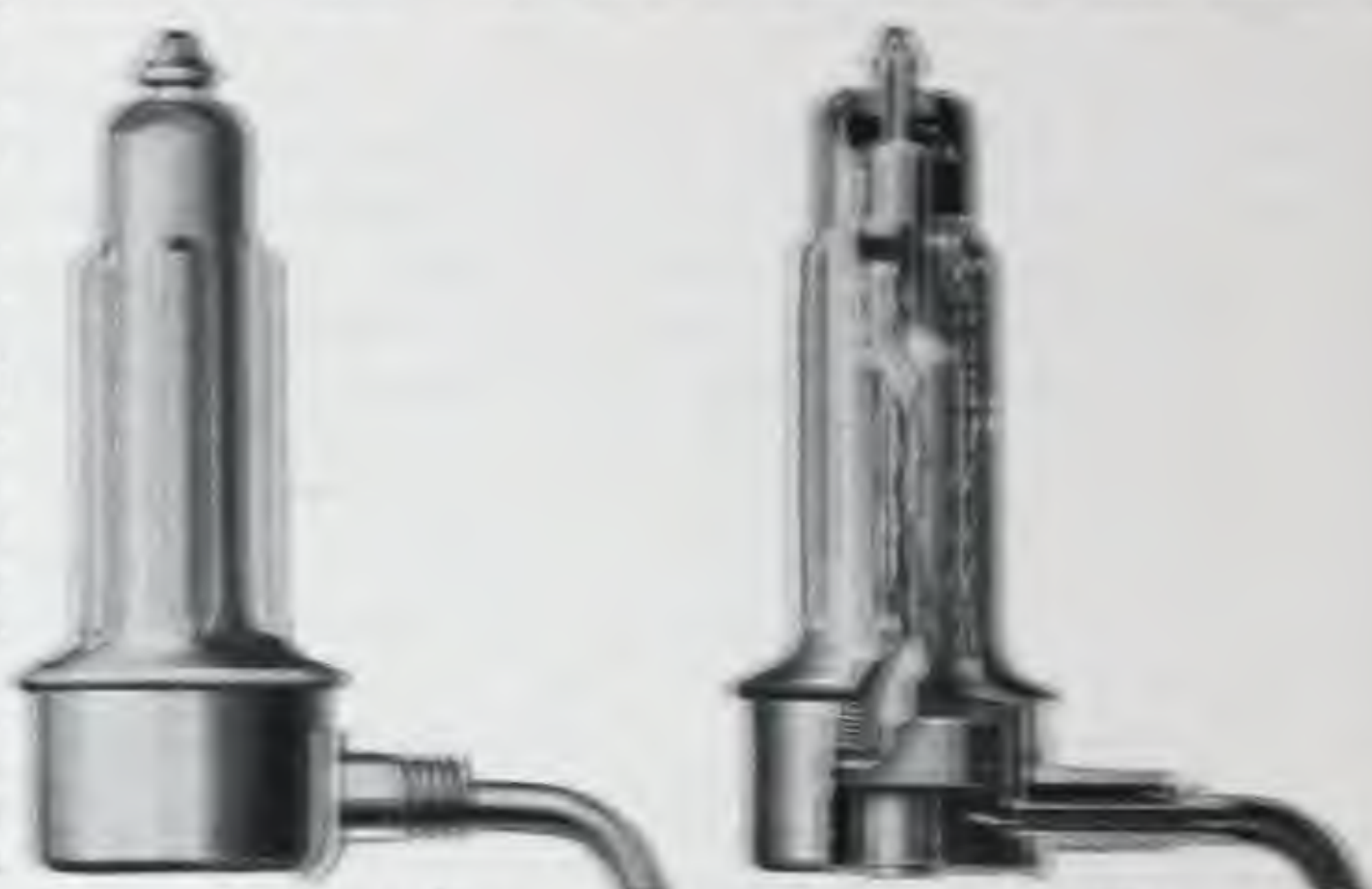
The arrows in the sectional view show the direction of the flow of water through the siphon and the flow of air into the valve. It will be noted that air entering the valve can not pass through the water in the float chamber, but must enter through channels provided for it. Note also that the outlets from these channels are above the water line in the float chamber, therefore, when the valve port opens, even though there is water in the valve, the air passes out through the valve port, perfectly dry. There is not the slightest spit. The valve closes tightly without the slightest leakage as often as water comes against it, and opens instantly without leakage whenever water leaves it.

Advantages—(1) The No. 1 Hoffman siphon air valve distinguishes perfectly and effectively between steam and air and between water and air. (2) Its air channels are separate from those provided for water. (3) It closes tightly against steam or water, but freely vents all air from the radiator, whether the air is hot or cold, and permits steam to replace the air that is vented, thereby maintaining full radiator efficiency.

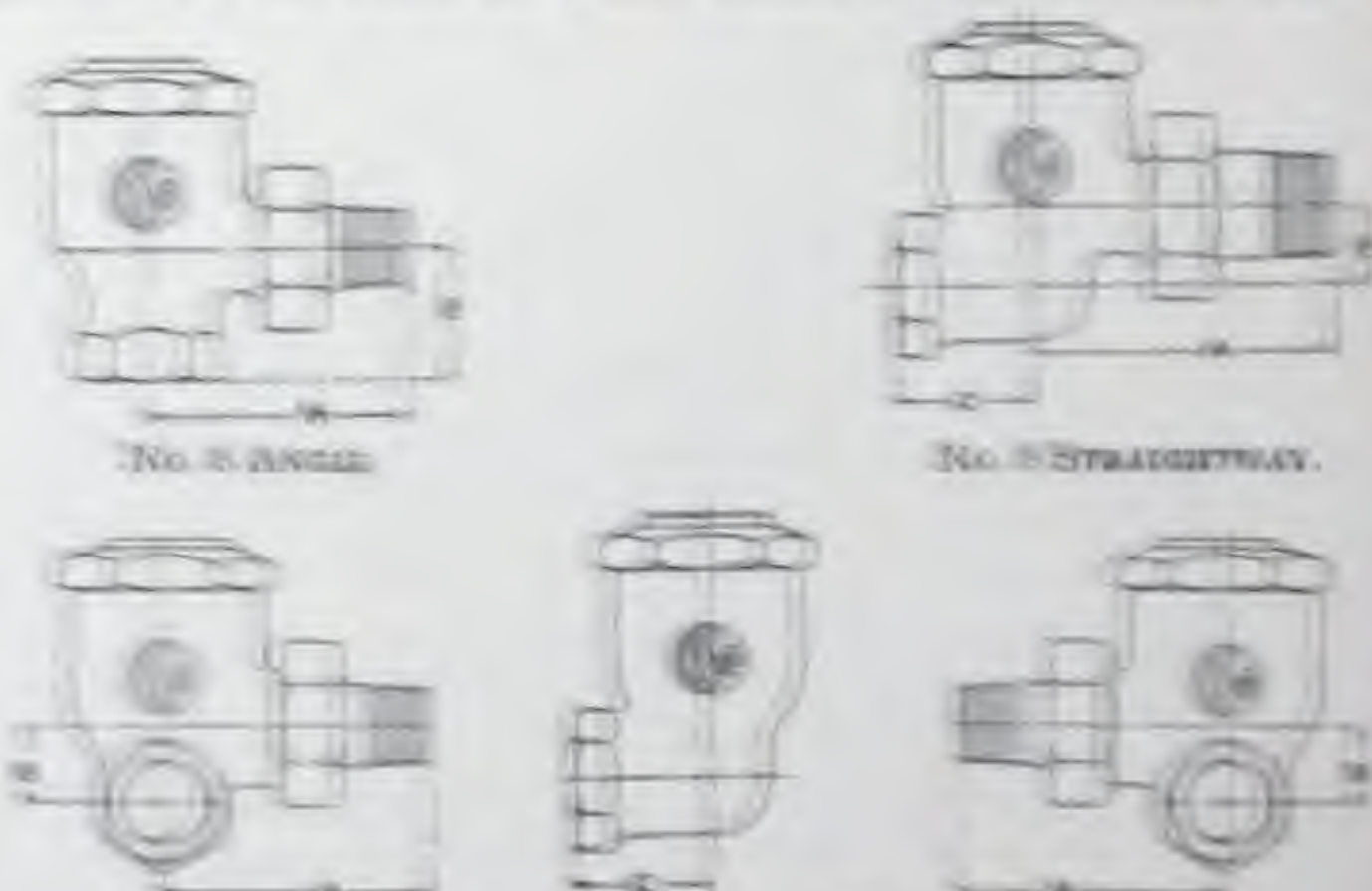
No. 2 and 3 HOFFMAN RETURN LINE VALVE

Purpose—This valve is for use on vapor, vapor-vacuum, modulating and vacuum heating systems.

Description—The Hoffman return line valves are automatic and non-adjustable. The sectional illustration below clearly shows that radical departure has been made in its mechanical design. The first, last, and only function of a thermostatic return line valve is to positively distinguish between steam, air and water, freely



Exterior View. Sectional View.
No. 1 Hoffman Siphon Air Valve.



DATA FOR NO. 2 AND 3 HOFFMAN RETURN LINE VALVES

Style	Size, in.	Maximum capacity, sq. ft.	Dimensions, in.			No. Valve Port
			A	B	C	
No. 2 angle.....	1/2	200	2 1/2	3 1/2	4 1/2	1/2"
No. 2 straightway.....	1/2	200	3	4	5	1/2"
No. 3 angle.....	1/2	200	2 1/2	3 1/2	4 1/2	1/2"
No. 3 straightway.....	1/2	200	3	4	5	1/2"

*No. 2 Valve is supplied with 1/4 in. port for pressure above 15 lbs.



Exterior View. Sectional View.
No. 2 Hoffman Return Line Valve.



No. 3 Valve

No. 8 AND 9 HOFFMAN RETURN LINE VALVE —(Continued)

permitting the passage of air and water which may come to it, but stopping steam. The Hoffman return line valve has quarter inch valve travel, which means a wide open unobstructed passage when the flood of condensation reaches the valve; thus minimizing the question of dirt lodging therein and interfering with its proper operation.

In order to get this movement thermostatically and at the same time preserve three vital essentials in a thermostatic return line valve, i.e., efficiency, durability and non-adjustability, three small thermostatic chambers (they are only 1 in. in diameter) with a phosphor bronze flexible diaphragm top and bottom of each chamber, making six diaphragms in all, are assembled in a cage. The three chambers are joined together in the center and are made practically into one thermostatic chamber, by having an opening through the center connections between the chambers. These chambers are then suspended from the top of the cage, the valve pin being rigidly attached to the bottom diaphragm. This method of construction insures not only that the thermostatic travel or movement of the chambers will be the total collective movement of the separate diaphragms, but also that the movement will be absolutely vertical; and the valve pin, being guided by the bottom of the cage, is insured proper seating.

The chief feature of the valve is its consistency of operation under a pressure range from 13" vacuum to 50 lbs. pressure. Within this range water at a temperature of 10° less than the temperature corresponding to the steam pressure will cause a full valve opening. This uniform sensitiveness under any pressure within the specified limits insures practically instantaneous release of condensation as soon as it reaches the valve. It is by means of a special Thermostatic fluid whose pressure and temperature maintain a constant relationship with the pressures and temperatures of steam that the uniformity of action under varying pressures is always maintained.

ADVANTAGES—(1) The Hoffman return line valve is absolutely noiseless and positively distinguishes steam, air and water from one another. (2) It freely passes air and water, but prevents the passage of steam. (3) The valve is non-adjustable. (4) The thermostat parts are interchangeable and may be shifted from one valve to another without affecting the proper operation of the valve. (5) The valve operates at various pressures without adjustment. (6) The valve may be used as a steam trap in industrial work or for draining steam jacketed kettles, sterilizers and similar apparatus.

SIZES—Hoffman return line valves are made in 1/2-in. and 3/4-in. sizes only. The No. 8 valve with 1/2-in. connections is made in angle, straightway and right- or left-hand offset patterns. When straightway or offset patterns are wanted, they should be specified. The 3/4-in. valve designated as No. 9 is made in the angle pattern only.

The standard port of all No. 8 valves is 1/4-in. diameter. The standard port of the No. 9 valve is 3/8-in. diameter.

For high pressure service the No. 9 valve is furnished with 3/16 in. port.

CAPACITIES—The capacity of any return valve or trap is determined by the temperature and the pressure of the water at the valve. The conservative capacity of the No. 8 (1/2-in.) valve is 200 sq. ft. of cast iron radiator surface. The capacity of the No. 9 (3/4-in.) valve is 600 sq. ft. of cast iron radiator surface.

To determine valve capacity for blast coils the condensing power of the coils should be calculated as four to six times greater than that of radiator cast iron service. The minimum outside temperature determines which factor should be used.

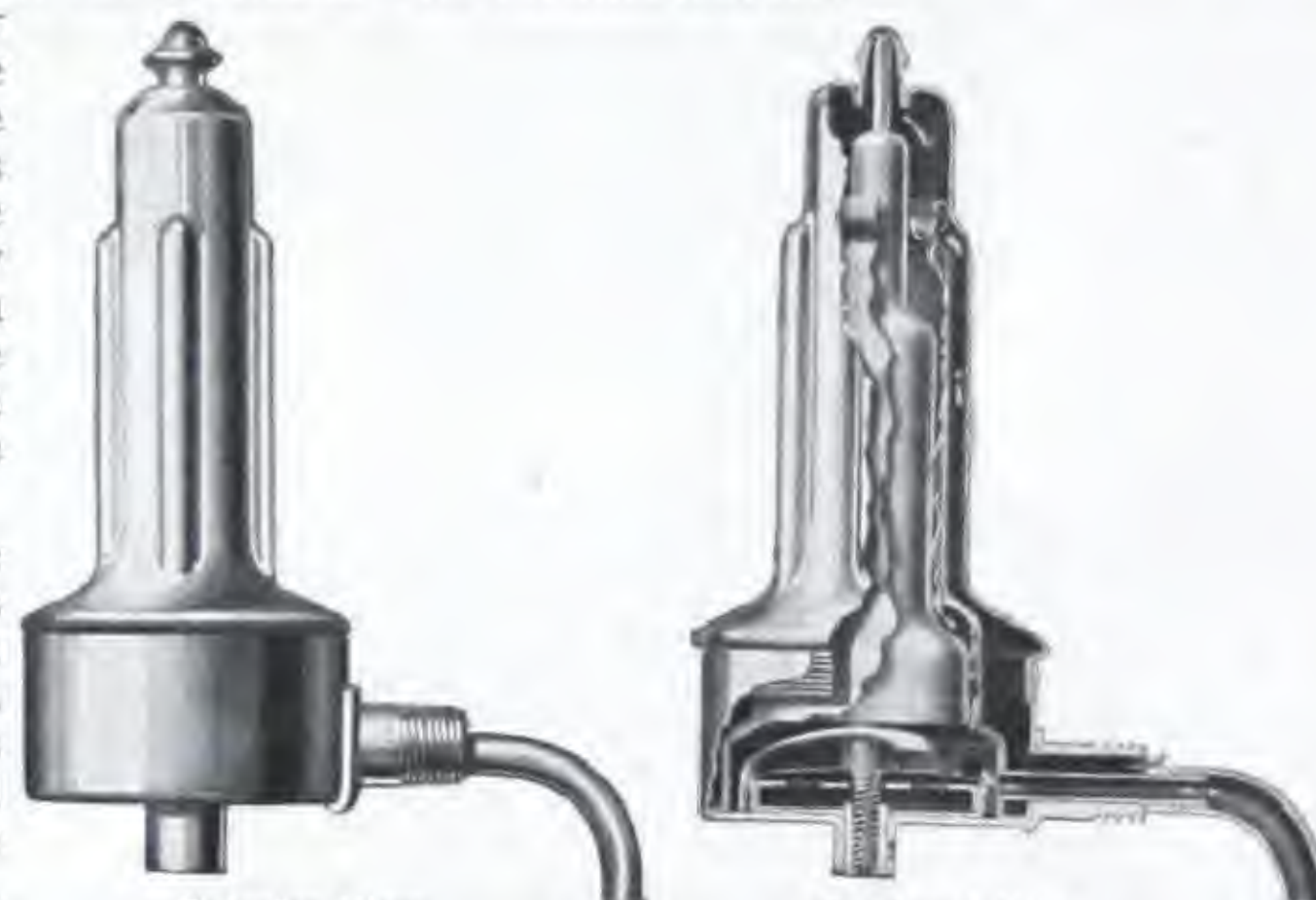
ADAPTABILITY—This valve is designed for use on gravity vacuum systems.

DESCRIPTION—When a pressure of 6 oz. or more reaches this valve, it acts exactly as the No. 1 Hoffman siphon air valve. The description of that valve is a duplication of all of this one except in one particular—its vacuum feature.

The function of any air valve is to vent the air from the radiator when steam enters it, and then to close when steam fills it. The ordinary air valve, however, when steam pressure goes off and the steam in the radiator begins to cool and condense, opens and allows the air to return into the radiator. Since fuel is consumed to produce the pressure necessary to push the air from the radiator, fuel economy results if air is kept out after it has been expelled. The Hoffman siphon air and vacuum valve freely vents air at a pressure of more than 6 oz., and automatically closes to prevent the emission of steam or water. It also closes automatically to prevent the intake of air through it into the radiator when the pressure goes off.

CONSTRUCTION AND OPERATION—The sectional view shows that the outlet is normally closed, and that the float pin is held tightly against its seat by the upward pressure of a small bronze diaphragm in the bottom of the valve. The port in the bottom of the valve leads to this diaphragm chamber and is always open, so that any pressure within the valve tends to deflect the diaphragm, the upward tension of which is so adjusted that 6 oz. of pressure, or more, will deflect it. As the float follows the diaphragm downward the valve port in the top of the valve opens. Temperature has nothing to do with this function of the valve; pressure opens it, lack of pressure closes it.

ADVANTAGES—(1) The No. 2 Hoffman siphon air and vacuum valve, when cold, is normally closed, but opens as soon as a pressure of more than 6 oz. reaches it. (2) If water comes against it, it closes and prevents water leakage through the valve. (3) As soon as the water that has caused it to close drops away, it opens without spitting. (4) It closes instantly if steam reaches it. (5) If pressure goes off, the valve instantly and automatically closes against the intake of air into the radiator through the valve. (6) It vents all air that is in the radiator, and does not let any air enter through the vent port. (7) It is absolutely automatic in all its functions. (8) It holds heat in the radiators and reduces fuel consumption.



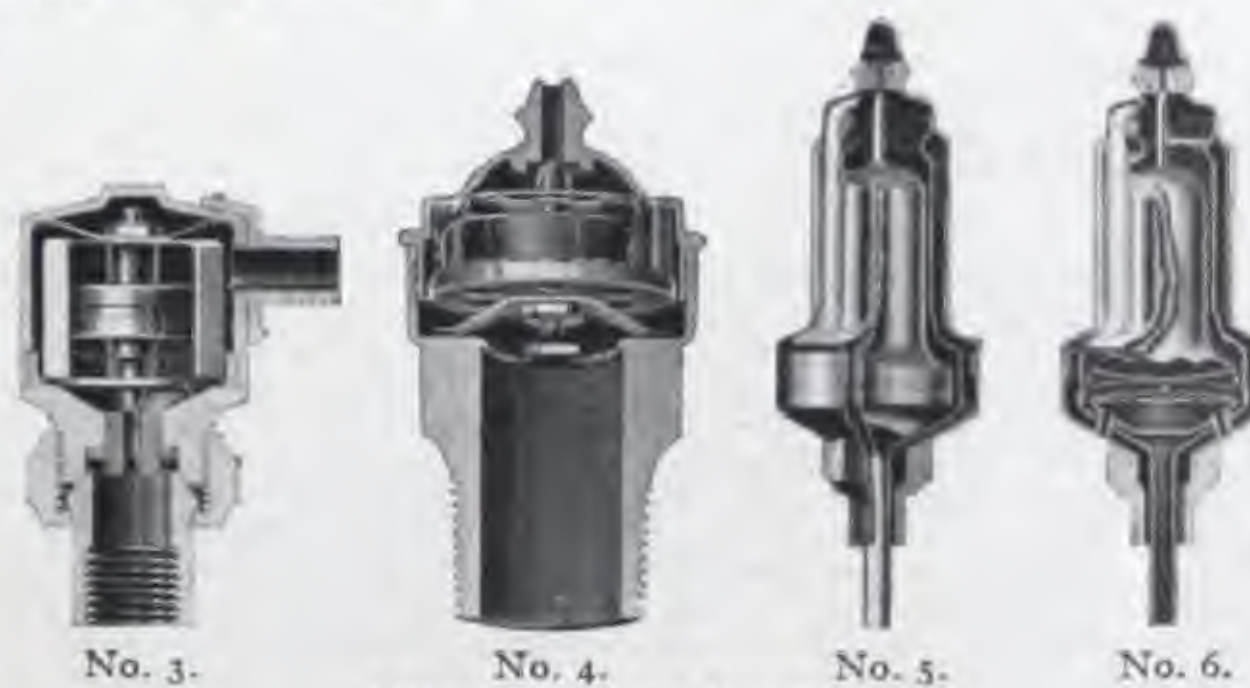
Exterior View.
Sectional View.
No. 2 HOFFMAN SIPHON AIR AND VACUUM VALVE.

No. 3 HOFFMAN "AIR LINE" VALVE—Designed for drip line or vacuum air line service. It vents all air, but automatically closes against steam. It has a 1/8-in. male thread and a 1/4-in. female thread on the union.

No. 4 HOFFMAN JUNIOR "QUICK VENT" AIR VALVE—Designed for quick vent service where water is not a factor. The vent port has a 1/8-in. diameter. This valve closes tightly against steam emission, but does not close against water. It is universally used for venting risers in large systems. It is threaded either 1/4-in. or 3/4-in.

No. 5 HOFFMAN "QUICK VENT FLOAT" AIR VALVE—For quick vent service where it is desired to prevent the emission of either steam or water through the valve. Valve is threaded 3/8-in. For pressures under 3 lbs. valve port is 1/8-in.; for 3 lbs. or over 1/4-in. port.

No. 6 HOFFMAN "QUICK VENT FLOAT" AIR AND VACUUM VALVE—For quick vent service where it is desired to control or prevent the emission of either steam or water through the valve, and also to prevent the return of air to the stack or the line to which the valve is connected. This valve is threaded 3/8-in., and has a 1/8-in. vent port for pressures above 3 lbs. When the pressure is under 3 lbs. the vent port is made 1/16-in.



No. 3. No. 4. No. 5. No. 6.
OTHER HOFFMAN VALVES.

ADAPTABILITY—This valve meets absolutely the demand for a large port automatic air valve in connection with vapor heating. **DESCRIPTION**—The valve is made entirely of metal; is automatic, non-adjustable and thermostatic.

Diameter of air port is 3/4-in. and this is maintained through the valve. Hence there can be no back pressure in the air line due to restricted air port.

The valve is equipped with large buoyant float which instantly closes the valve port whenever water reaches the valve.

No. 2 HOFFMAN SIPHON AIR AND VACUUM VALVE.

OTHER TYPES OF VALVES.

No. 10 HOFFMAN VAPOR VALVE.

No. 10
HOFFMAN
VAPOR
VALVE—
(Continued).

In the No. 10 Hoffman Vapor Valve is remedied the defect heretofore common to large port air valves in that the float, once raised to its seat by a flood of water, would remain there after the water receded. As long as pressure is maintained such a valve remains closed and there can be no further air relief from the system until there is a marked reduction in the pressure. This defect is fully and successfully remedied in the No. 10 Hoffman Valve by equipping the float with a double port valve, the larger valve closing the $\frac{3}{4}$ -in. port in the valve proper and the smaller valve closing the $\frac{1}{8}$ -in. port which passes through the center of the $\frac{3}{4}$ -in. valve. The $\frac{1}{8}$ -in. port is normally always closed as the $\frac{3}{4}$ -in. valve rests on top of the $\frac{1}{8}$ -in. valve.

The thermostatic member of the valve surmounting the float chamber is similar in construction to the thermostat of the No. 8 valve.

OPERATION—The valve when cold is always open for free passage of air; but as soon as steam reaches valve, the volatile fluid in the thermostatic chamber vaporizes, generating sufficient pressure to distend the flexible diaphragm on top and bottom of these chambers, thus pushing the valve pin to its seat, which closes the valve port tight stopping passage of steam.

When water comes to the No. 10 Hoffman vapor valve, the float rises and closes the $\frac{3}{4}$ -in. port, and as the 3-16-in. port is normally closed, both ports are closed by this float action against passage of water through valve. When water drops from valve, the float follows with receding water, instantly opening 3-16-in. port, thus relieving air. Under pressure conditions, not exceeding 1 lb., this relief permits the $\frac{3}{4}$ -in. valve to drop and thereby restores valve to normal service conditions, i.e., the $\frac{3}{4}$ -in. port again being open through the valve. In case pressure is over 1 lb. and does not exceed 5 lbs., the 3-16-in. valve is operative and 3-16-in. port is fully open, and because of greater air velocity, due to higher pressure, this size port is ample to freely vent the system.

The No. 10 Hoffman Vapor Valve distinguishes positively between air, steam and water, freely venting the air no matter whether hot or cold, but instantly closing against passage of steam. It also closes tight against water leakage when water comes against the valve.

NOLL
HOFFMAN
VAPOR VA-
CUUM VALVE

This valve is similar in construction to the No. 10 valve with the addition of a check valve above the vent port for preventing the return of air when once vented.

HOFFMAN
EQUALIZING
LOOP.

Its chief function is to safeguard the boiler by preventing water from backing up into the return main when pressure increases beyond a predetermined amount. It will therefore be seen that in a well designed system, the Equalizing Loop is very seldom called upon to operate, but like the safety valve it is absolutely essential to insure full protection against cracked boilers.

Whenever a differential pressure of 10 oz. between steam and return main is obtained, the water seal of the Loop is "blown" and a small quantity of steam delivered to the thermostatic vent in the return main, thereby closing it and permitting the pressure in the main to build up until the normal differential is restored, when the Loop automatically reseals and remains so until there is need for repetition of the action.

The Hoffman Equalizing Loop is made in three sizes. No. 1 for systems up to 4,000 sq. ft., No. 2 from 4,000 to 15,000 sq. ft., No. 3 for 15,000 and larger. No. 2 and No. 3 Loops are usually made up to fit the differential pressure requirements of each system.

Special attention is called to the fact that the Loop can only be used with thermostatic return line valves closing with the steam and it cannot be used in connection with return line valves that close against steam.

HOFFMAN
AIR
SEPARATOR.

THIS DEVICE HAS A TWOFOLD PURPOSE:

- (1) To provide a positive means for separating air and condensation in the return main.
- (2) To make the action of the system more positive by supplying a chamber which has connection with the four elements through which it is possible to control a vapor or vapor vacuum heating system, viz.: steam main, return line, boiler and atmosphere. The Hoffman Air Separator employs a simple yet effective principle in abruptly changing the direction of flow of air and condensation, deflecting them into an enlarged chamber where separation takes place because of the different gravities of the two elements.

WIDE DIS-
TRIBUTION
OF HOFFMAN
VALVES.

Every jobber of steam heating and plumbing supplies in the United States and Canada is a Hoffman representative, and carries in stock most of the various patterns of Hoffman valves.

SPECIFICA-
TION INFOR-
MATION.

The information that follows is furnished by the HOFFMAN SPECIALTY CO., INC., to guide architects in specifying Hoffman automatic vent and return line valves for various kinds of steam heating systems.

SPECIFICATION DATA FOR LOW PRESSURE ONE-PIPE GRAVITY STEAM JOBS (OPEN SYSTEM).

AUTOMATIC AIR VALVES—Heating contractor to operate heating apparatus several days, using old automatics or pet cocks. At the beginning of test, prime boiler with 5 gals. of vinegar through safety valve opening. During this preliminary test, boiler should be blown off not less than 3 times under 10-lb. pressure. At the completion of this test, furnish and connect to each radiator in building one No. 1 Hoffman Siphon Air Valve. Contractor shall furnish owner with a written guarantee from the manufacturer covering the satisfactory operation of the venting valves for five years from date of installation. (Note: The use of vinegar cuts or neutralizes oil and grease in system, preventing boiler from foaming; and by giving the Hoffman air valve a clean job, insures long and uninterrupted service on its part.)

SPECIFICATION DATA FOR VAPOR, VAPOR VACUUM, MODULATING AND VACUUM JOBS.

RETURN LINE VALVES—Heating contractor to furnish and connect to each radiator in building one $\frac{1}{2}$ -in. No. 8 Hoffman Return Line Valve for radiators of 200 sq. ft. or less. Where pipe coils exceed 200 sq. ft. of radiation, or where drips are employed to carry condensation from mains into air return line, one $\frac{3}{4}$ -in. No. 9 Hoffman Return Line Valve to be used. Offset and straightway valves to be installed wherever specified by architect. Before system is accepted as complete by architect, heating contractor must remove thermostats and permit system to operate for at least 3 weeks without using interior part of valves. This insures an absolutely clean system. After this is done, thermostats must be replaced, and final test must be made in presence of architect or architect's representative. Contractor shall furnish owner with a written guarantee from the manufacturer covering the satisfactory operation of the venting valves for five years from date of installation.

SPECIFICATION DATA FOR LOW PRESSURE ONE-PIPE COMBINATION PRESSURE AND VACUUM STEAM JOBS (CLOSED SYSTEM).

AIR AND VACUUM VALVES—Heating contractor to operate heating apparatus several days, using old automatics or pet cocks. At the beginning of test, prime boiler with 5 gals. of vinegar through safety valve opening. During this preliminary test, boiler should be blown off not less than three times under 10-lb. pressure. At the completion of this test, furnish and connect to each radiator in building one No. 2 Hoffman Siphon Air and Vacuum Valve. Contractor shall furnish owner with a written guarantee from the manufacturer covering the satisfactory operation of the venting valves for five years from date of installation. (Note: The use of vinegar cuts or neutralizes oil and grease in system, preventing boiler from foaming; and by giving the Hoffman air and vacuum valve a clean job, insures long and uninterrupted service on its part.)

"QUICK VENT" VALVES—Each return main, before it drops below the water line, must be equipped with one No. 4 Hoffman Junior "Quick Vent" Air Valve, in order to relieve the basement piping of all air.

Note for Architects—Should return main exceed 3 ins., or distance between return line and water line less than 15 ins., it is strongly recommended that the No. 5 Hoffman "Quick Vent Float" Air Valve be used instead of No. 4 Hoffman Junior "Quick Vent" Valve.

These quick vent and vapor valves are designed to vent all air from entire system without the use of any other venting devices.

Install where shown on plans, one Hoffman Air Separator and one Hoffman Equalizing Loop to maintain a constant water level in the boiler and hold a 10-oz. differential between the main steam line and the return air line.

Note for Architects—For vapor heating it is recommended that either the No. 3 Hoffman "Quick Vent Float" Air Valve or the No. 10 Hoffman Vapor Valve be used in connection with the Hoffman Return Line Valves for venting Return Mains, except on systems having over 1,000 sq. ft. of radiation, when the No. 10 Hoffman Vapor Valve must be used. Where vapor, vapor-vacuum, vacuum or modulating systems are contemplated, specify No. 6 Hoffman "Quick Vent Float" Air and Vacuum Valve with 3-16-in. port. One valve will vent all air from systems up to 1,200 sq. ft. of radiation. For larger installations use the Noll Hoffman Vapor Vacuum Valve.

These quick vent and vapor valves are designed to vent all air from entire system without the use of any other venting devices.

"QUICK VENT" AIR AND VACUUM VALVES—Each return main, before it enters boiler, to be equipped with one No. 6 Hoffman "Quick Vent Float" Air and Vacuum Valve to relieve basement piping of all air and insure a perfect and even distribution of vapor and steam throughout entire system.

Note for Architects—It is advisable to use packless radiator valves with this method of heating. They are not absolutely necessary, if the ordinary radiator valves are thoroughly packed. In order to get full and efficient service from the use of these valves, it is necessary that the system as a whole be made as near airtight as possible. This the heating contractor must see to. It is recommended that a compound pressure and vacuum gauge be used to ascertain amount of vacuum on system.



Sectional View.

No. 10 HOFFMAN VAPOR VALVE.

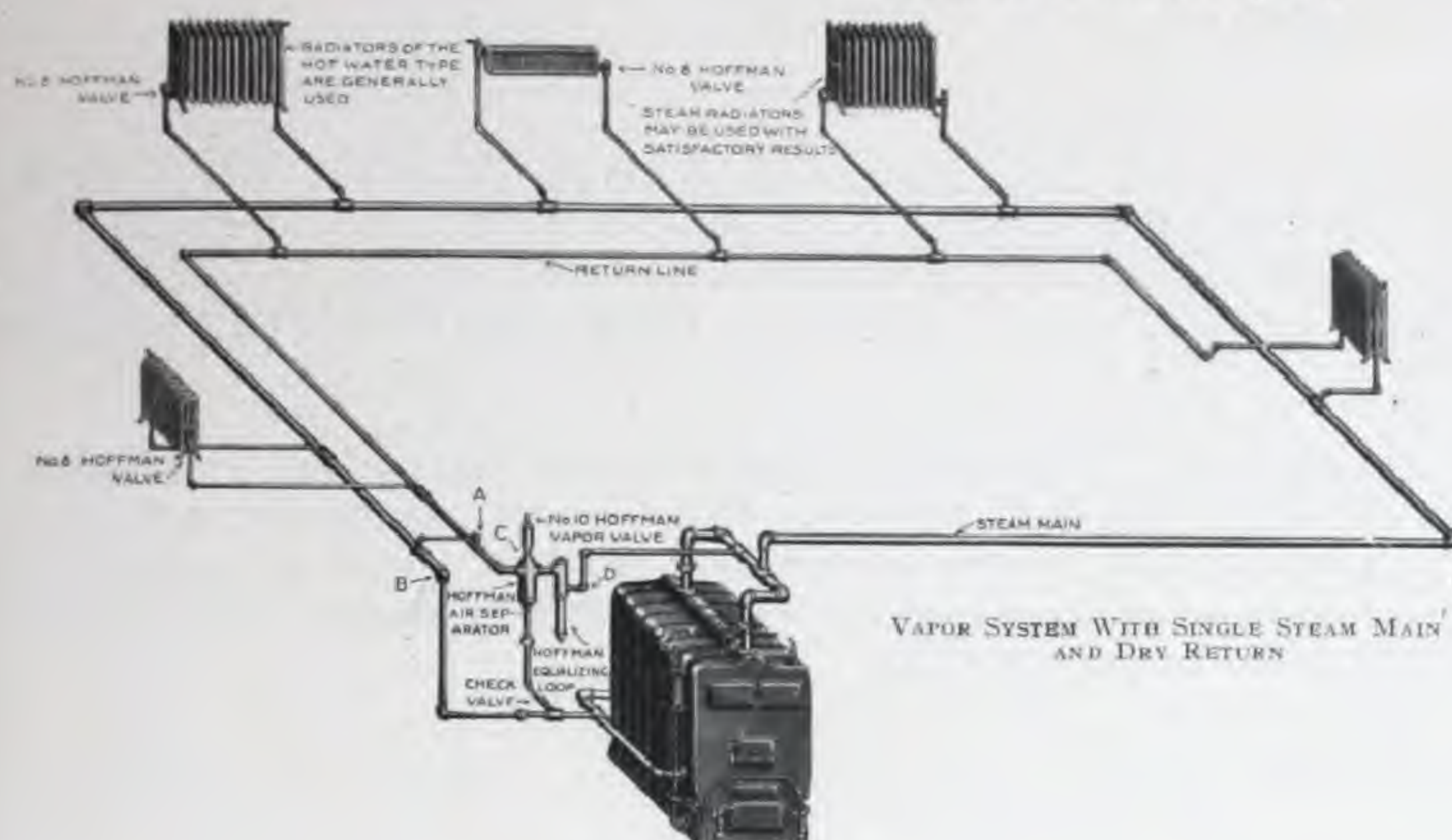


Exterior View. Sectional View.
HOFFMAN EQUALIZING LOOP.



HOFFMAN AIR SEPARATOR

TYPICAL LAYOUTS SHOWING METHOD OF INSTALLING HOFFMAN SPECIALTIES IN VAPOR AND VAPOR VACUUM SYSTEMS.



IMPORTANT NOTES.

The typical systems herewith shown illustrate the manner of installing Hoffman Specialties in various types of vapor and vapor-vacuum systems. The simplicity of the layouts is worthy of note; for, in systems where Hoffman Valves are used, the arrangement of piping is not unlike that of the two-pipe Gravity system with which all heating contractors are familiar. It is a policy of this Company to eliminate all of the "mystery" which has surrounded the so-called "Special Systems."

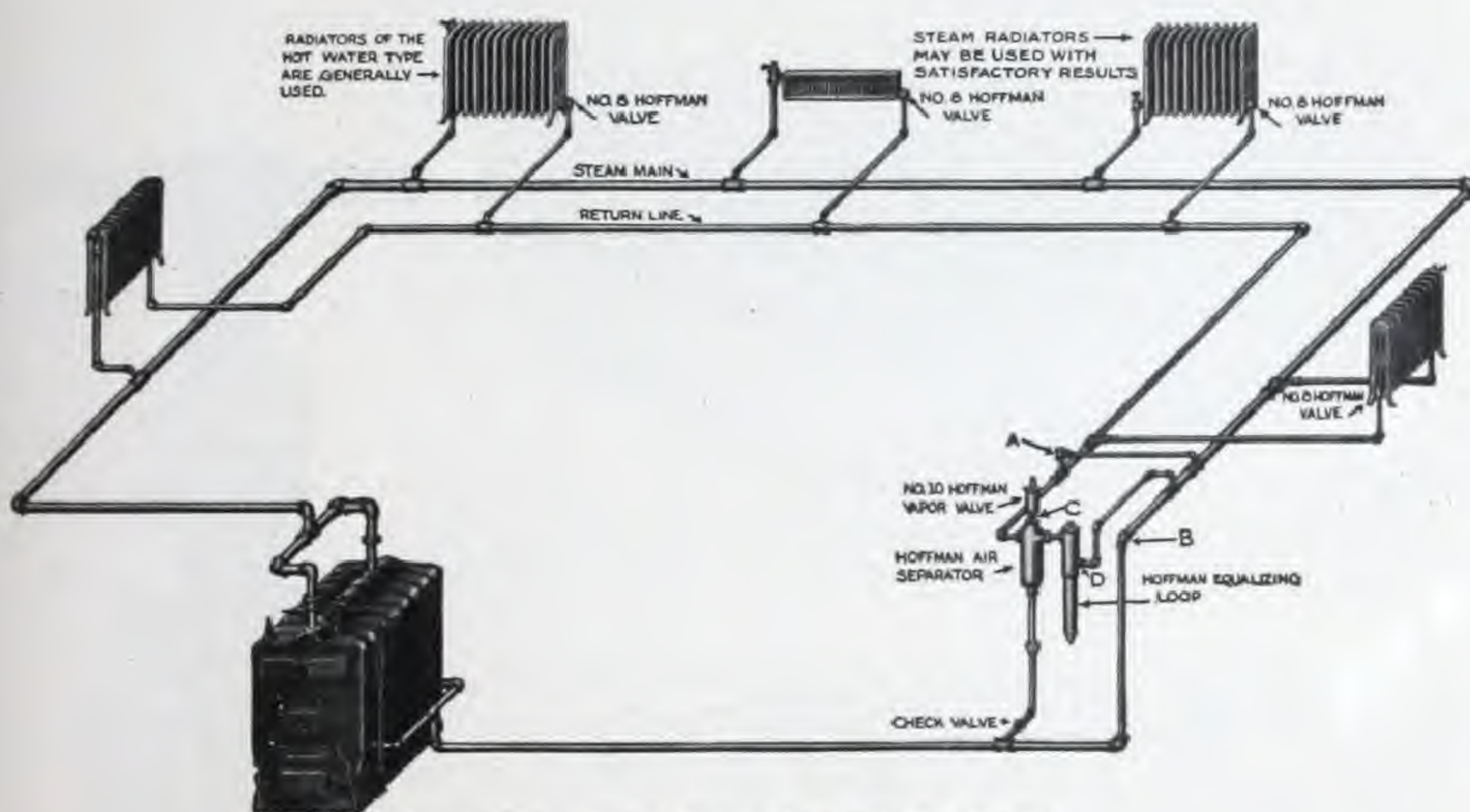
The general arrangement of valves and piping in Vapor and Vapor-Vacuum systems is similar; the only difference being in the type of Return Line Vents.

VAPOR SYSTEMS.

In vapor systems the mains may be vented by cross-connecting steam main and return line, installing a No. 8 valve at (A). (In small systems a No. 3 valve may be used.) As an alternate, a No. 4 valve may be located at (B), omitting the cross-connection between the steam main and return line. In small systems—of less than 1,000 square feet of radiation—a No. 5 valve may be used at (C) in place of the No. 10 valve; although, if the latter is used in small systems, the venting action will be extremely free. It is preferable to oversize rather than undersize the vent port.

VAPOR-VACUUM SYSTEMS.

To transform systems, as shown, from Vapor to Vapor-Vacuum, a No. 6 valve is installed at (C) where radiation is 1200 sq. ft. or less, preventing the intake of air into the return lines through the valve port, when once vented. When radiation exceeds 1200 sq. ft. use Noll valve at (C). When it is not convenient to cross-connect steam main and return lines, as shown, use No. 6 valve at (B).



EQUALIZING LOOP.

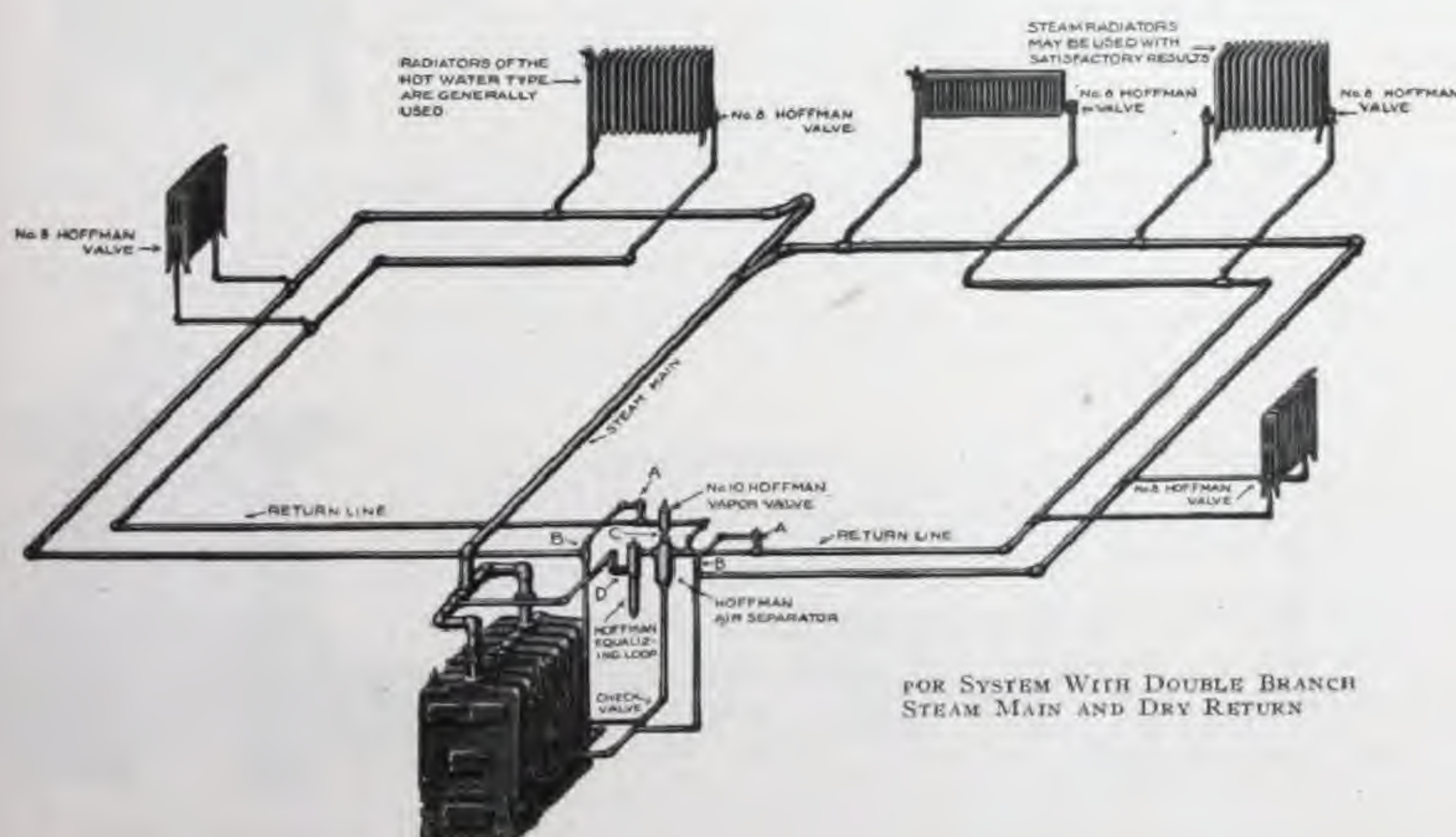
Steam connection to loop may be carried direct from the boiler, header, or steam main. It should be uncovered and at least four feet long, to supply the necessary amount of condensation to Loop. Center of opening (D) on Loop must be 14 inches or more above the boiler water-line, and at least 7 inches below the bottom of header or steam main.

BOILER HEADER.

The arrangement of header must be in accordance with manufacturer's recommendations.

RADIATOR INLET VALVES.

Hoffman Return Line Valves will work in conjunction with any reliable Modulating Valve or Standard Radiator Valve.



THE KERR ENGINE COMPANY, LIMITED

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PRODUCTS.

We manufacture a strictly high-grade line of RENEWABLE DISC BRASS GLOBE AND ANGLE VALVES; BRASS STEAM AND HOT WATER RADIATOR VALVES; BRASS AND IRON BODY GATE VALVES; IRON BODY SWING CHECK VALVES; INDICATOR POSTS; FIRE HYDRANTS; WATER CRANES, Etc.

CATALOGUE.

Our list of manufactures is so varied that it would be useless to attempt a general description of each, but our Catalogue No. 5 is very complete, and will, we believe, convey to anyone most of the information necessary, and we suggest that you write us for one or more copies at once. It is a small catalogue, well illustrated with half-tones, and should be on your files.

OUR HOME AND WORKSHOP.

Established here since 1874.



WORKS AT WALKERVILLE, ONTARIO.



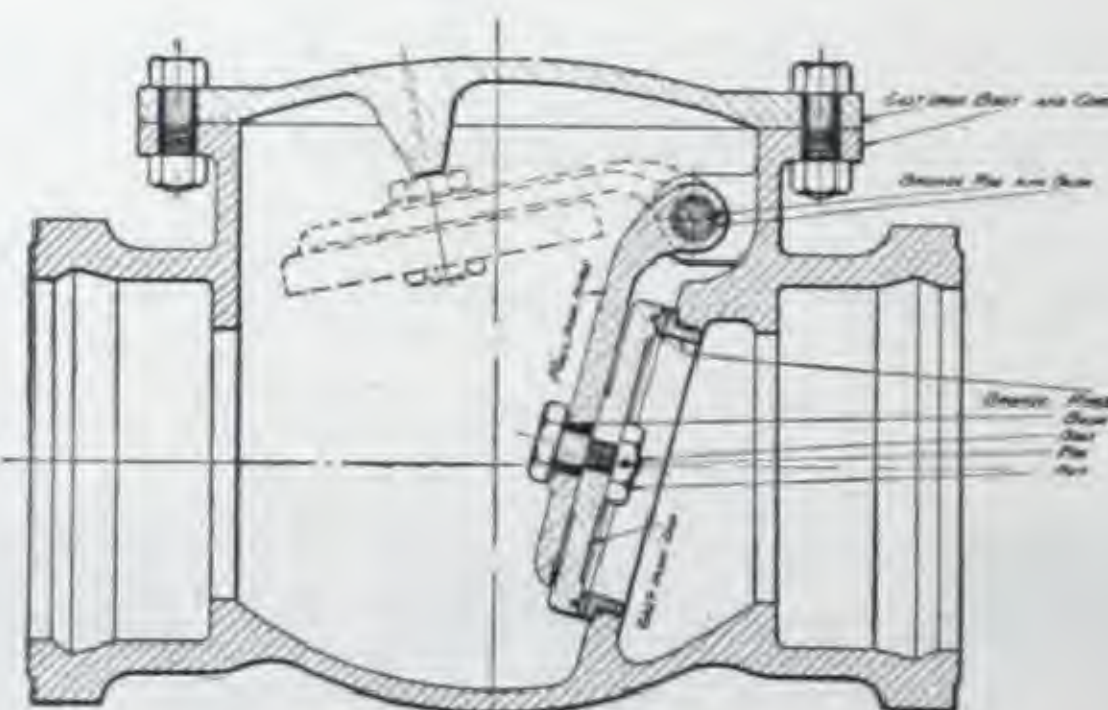
No. 59.
NON-RISING STEM "KEYSTONE"
GATE VALVES.



No. 87.
APPROVED
INDICATOR POST
AND GATE VALVE.
(UNDERWRITERS.)



BRASS "WEBER"
GATE VALVES.



CROSS SECTION.
UNDERWRITERS' APPROVED
SWING CHECK VALVES.



No. 62.
APPROVED O. S. & Y. GATE VALVES.
(UNDERWRITERS.)



RADIATOR VALVES.

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Write us to-day for our Catalogue No. 5, which will give full information and good detailed illustrations.

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LONDON, W.C. 2, ENGLAND.

PRODUCTS.

VALVES—Air Valves, Angle Valves, Automatic Relief Valves, Back Pressure Valves, Blow-Off Valves, Check Valves, Corner Valves, Cross Valves, Equalizing Stop and Check Valves, Fractional Radiator Valves, Gate Valves, Gauge Cocks, Globe Valves, Hose Valves, Injectors, Radiator Valves, Safety Valves, Steam Traps, Valve Boxes, etc.

FIRE UNDERWRITERS' APPROVED APPLIANCES.

Fire Hose Valves, Iron Body Swing Check Valves, Brass O.S. & Y. Gate Valves, Iron Body O.S. & Y. Gate Valves, Indicator Posts, Hub End Gate Valves.

MECHANICAL RUBBER GOODS.

Bibb Washers, Discs, Fuller Balls, Gaskets, Gasket Tubing, Packing, Pump Valves, etc.



FIG. 106.



FIG. 117.



FIG. 300.



FIG. 404.

PRESSURES
AND
SERVICE.

Standard Pattern Brass Globe, Angle, Check and Blow-Off Valves, suitable for 175 lbs. working steam pressure or 250 lbs. working water pressure. Tested before shipment to 325 lbs. water pressure.

Type "K" Standard Pattern Brass and Iron Body Gate Valves, suitable for 125 lbs. working steam pressure or 175 lbs. working water pressure. Tested to 300 lbs. water pressure.

MEDIUM PRESSURE Brass and Iron Body Gate Valves, suitable for 175 lbs. working steam pressure or 250 lbs. working water pressure. Tested to 500 lbs. water pressure.

EXTRA HEAVY Brass and Iron Body Globe and Gate Valves, suitable for 250 lbs. working steam pressure or 400 lbs. working water pressure. Tested to 800 lbs. water pressure.

CAST STEEL VALVES in Globe, Angle, Check Gate and Stop and Check Patterns, with Monel Metal Working Parts, for superheated steam and hydraulic service, suitable for working steam pressures up to 350 lbs. and total temperature of 800 degrees F.

JENKINS VALVES have become the Standard for Steam Users everywhere, therefore it is not necessary to enter into a full description here.

Catalogue No. 8 fully describes and illustrates the entire line of Jenkins Valves and will be mailed free on request.



FIG. 401.



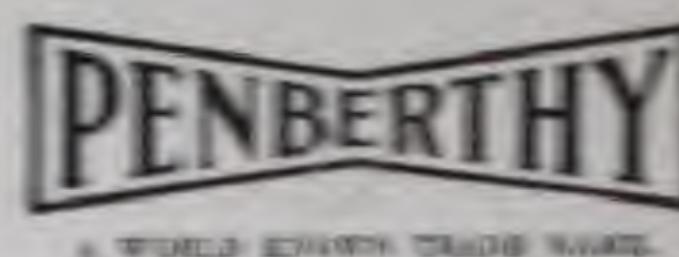
FIG. 142.



PENBERTHY INJECTOR CO., LIMITED

HEAD OFFICE AND WORKS:

WINDSOR, ONT., CANADA.



PRODUCTS.

AUTOMATIC and AUTO-POSITIVE INJECTORS—EJECTORS—CELLAR DRAINERS—COMPOUND BRASS GLOBE, ANGLE and CHECK VALVES—REGRINDING GLOBE, ANGLE and CHECK VALVES—BRASS GATE VALVES—RADIO STEAM and HOT WATER RADIATOR VALVES—SOFT FEED LUBRICATORS, NAWALA, NEEDLESS and POLAR—PLAIN ENGINE LUBRICATORS—OIL and GREASE CUPS—STEAM WHISTLES—HYDRAULIC VACUUM GENERATORS—WASHING MACHINE DRAINERS, Etc., Etc.

ILLUSTRATIONS.

AUTOMATIC CELLAR DRAINER.

WHAT IT IS FOR AND HOW IT IS OPERATED.

A device for transferring liquids from one level to another with water under pressure or steam as power. The name Cellar Drainer is derived from its commonest use, that of pumping water from cellars, but its utility is not necessarily



FIG. NO. 305.
Discharge Drainer as the in Sump.

restricted to this usage. The construction of the Penberthy Automatic Cellar Drainer is admirably simple, being a highly efficient ejector or siphon jet to which is attached a quick-opening, float-controlled valve. Nor is there anything complicated about its operation. The Drainer is placed in the sump or place where the water or seepage collects, a line from the city water supply attached at one side E (see Fig. No. 373) and a line leading to your discharge point (sewer, gutter or wherever it may be) to the other side D (see Fig. No. 373). Then turn on the water and forget it, for as the water rises in the pit the float is raised and when the right height is reached the valve is opened instantly allowing the city water to flow through the ejector, cause a suction, and carry the sump water with it to the discharge. As the water goes down the float falls and when the low point is reached the valve closes to remain closed until enough water collects to again raise the float, when the whole operation is repeated.

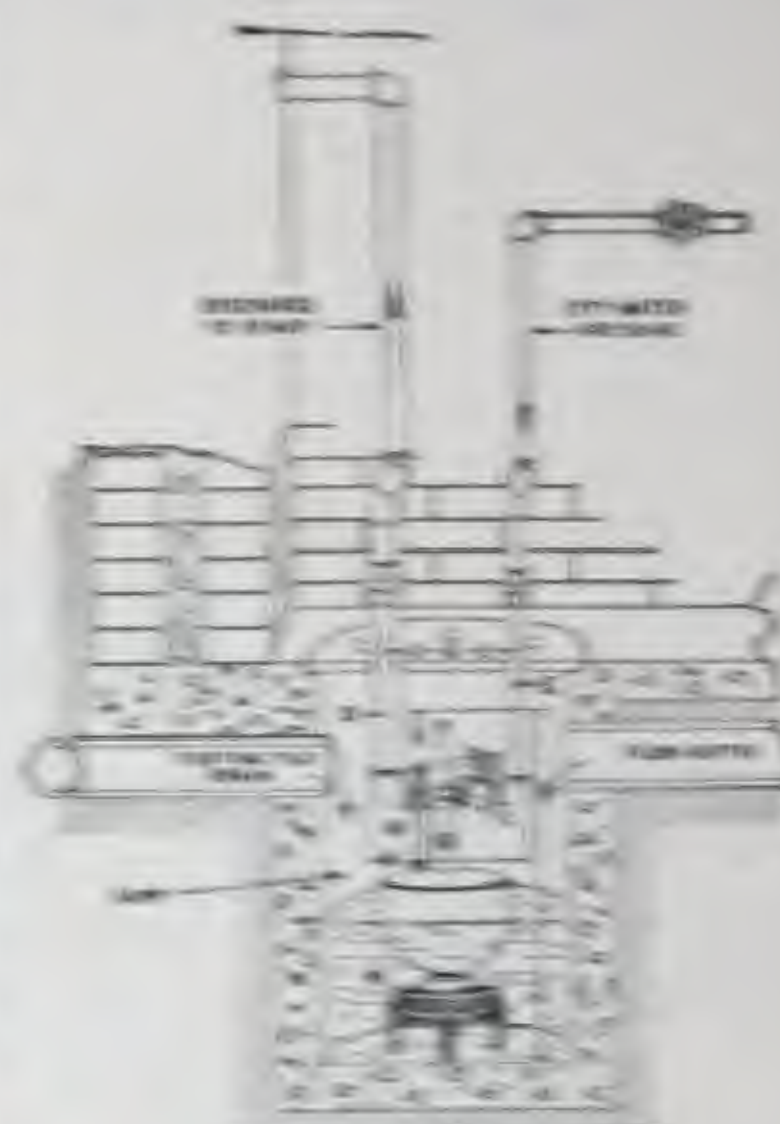


FIG. NO. 373.

LIST PRICES.

CAPACITIES.

DIMENSIONS OF DRAINER AND SUMP.

WEIGHTS, Etc.

Size No. and List Price.	Working Head in Feet.	Actual Capacities in Gallons of Water per Hour Taken from Sump and Not Total Amount of Discharged Water.				Pipe Sizes Incht.		Dimensions Over All in Inches.		Shipping Weight Pounds.	Size Sump Suggested.	
		At 10 Lbs. Will Elevate	At 20 Lbs. Will Elevate	At 30 Lbs. Will Elevate	At 40 Lbs. Will Elevate	Sump	Discharge and Suction.	Height.	Diam.		Minimum Diam. Inches.	Minimum Depth Inches.
\$25.00	3	130	400	530	650	1/2	1	20 3/4	9 1/2	18	12	22
	6	200	550	480	580							
	9		285	420	490							
	12			360	420							
	18				340							
\$40.00	3	430	600	620	1050	3/4	1 1/4	22 1/4	11 1/4	22	16	24
	6	520	480	700	840							
	9		400	600	780							
	12			480	620							
	18				490							
\$55.00	3	660	1100	1440	1650	1	1 1/2	25 3/4	15 1/4	37	20	28
	6	520	860	1230	1440							
	9		720	1050	1520							
	12			840	1040							
	18				760							
\$80.00	3	910	1600	2020	2430	1 1/4	2	27 1/4	18 1/2	51	24	30
	6	710	1140	1680	2080							
	9		1040	1600	2080							
	12			1580	2430							
	18				1650							
\$110.00	3	1280	2000	2700	3200	1 1/2	2 1/2	27 3/4	20 3/4	55	26	30
	6	1000	1620	2300	2820							
	9		1260	1960	2600							
	12			2360	2600							
	18				1500							

SPECIAL NOTICE.—The above capacities are the actual capacities of water taken from sump and not the combined discharge of operating and drainage water as given in most tables. For higher elevations than shown above, special drainers can be made.

We recommend our Low Pressure Type Drainer when water pressure is below 25 pounds. Ten pounds is the lowest pressure that can be used satisfactorily and the elevation with this pressure should not exceed four feet for best results. But with each three pounds additional pressure, one foot of elevation may be added. It is a good rule to make this for a better margin than necessary for safety.



PENBERTHY INJECTOR CO., LIMITED

HEAD OFFICE AND WORKS:

WINDSOR, ONT., CANADA.



PRODUCTS.

AUTOMATIC AND AUTO-POSITIVE INJECTORS—EJECTORS—CELLAR DRAINERS—COMPODISK BRASS GLOBE, ANGLE AND CHECK VALVES—REGRINDING GLOBE, ANGLE AND CHECK VALVES—BRASS GATE VALVES—RADIO STEAM AND HOT WATER RADIATOR VALVES—SIGHT FEED LUBRICATORS, NAMELY, PEERLESS AND POLAR—PLAIN ENGINE LUBRICATORS—OIL AND GREASE CUPS—STEAM WHISTLES—HYDRAULIC VACUUM GENERATORS—WASHING MACHINE DRAINERS, Etc., Etc.

ILLUSTRATIONS.

HYDRAULIC VACUUM GENERATOR.

FOR EXHAUSTING AIR FROM RETURN PIPE STEAM HEATING SYSTEMS.

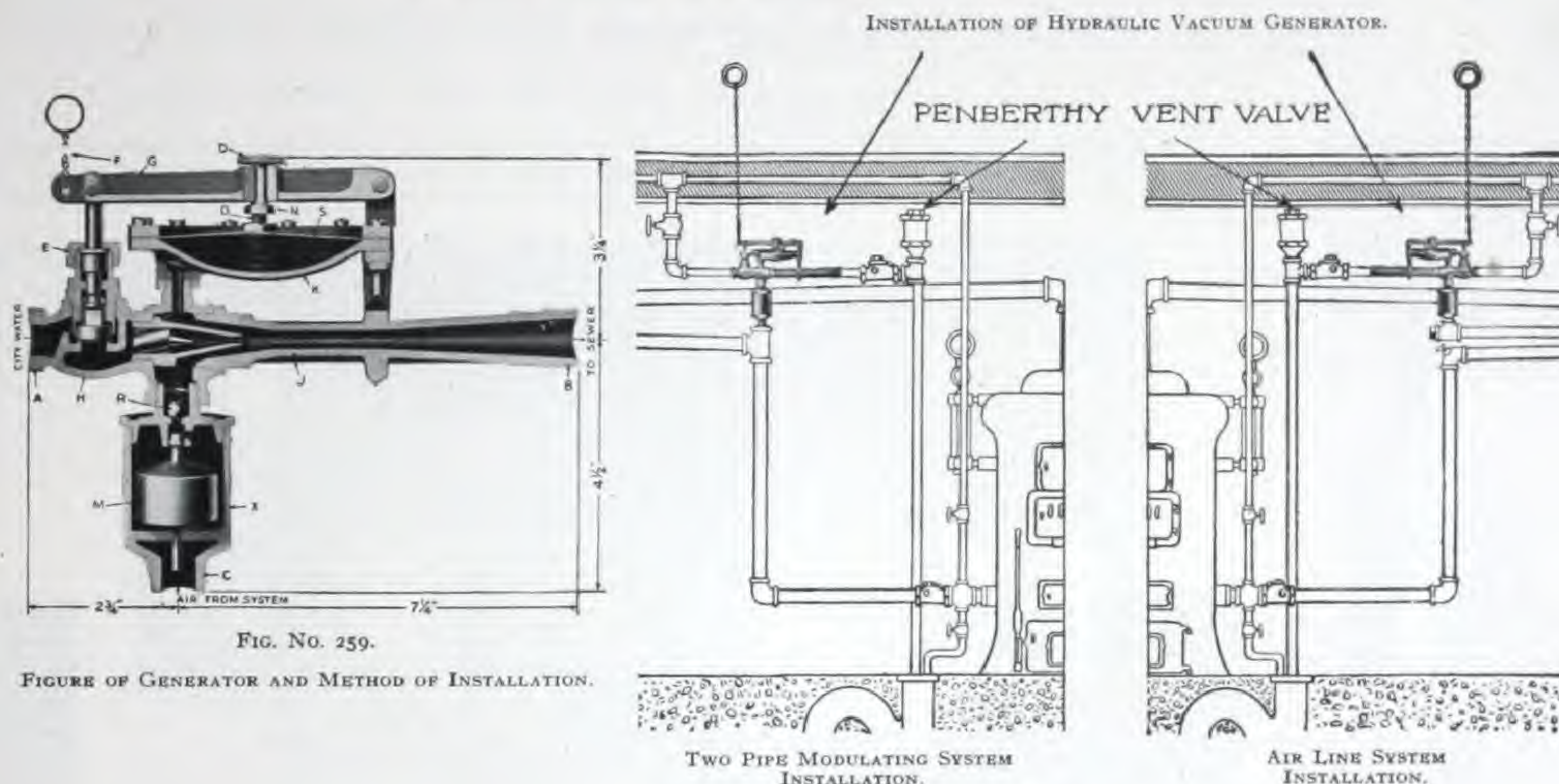


FIG. NO. 259.

FIGURE OF GENERATOR AND METHOD OF INSTALLATION.

THE PRIME FUNCTION

of this pump is to pull the air from the system. Its operation is very simple. Pull the chain "F" which is connected to lever "G". This opens valve "H", which allows the water from city mains to pass through pump "J". This water, passing through pump "J" and into sewer through opening "B", also pulls the air from the system through opening "C", thereby establishing a vacuum throughout the entire heating system.

ITS FUNCTION.

As there is now no air to obstruct the passages, the steam rushes in to fill the vacancy caused by the removal of air, with the result that every radiator is instantly filled with steam. As the steam passes through the radiators, the instantaneous change in temperature causes the valves on the outlet end of the radiator to close automatically, thus holding steam in the radiator.

When the proper vacuum is attained, it exerts a tension on the diaphragm enclosed in "K". This diaphragm pulls down the lever "G" and automatically closes the valve "H", thereby shutting off the operating water pressure.

We further wish to call your attention to the fact that this pump is semi-automatic, that is, it is only necessary to lift the chain (which can be run up through the floor to a convenient location) to start it operating. It shuts itself off automatically when proper vacuum is established.

This semi-automatic feature is a distinct advantage because, when you want to accelerate your heating, you turn it on. Otherwise, it is not in operation, and consequently it is not running up a maintenance expense, as it would if it were wholly automatic.

LIST PRICE AND CAPACITIES.

LIST PRICE AND TABLE OF CAPACITIES—MADE IN ONE SIZE ONLY.

Pounds Water Pressure	Vacuum in Mercury	Cubic Feet of Air Displaced per Minute	Size	Water Connection A	Discharge Connection B	Suction Connection C	List Price
20	3 in.	1.7	No. 1	1/2 in.	1/2 in.	1/2 in.	\$75.00
40	3 in.	2.7					
60	3 in.	3.8					
80	3 in.	6.7					

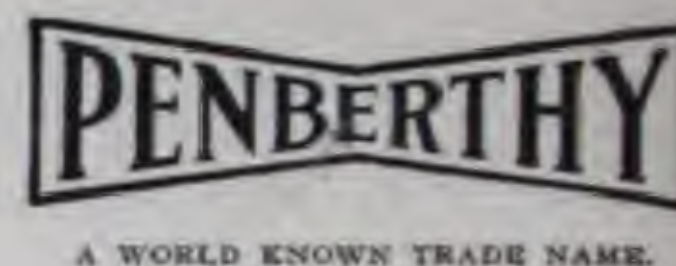
EXPLANATION:—It is safe to figure approximately 8.5 cubic feet to every 500 square feet of radiation, estimated. Therefore, in the average size house with 500 square feet of radiation and a city water pressure of 20 pounds, you can pull a vacuum of 3 inches on your entire heating system in approximately 4 1/2 minutes. As the water pressure increases, the time to accomplish this decreases, as is shown by the table.

DISTINCT ADVANTAGES.

1. Reduces the coal bill 20 to 35%.
2. Gets heat into the whole radiator quicker.
3. Most economical installation.
4. Maintenance cost negligible.
5. Shuts off automatically.
6. Discharges foul air into sewer.
7. Eliminates water hammer in radiators.
8. Has all the virtues and none of the objections that you find in the more elaborate and expensive devices now on the market.
9. Can be operated wherever city pressure water is available.
10. Heat as you want it, when you want it.
11. Made by the Penberthy Injector Co., Limited, Windsor, Ont., (which is sufficient guarantee that it is all it is represented to be).



PENBERTHY INJECTOR CO., LIMITED

HEAD OFFICE AND WORKS:
WINDSOR, ONT., CANADA.

PRODUCTS.

AUTOMATIC AND AUTO-POSITIVE INJECTORS—EJECTORS—CELLAR DRAINERS—COMPODISK BRASS GLOBE, ANGLE AND CHECK VALVES—REGRINDING GLOBE, ANGLE AND CHECK VALVES—BRASS GATE VALVES—RADIO STEAM AND HOT WATER RADIATOR VALVES—SIGHT FEED LUBRICATORS, NAMELY, PEERLESS AND POLAR—PLAIN ENGINE LUBRICATORS—OIL AND GREASE CUPS—STEAM WHISTLES—HYDRAULIC VACUUM GENERATORS—WASHING MACHINE DRAINERS, Etc., Etc.

ILLUSTRATIONS.

PENBERTHY BRASS VALVES.

"OUTSIDE BONNET CONSTRUCTION."

(STRONG WHERE OTHERS ARE WEAK.)

The First Radical Improvement Made in Brass Valves in Generations.

ADVANTAGES OVER THE OLD CONSTRUCTION.

COMPODISK

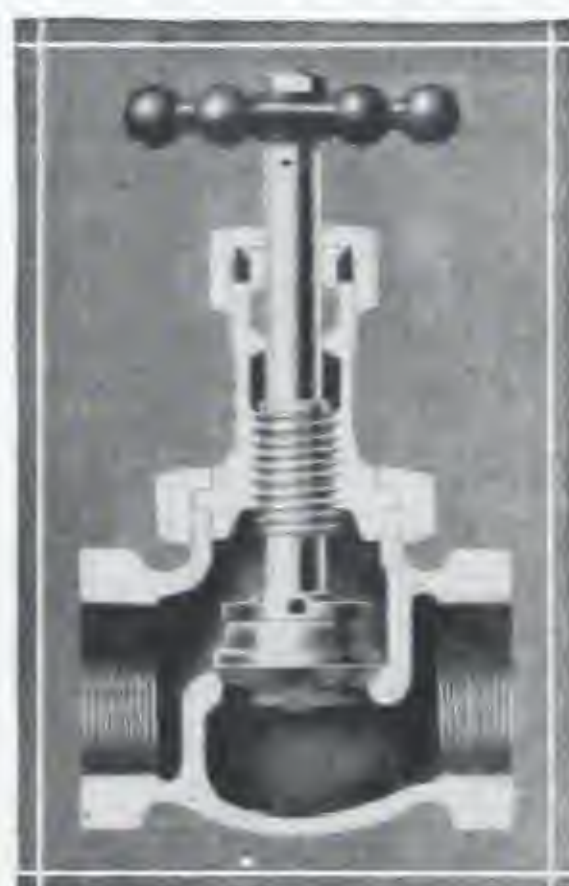
(WITH THE COMPOSITION DISC.)

GOVERNMENT APPROVED,
FOR 175 LBS. STEAM
PRESSURE.
MADE IN GLOBE, ANGLE
AND HORIZONTAL CHECKS.

Makes valve always accessible. Eliminates corrosion of threads. No corrosion prevents all strains in taking valve apart. Prevents spreading of bonnet end of body when screwing down bonnet tight, which may cause a loose-fitting and unsafe bonnet. Makes a steam-tight connection—no leaks. Permits of a more compact valve—consequently a stronger one.

REGRINDING.

(WITH THE METAL DISC.)

GOVERNMENT APPROVED,
FOR 200 LBS. STEAM
PRESSURE.
MADE IN GLOBE, ANGLE,
CROSS, HORIZ., VERTICAL
AND ANGLE CHECKS.FIG. No. 510-A.
SECTIONAL VIEW
REGROUNDING GLOBE VALVE.
"OUTSIDE BONNET
CONSTRUCTION."

GATES

SOLID WEDGE DISC.

NON-RISING SPINDLE.
GOVERNMENT APPROVED,
FOR 150 LBS. STEAM
PRESSURE.MAGNIFIED STRENGTH.
FIG. No. 550-S.**COMPODISK** SECTIONALA POINTED ILLUSTRATION OF THE
"OUTSIDE BONNET CONSTRUCTION"
FOUND IN ALL PENBERTHY VALVES.

FOR VALVE SERVICE

LET YOUR SPECIFICATIONS READ:—

VALVES—PENBERTHY—WITH THE
"OUTSIDE BONNET CONSTRUCTION."FIG. No. 567.
SECTIONAL VIEW
BRASS GATE VALVE.
"OUTSIDE BONNET
CONSTRUCTION."

SWING

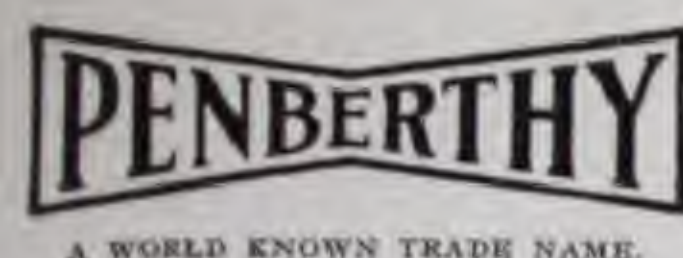
CHECK VALVES.
(REGRINDING TYPE.)DOUBLE PLUG
CONSTRUCTION.
GOVERNMENT APPROVED,
FOR 200 LBS. STEAM
PRESSURE.FIG. No. 554.
REGRINDING SWING CHECK.

ARCHITECTS]

AND CONSULTING ENGINEERS

May recommend Penberthy all quality Valves in connection with their specifications with the full assurance that the installation of our products in Home, Factory and Power Plant is a guarantee of reliable and efficient service as well as a satisfied client.

FIG. No. 553.
COMPODISK HORIZONTAL CHECKS.



PENBERTHY INJECTOR CO., LIMITED

HEAD OFFICE AND WORKS:
WINDSOR, ONT., CANADA.



PRODUCTS.

AUTOMATIC AND AUTO-POSITIVE INJECTORS—EJECTORS—CELLAR DRAINERS—COMPODISK BRASS GLOBE, ANGLE AND CHECK VALVES—REGRINDING GLOBE, ANGLE AND CHECK VALVES—BRASS GATE VALVES—RADIO STEAM AND HOT WATER RADIATOR VALVES—SIGHT FEED LUBRICATORS, NAMELY, PEERLESS AND POLAR—PLAIN ENGINE LUBRICATORS—OIL AND GREASE CUPS—STEAM WHISTLES—HYDRAULIC VACUUM GENERATORS—WASHING MACHINE DRAINERS, Etc., Etc.

ILLUSTRATIONS.

RADIO

TRADE MARK

STEAM AND HOT WATER RADIATOR VALVES.

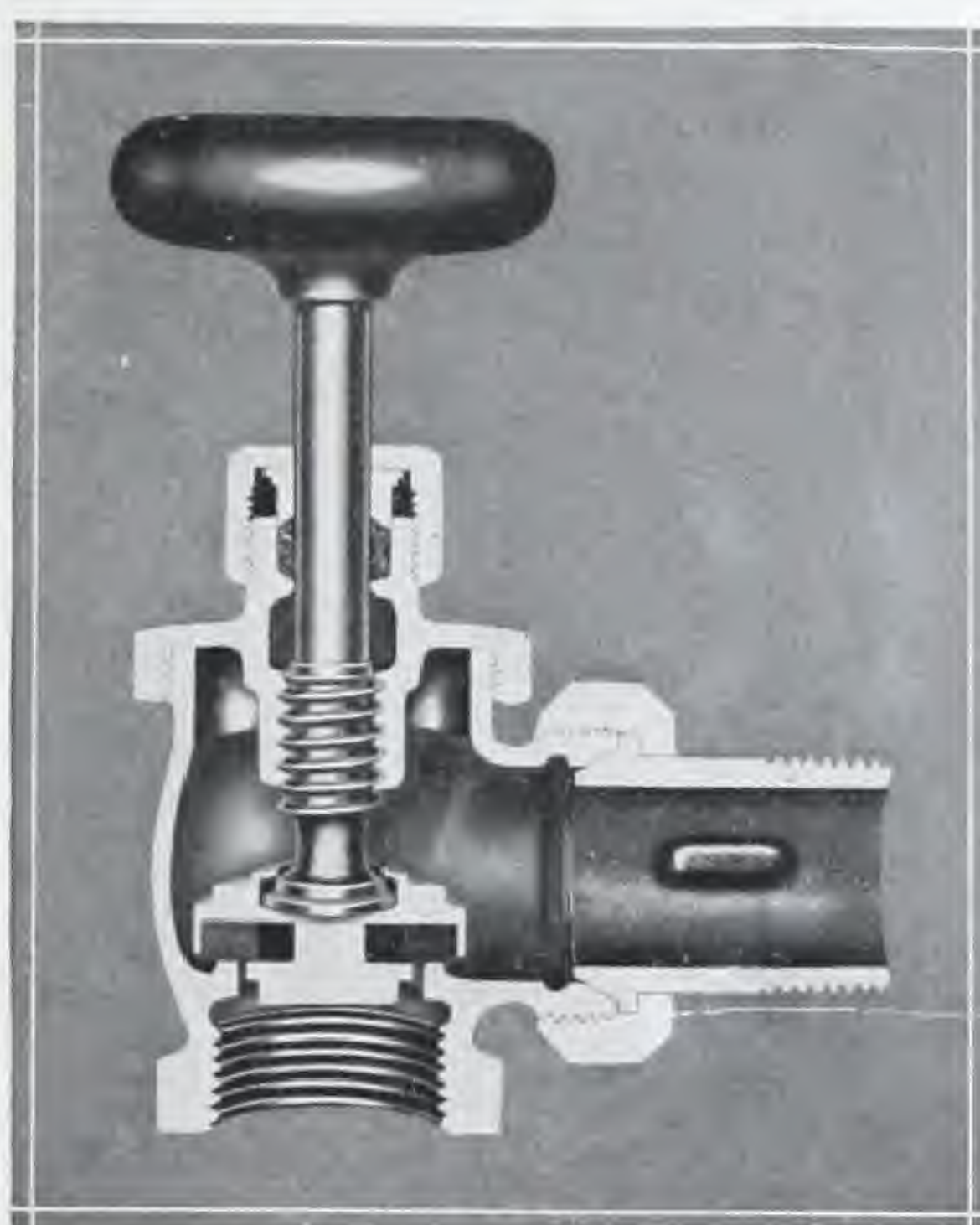
With this Distinctive Feature:
"OUTSIDE BONNET CONSTRUCTION."



RADIATOR VALVES
FOR STEAM,
FITTED WITH
SPECIAL COMPOSITION
DISCS.



FIG. No. 580.
Steam Radio Valve,
Female Ends.



Illustrating Sectional Radio Steam Valve.
Note the "Outside Bonnet Construction."



FIG. No. 582.
Quick Opening
Hot Water Radio Valve,
Female Ends.



RADIATOR VALVES
FOR HOT WATER.
QUICK OPENING.
SLEEVE TYPE.



FIG. No. 581.
Steam Radio Valve
with Union.

THE RADIO LINE

TRADE MARK

Represents the most modern and progressive ideas of valve construction. The "Outside Bonnet Construction" is without doubt the most sensible, practical and reliable improvement ever made in valve design.



FIG. No. 583.
Quick Opening
Hot Water Radio Valve
with Union.

SOME SENSIBLE REASONS FOR THE "OUTSIDE BONNET CONSTRUCTION."

1. The connection is non-corrosive, because the *threads* (see sectional cut) are on the *outside*, away from the action of steam and water, making it impossible for them to become limed up and corroded.
2. The connection is stronger, more rigid and always steam-tight.
3. Prevents straining or spreading of bonnet end of valve when screwing down bonnet tight, which may cause a loose fitting and unsafe bonnet—Safety First.
4. It prevents stripping off threads.
5. It permits easy accessibility to the valve at any time without injury to any part of it.
6. It is the only correct mechanical method of fastening bonnet to body of valve.
7. All Penberthy valves are designed with the outside bonnet; viz., compodisk, regrinding radio, gates. They are the first Made-in-Canada valves so designed.

Architects and Engineers may recommend Penberthy Valves in connection with their specifications with the full assurance that the installation of our products in Home, Factory or Power Plant is a guarantee of reliable and efficient service as well as a satisfied client.

CRANE LIMITED

HEAD OFFICE AND WORKS:

1280 ST. PATRICK STREET, MONTREAL, QUE.

MANUFACTURERS OF VALVES AND FITTINGS IN BRASS AND IRON,
AND DISTRIBUTORS OF PIPE, PLUMBING AND HEATING SUPPLIES.

BRANCHES:

CALGARY, ALTA., - 11th Ave. & Fifth Street West.
 HALIFAX, N.S., - New Roy Bldg.
 OTTAWA, ONT., - 358 Frank St.
 TORONTO, ONT., - 88 Teranley St.
 VANCOUVER, B.C., - 540 Beatty St.

WINNIPEG, MAN., - 93 Lombard St.
 REGINA, SASK., - 1408 Broad St.
 LONDON, ENGLAND, } 45-51 Leman St.
 CRANE-BENNETT LTD.

SALES OFFICES:

HAMILTON, ONT., - 11 McNab Street South.
 QUEBEC, QUE., - Canadian Bank of Commerce Bldg.

SHERBROOKE, QUE., - 20 Olivier Bldg.
 VICTORIA, B.C., - 210 Central Bldg.

PRODUCTS

WE SUPPLY CAST IRON FITTINGS, SCREWED AND FLANGED; MALLEABLE IRON FITTINGS, CAST STEEL FLANGED FITTINGS, FORGED STEEL SCREWED FITTINGS AND FLANGES; UNIONS AND FLANGE UNIONS—ALL IRON; BRASS TO IRON AND ALL BRASS; BRASS FITTINGS, SCREWED AND FLANGED; DRAINAGE FITTINGS; BRASS, IRON AND STEEL VALVES FOR ALL PRESSURES AND PURPOSES; POWER PLANT EQUIPMENT; PIPE BENDS; FLANGED AND SCREWED PIPE, STEAM SPECIALTIES, PLUMBING AND HEATING MATERIAL.

CRANE
IRON BODY
POP SAFETY
VALVES.

No. 1117 Flange.
 No. 1118 Screwed.
 Bourdon Stem— $1\frac{1}{2}$ " to 4"

CRANE IRON BODY POP SAFETY VALVES.

Have a patented self-adjusting auxiliary disc and spring, operating entirely independently of the main disc and spring.

This device automatically regulates the blow-back of the valve within certain limits and combines the following qualities:—

- High Discharging capacity.
- Small blow-down of pressure.
- Minimum waste of steam.
- Absence of wire drawing at the seat.
- Prompt seating without hammering.



No. 1118

CRANE
"Y" PATTERN
AUTOMATIC
STOP-CHECK
VALVES.
EXTRA HEAVY.CRANE "Y" PATTERN AUTOMATIC STOP-CHECK VALVES,
EXTRA HEAVY.

Straight and Angle Pattern—Sizes $2\frac{1}{2}$ to 10 inches.

All steam plants having more than one boiler should have one of these combination stop-check valves in the piping, between each boiler and the main steam line or header.

In the event of a tube blowing out, or the bursting of a joint in the boiler lead to which a stop-check valve is connected, the valve will instantly and automatically close, cutting out the boiler, and acting as a non-return valve, preventing a back flow of steam from the main.

They also act as a safety stop valve, preventing any steam entering or backing into a closed boiler while men are at work inside.

Disc and Piston in one piece.

Liner or Stem cannot be cramped by pulling up yoke bolts.

Readily removable seat, which is integral with the liner or dash pot.

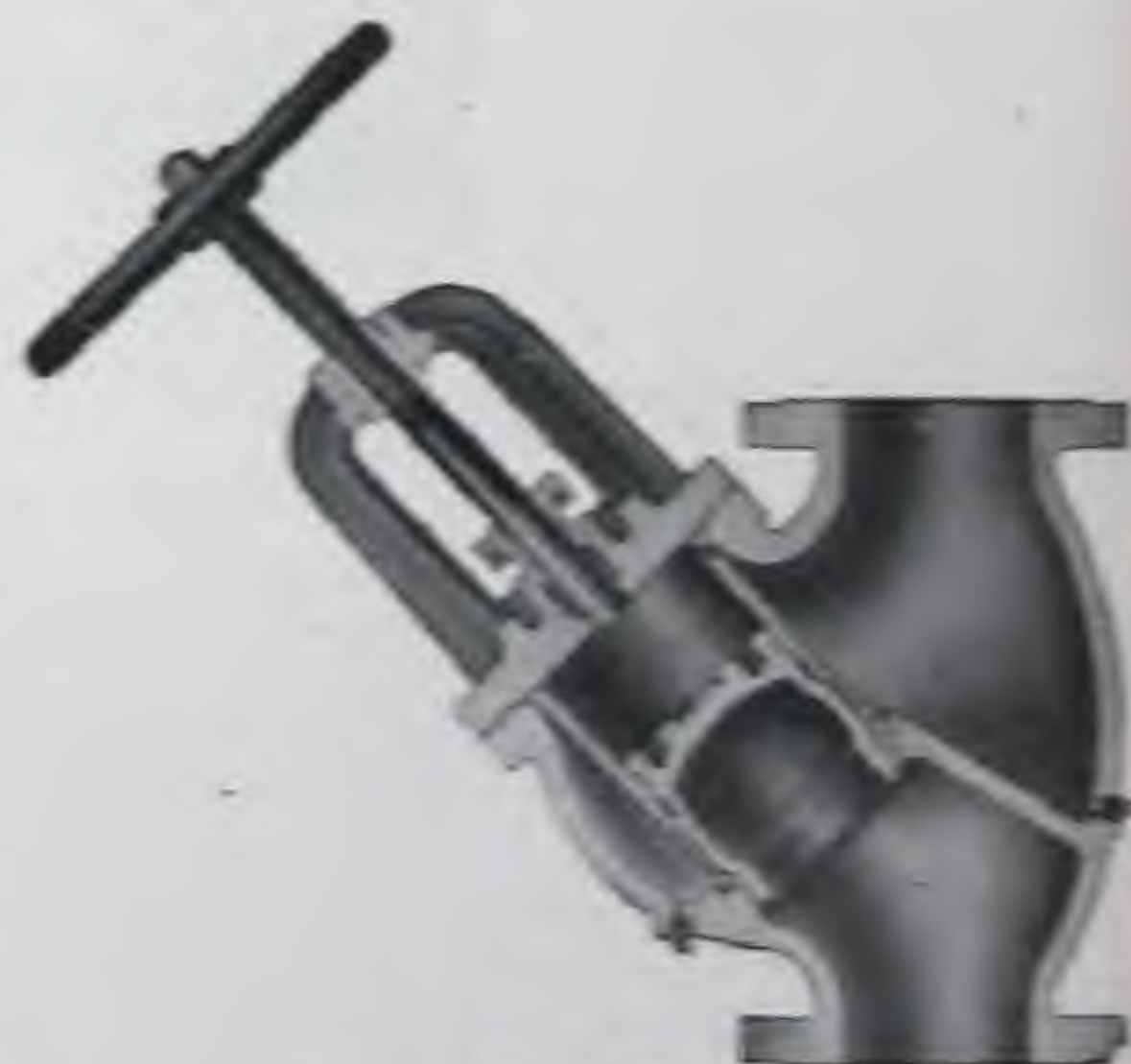
Disc may be reground readily.

Deep throttling lip to prevent chatter on light loads.

45° angle of disc eliminates chattering.

Full length bearing of disc in liner.

Will operate in vertical or horizontal position.



No. 30E.
 Automatic Stop-Check Valve.
 Bourdon Stem— $1\frac{1}{2}$ " to 2"

CRANE EXTRA HEAVY BLOW-OFF VALVES.

CRANE EXTRA HEAVY BLOW-OFF VALVES.

We recommend these valves for use as blow-offs on high pressure boilers and all other purposes where it is desirable to blow off dirty water, or water containing grit or sediment, under pressure.

This service, therefore, requires a valve which can be repaired quickly and cheaply. To prevent too frequent repairing we make these valves with a removable iron seat ring, having the seating surface on the outside of the ring. This disc is also made of iron.

This construction prevents scale from lodging between the seat and disc. The use of iron for this service in the seat and disc is the result of many years' experience with valves of this type.



No. 393

CRANE EXTRA HEAVY ALL-IRON BLOW-OFF COCKS.



No. 317.
ALL-IRON BLOW-OFF COCK.
1" to 2 1/2".

CRANE EXTRA HEAVY ALL-IRON BLOW-OFF COCKS.

SCREWED AND FLANGED.

With compensating spring.

250 pounds steam working pressure.

The compensating spring, which is located between the plug and the cap, automatically takes up wear and holds the plug securely in place at all times, thereby preventing the accumulation of scale, sediment, etc., which would tend to impair the ground bearing surfaces of the plug and body.

CRANE PRESSURE REGULATORS.

CRANE PRESSURE REGULATORS.

For saturated steam or air working pressures up to 250 pounds.

Sizes 1/2" to 8".

Wherever it is necessary or desirable to reduce the pressure of steam or air, a Crane Pressure Regulator should be used, because they are designed particularly to give accurate automatic pressure regulation. Our regulators are recommended because they possess the following features: Reliability, wide range of variation in reduced pressure, simplicity of operation, accessibility for inspection, convenience in making repairs.

Crane Pressure Regulators are adapted for use with steam heating systems, vulcanizers, cookers, paper machines, engines, pumps, turbines, dryers, various industrial processes, air tools, blasts, heaters of various kinds, etc.

Crane Pressure Regulators should be specified according to capacity—not pipe sizes.

Send for circular No. 126.



No. 962.
C.C. PRESSURE REGULATOR.

CRANE STEAM AND OIL SEPARATORS.

CRANE STEAM AND OIL SEPARATORS.

OIL SEPARATORS.

For steam working pressures up to 25 pounds.

STEAM SEPARATORS.

STANDARD.—For steam working pressures up to 125 pounds.

EXTRA HEAVY.—For steam working pressures up to 250 pounds.

CAST STEEL.—For superheated steam working pressures up to 350 pounds and a total temperature of 800° Fahrenheit.

The design of Crane Separators is based upon the most approved and scientific principles.

We do not hesitate to offer this superior line of Separators in competition with any steam or oil separating devices on the market.

They have large areas and ample baffling surfaces, affording the highest degree of efficiency with the slightest loss in pressure.

Condensation in steam is dangerous—it has no power value and reduces engine efficiency.

To obtain the best results from any Separator it must be properly drained.



No. 011.
HORIZONTAL.



No. 03.
LOW PRESSURE OIL
SEPARATOR.

CRANETILT STEAM TRAPS. PATENTED.



NON-RETURN



DIRECT RETURN

CRANETILT STEAM TRAPS.

PATENTED.

NON-RETURN, DIRECT RETURN, THREE VALVE
LIFTING AND VACUUM.

Will work on pressures up to 250 pounds per square inch.

Cranetilt Steam Traps Save Coal.

Cranetilt Steam Traps will handle condensation from all sources and conditions of service, and under any pressure of steam up to 250 pounds. Their discharging capacities are much greater than any other style tilt trap now on the market.

The Direct Return will automatically return all condensations, at any pressure or temperature, directly back to the boiler. Made in sizes $\frac{1}{2}$ to 4 inches, capacities up to 28,000 pounds of water per hour.

Cranetilt Three Valve Lifting Traps are designed to be used as Lifting, Vacuum or Metering Traps. Made in sizes $\frac{1}{2}$ to 4 inches, capacities up to 28,000 pounds of water per hour.

Cranetilt Non-Return Traps will handle ten times more water than bucket, pot or float traps having equal size pipe connections. Made in sizes $\frac{1}{4}$ to 3 inches, capacities up to 112,500 pounds of water discharged per hour.

Cranetilt Traps have no internal working parts. The discharge valve is on the outside, easily accessible and simple in construction, and has an area 50% greater than the area of the inlet pipe.

Specify Steam Traps on their discharging capacities—not by pipe sizes. Our Engineers are always at your service on any condensation problem.



THREE VALVE LIFTING

CRANE PIPE BENDS ARE THE STANDARD.

A Crane Pipe Bend is exact to the number of degrees specified and flanges are made on at 90 degrees to the axis of the pipe in the tangent, so that it is not necessary to force a Crane Bend into position.

There is more to a pipe bend than just the plain process of bending a piece of pipe. After the customer has gone to the expense of having a pipe bent, he gets much more for his money if the bend is made to proper radius, proper tangents, and arranged to take care of required expansion. Sometimes it is possible to arrange one pipe bend to take care of the entire expansion of a long run of pipe at a minimum of expense. Properly designed pipe bends relieve the entire system of piping from expansion strains, reduce leakage at the joints, and eliminate upkeep cost.

Our Pipe Shop is equipped with modern machinery for making Pipe Bends, Cutting, Threading, Flanging with Craneweld, Cranelap, Shrunk and Screwed flanges, either in Cast Iron, Ferrosteel, Forged and Cast Steel.

We make a specialty of making up all kinds of pipe work to drawings and specifications.

CRANE PIPE BENDS ARE THE STANDARD.



CRANE VALVES.



CRANE VALVES.

Represent all types and sizes necessary for the controlling of fluids and vapors, and are made of brass, hard metal, cast iron, ferrosteel, cast steel and forged steel, in sizes one-eighth to 72 inches, for all pressures and purposes.

CRANE PIPE FITTINGS.

CRANE PIPE FITTINGS.

Represent all the shapes and sizes necessary in the pipe carrying of fluids and vapors, and are made of cast iron, brass, hard metal, malleable iron, steel, ferrosteel and forged steel in sizes one-eighth to 72 inches, for all pressures and purposes.



THE CANADIAN POWERS REGULATOR CO., LIMITED

82 CHESTNUT STREET,
TORONTO.

AGENCIES—MONTREAL—ENGINEERS' SUPPLY COMPANY, New Birks Building.
WINNIPEG—WALSH & CHARLES, Tribune Bldg. VANCOUVER—Standard Bank Building.
CALGARY—AMERICAN AGENCIES, LTD., 231 Eighth Ave. W.

PRODUCTS.

AUTOMATIC TEMPERATURE CONTROLLING APPARATUS: For Schools, Churches, Residences, Office Buildings, etc., for various mechanical processes, for sterilizers, drying ovens, etc. Wherever artificial heat is supplied and uniform temperature desired, our heat regulating apparatus may be employed.

AUTOMATIC HUMIDITY CONTROL: For all classes of buildings.

SERVICES.

We are contracting engineers for the design and installation of our appliances. We maintain branch offices in the principal cities with a competent engineering and construction force, so as to insure the proper application of our apparatus. Powers Regulation has been in use for the past 20 years throughout the United States and Canada, and thousands of buildings have been equipped with it. Except in the case of a few specialties all installations are made by our own construction departments.

SPECIAL FEATURES.

The Powers Temperature Controlling Appliances and Systems stand pre-eminent in the field by reason of their simplicity and durability. The thermostats are all constructed upon the well-known vapour-disc principle which has now been used by us for the past 20 years with the greatest success. They are powerful in their action and free from the fine air passages, delicate springs and complicated mechanisms which characterize other devices used in this class of work. Great attention is paid to design and finish of apparatus, and, where desired, the thermostats will be provided in special finishes to match the hardware or decorative scheme of the rooms in which they are located.

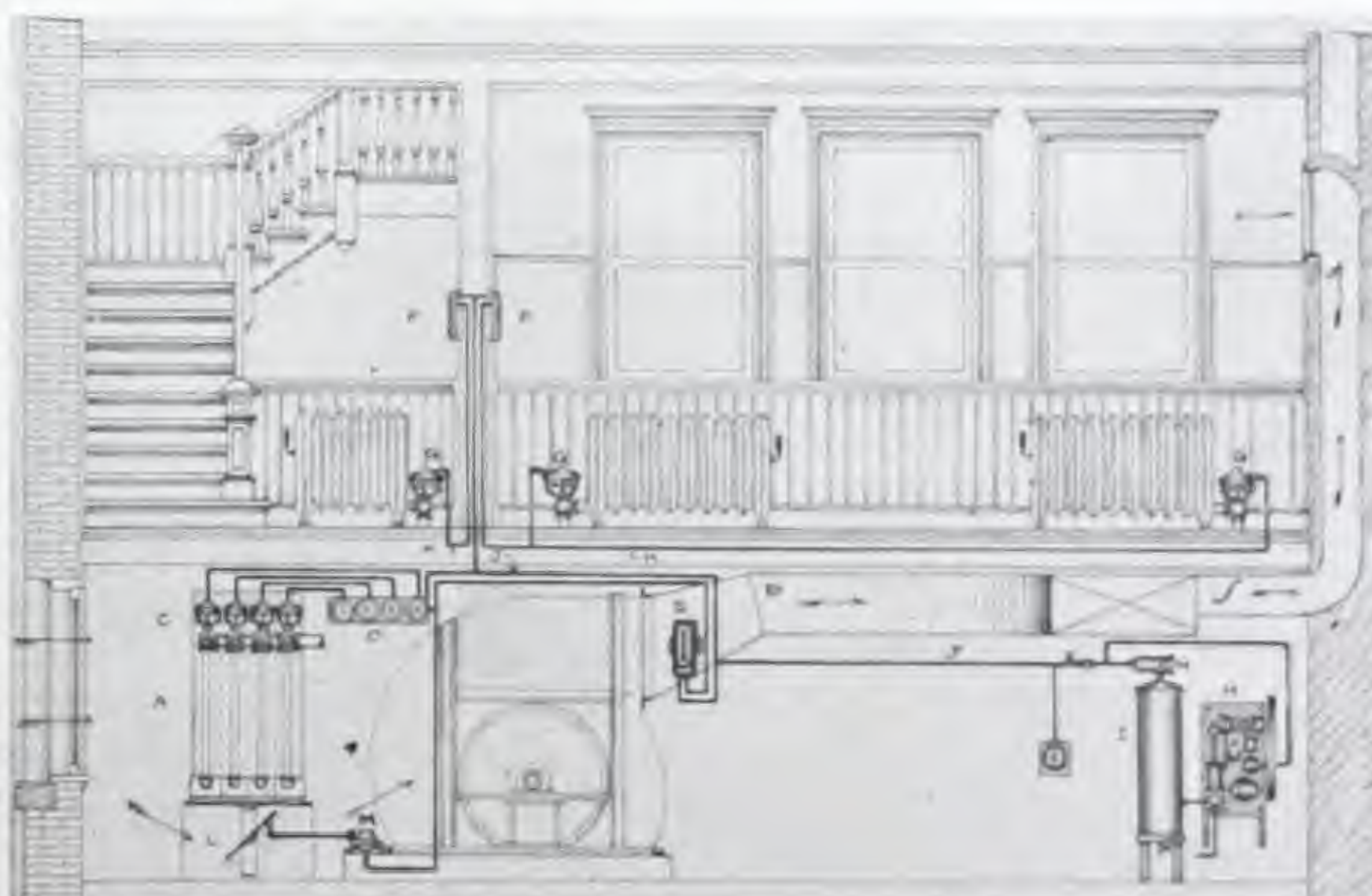
DESCRIPTION OF SYSTEM.

Temperature control is accomplished by means of an instrument called a thermostat, which responds sensitively to temperature changes, and, using compressed air as a motive power, automatically regulates the supply of heating medium to the apartment where the thermostat is installed. Each apartment must have its thermostat and each radiator or other heat source its pneumatic valve or damper controlling the heat supply, all being connected together by a system of air piping communicating with an air compressor of suitable design.



Powers Thermostat and Radiator Valve.

In Plate 3 we show a typical application of automatic temperature control as applied to the modern building with direct radiation in the rooms and mechanical ventilation. The room shown is typical of the others, in the fact that it is equipped with a thermostat "F" and diaphragm valves "GG" on the radiators. This room is also supplied with indirect heat for ventilating purposes, this coming from the blower which draws it through the heating coils "A." A thermostat, "E," located in the blower discharge controls automatically the steam supply to the coils, at the same time operating the by-pass damper beneath them for the purpose of passing unheated air whenever necessary. This thermostat will secure a constant delivery of air at a specified temperature, usually 70 degrees. The radiators in the rooms will furnish the additional heat necessary, and under the control of their thermostats will do it automatically. Our system of temperature control is applied with equal facility to steam or hot water heat, giving either the positive or graduated control of valves as may be desired.



Typical application of Powers Regulation to Direct Steam Heating Plant with fan ventilation. (School House Type.)

SPECIFICATION.

Send for our Special Detailed Specification.

JOHNSON TEMPERATURE REGULATING CO. OF CANADA, LTD.

CALGARY, ALTA., 605 SECOND STREET WEST.

TORONTO, ONT., 118 ADELAIDE STREET WEST.

MONTREAL, QUE., 284 BEAVER HALL HILL.

WINNIPEG, MAN., 259 STANLEY STREET.

VANCOUVER, B.C., 550 SIXTH AVENUE WEST.

PRODUCTS.

The Johnson System of Automatic Temperature Regulation and Humidity Control for regulating and controlling the temperature and the humidity of all kinds of buildings, particularly schools and other public buildings, offices, residences and factories. Equally efficient on any form of heating and ventilating, steam, air or water.

Thermostats, humidostats, metal diaphragm valves, dampers, switches, and all kinds of apparatus for automatically controlling temperature and humidity in dry kilns, bake ovens, cold storage rooms, and similar places where uniformity of temperature is required to produce the best results.

JOHNSON
POSITIVE
ACTING
METAL
DIAPHRAGM
THERMOSTAT.

The only ALL-METAL thermostat on the market, having no soft or hard rubber parts to deteriorate and become inoperative. The only thermostat with a positive snap action for closing and opening valves quickly, positively, and fully, which is necessary for satisfactory and durable operation of steam valves. The only thermostat having an indicator which shows at a glance whether the thermostat has the heat on or off, and convenient means for shutting off the heat permanently when desired. This thermostat is the result of the development of thirty-five years of experience in this business and is the most perfect and efficient instrument of its kind so far produced.



MODEL PI
THERMOSTAT.
4 3/4 inches high, 2 inches
wide, 1 inch deep.

JOHNSON
GRADUATED
ACTING
THERMOSTAT.

This thermostat conforms in size and general construction to the positive thermostat above described, and is its equal in quality in every respect, but operates with a graduated motion instead of with a positive motion, and is therefore the most desirable and adaptable to that form of heating and ventilating where mixing dampers are to be controlled.

THERMOSTAT
COVERS.

The covers which conceal the mechanism of the thermostat proper are the same for both positive acting and graduated acting movements or mechanism. They are very small, inconspicuous and neat in design and workmanship.

There are two distinct styles: one called the R type, and one called the P type.

The R type is a die-casting, very beautifully designed and used generally in residences and other handsomely decorated buildings.

The P type is a pressed metal cover, very finely finished, but not as ornamental and artistic as the R cover, and used more generally in schools, office buildings, hospitals and places where simple and neat design is desired rather than artistic and ornamental.

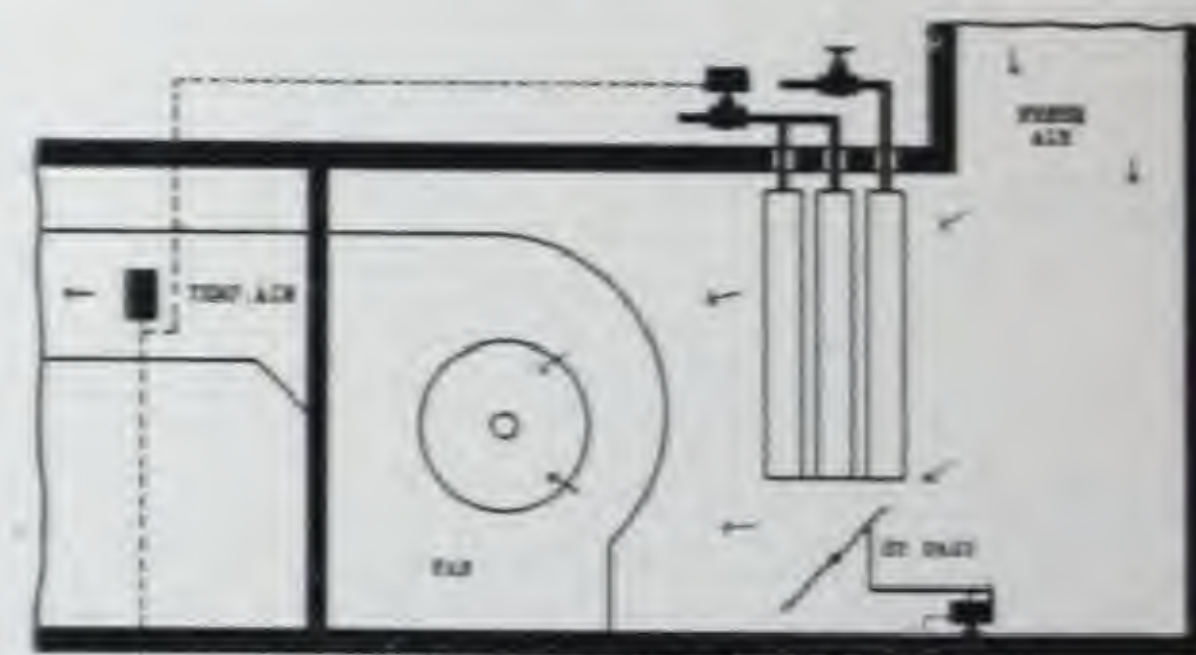
INSERTION
DUCT
THERMOSTATS.

These thermostats are identical in principle, quality, and construction with the room thermostats above described, but are constructed in such form that the sensitive element can be inserted in a duct or plenum chamber exposed to the temperature therein, but have the mechanism outside in an accessible place.

These thermostats are made either to control a single, individual valve or damper at any desired temperature, positively or intermediately, and are termed Unit Duct Thermostats, or to control a series of valves such as are usually located on a bank of steam coils, one after the other at predetermined, desired temperatures, and are known as multiple thermostats.

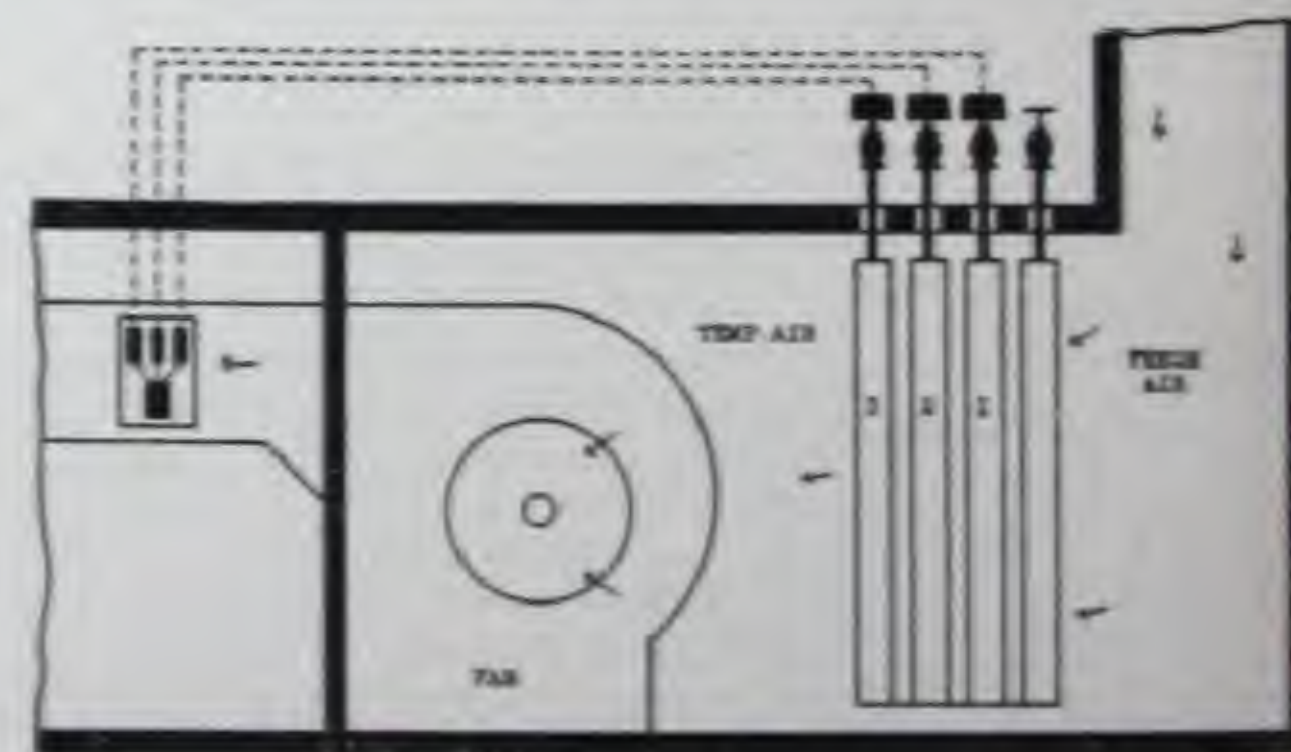
TANK
THERMOSTATS.

This thermostat is similar to the inserted duct thermostat, but is so constructed that the sensitive element can be inserted in a tank or pipe and exposed to liquid. It can be used to control the temperature of any liquid, either hot or cold, and is especially adaptable for controlling the temperature of hot water tanks.



TEMPERED FAN VENTILATION.

Thermostat, located in the duct from fan, controls by-pass damper under the tempering coils, or coils themselves, when there is no by-pass provided. Some engineers prefer to control both by thermostat. (See also multiple insertion thermostats.)



TEMPERED FAN VENTILATION.

The 3-point multiple thermostat here takes the place of single insertion thermostat. There is no by-pass damper, and temperature of ventilating air is regulated by coil control. For instance, section 1 opens at 68°; section 2 at 67°; section 3 at 66°. Thus, as the weather gets colder, the thermostat has more radiation under control.

**"SYLPHON"
VALVES.**

Diaphragm valves are obviously of equal necessity and importance to the thermostat in a complete system of temperature regulation. Because for many years no other suitable material was obtainable, rubber formed the diaphragms for these valves, but in the production of the "Sylphon," a metal diaphragm valve equal in efficiency to the rubber but permanently durable and absolutely indestructible was made possible, removing entirely the one great objection to automatic heat regulation, which is the perishable characteristic of rubber. The "Sylphon" seamless metal diaphragm valve is furnished by the Johnson Service Company for radiators, blast coils, hot water tanks, and, in fact, for any place where a steam valve is required, and in any sizes and commercial shapes. The "Sylphon" is also used in the construction of pneumatic motors for the operation of dampers.

**"SYLPHON" METAL DIA-
PHRAGM VALVE.****HUMIDITY
CONTROL.**

The supplying of moisture to the heated air in buildings and the automatic control of the percentage of moisture in this air are recognized by authorities to be as important as maintaining proper temperatures.

Humidity is indispensable for museums and fine residences to protect valuable pictures, furniture, wood carvings, etc. It is even more valuable for the protection of life in homes, schools, hospitals, etc.

**HUMIDOSTATS
AND
HUMIDIFIERS.**

The humidostat automatically controls the supply of moisture delivered to the air by a humidifier and maintains a constant percentage of relative humidity. It operates a diaphragm valve on the steam coils in the pan humidifier. The pan is provided with float box to maintain constant water level and is located in the ventilating air duct leading throughout the building. Steam jet and water spray types of humidifiers are also furnished.

**PNEUMATIC
SWITCH
CONTROL.**

Remote valve and damper control plays, by means of our pneumatic switches, a very important part in the economical operation of the modern heating plant, especially in schools. It saves the janitor's time for other duties, and makes it possible to accomplish results in the operation of the heating plant which cannot be obtained in any other way. It makes it easy to operate the fresh air, return air and vent dampers, with the corresponding assurance that these dampers will be economically operated as intended by the heating engineer.

**PNEUMATIC SWITCH.****AIR
COMPRESSORS.**

Electric, hydraulic, steam or belt driven compressors of all sizes are furnished and installed by this company to supply the small amount of compressed air necessary to operate Johnson thermostats, diaphragm valves, switches and other apparatus. They are entirely automatic in operation and require only the usual, ordinary care given to such classes of apparatus.

**HOW TO
SPECIFY.**

Furnish and install the Johnson All Metal system of automatic temperature regulation and humidity control, furnishing all necessary thermostats, valves, dampers, humidifiers, special devices, air compressors, piping and fittings, and labor of installing system, except setting valves and dampers in position—all in accordance with the following schedule and detailed specification:

SCHEDULE—State the rooms to be controlled and number of thermostats in each; the manner in which the tempered air, if there is any, is to be controlled; the manner in which the drafts of the boiler are to be controlled; and specify the manner of the control of any fresh air, vent or return air dampers, stating the location and number of switches.

THERMOSTATS—Specify Johnson Model Thermostat, size $4\frac{1}{2}$ " by 2" by 1"; and state whether it is to have residence or school cover, indicating device, positive shut-off, and whether it is to be positive or intermediate motion. Specify the number and kind of inserted thermostats.

VALVES—Specify the "Sylphon" Metal Diaphragm Valve, and state whether it is to be plain or nickel plated, with or without unions, adding that these valves will be placed in position by the heating contractor.

AIR COMPRESSORS—Specify kind of air compressor (steam, hydraulic, electric or power driven), requiring that the air compressor shall be of sufficient size to operate the system, with a factor of safety not less than 3, and requiring that it be provided with all necessary governing devices, fittings, gage, etc.

HUMIDOSTATS—Specify Johnson Humidostat and Humidifier, stating the kind of humidifier, whether perforated steam or copper evaporating pan.

DAMPERS—Specify that dampers shall be made by the heat regulating contractor, but installed by the galvanized iron contractor, and that dampers shall consist of wrought iron frames, sheet steel blades, strongly cleated, with brass bearings.

GUARANTEE—Require that system be complete in every respect, and that all necessary material and special fittings shall be furnished whether specifically mentioned or not. Require that entire system be guaranteed free from all original defects in material and workmanship, and that any parts proving defective or wearing out within 2 years from date of completion shall be replaced free of charge. Require that thermostats shall operate the valves or dampers to which they are attached, at a variation of not to exceed 1° above or below any given point. Require that both thermostats and valves shall be constructed entirely of metal.

SHELDONS LIMITED

ENGINEERS AND MANUFACTURERS.

HEAD OFFICE AND WORKS: GALT, ONTARIO, CANADA.

TORONTO OFFICE: 1002 KENT BUILDING,
TORONTO, ONTARIO.THE ONLY ALL-CANADIAN FIRM IN THE FAN MANUFACTURING BUSINESS.
ALL CANADIAN CAPITAL—ALL CANADIAN EXECUTIVES—ALL CANADIAN EMPLOYEES.

AGENTS:

MESSRS. ROSS & GREIG,
400 ST. JAMES ST., MONTREAL, QUE.
MESSRS. GORMAN, CLANCEY & GRINDLEY, LTD.,
CALGARY AND EDMONTON, ALTA.EAGAR, COOMBS & CO., LTD.,
HALIFAX, N.S.

AGENTS:

MESSRS. WALKER'S LTD.,
259 STANLEY ST., WINNIPEG, MAN.
MESSRS. ROBERT HAMILTON & CO., LTD.,
BANK OF NOVA SCOTIA BLDG., VANCOUVER, B.C.

FIG. 293—THE KEITH WHEEL.

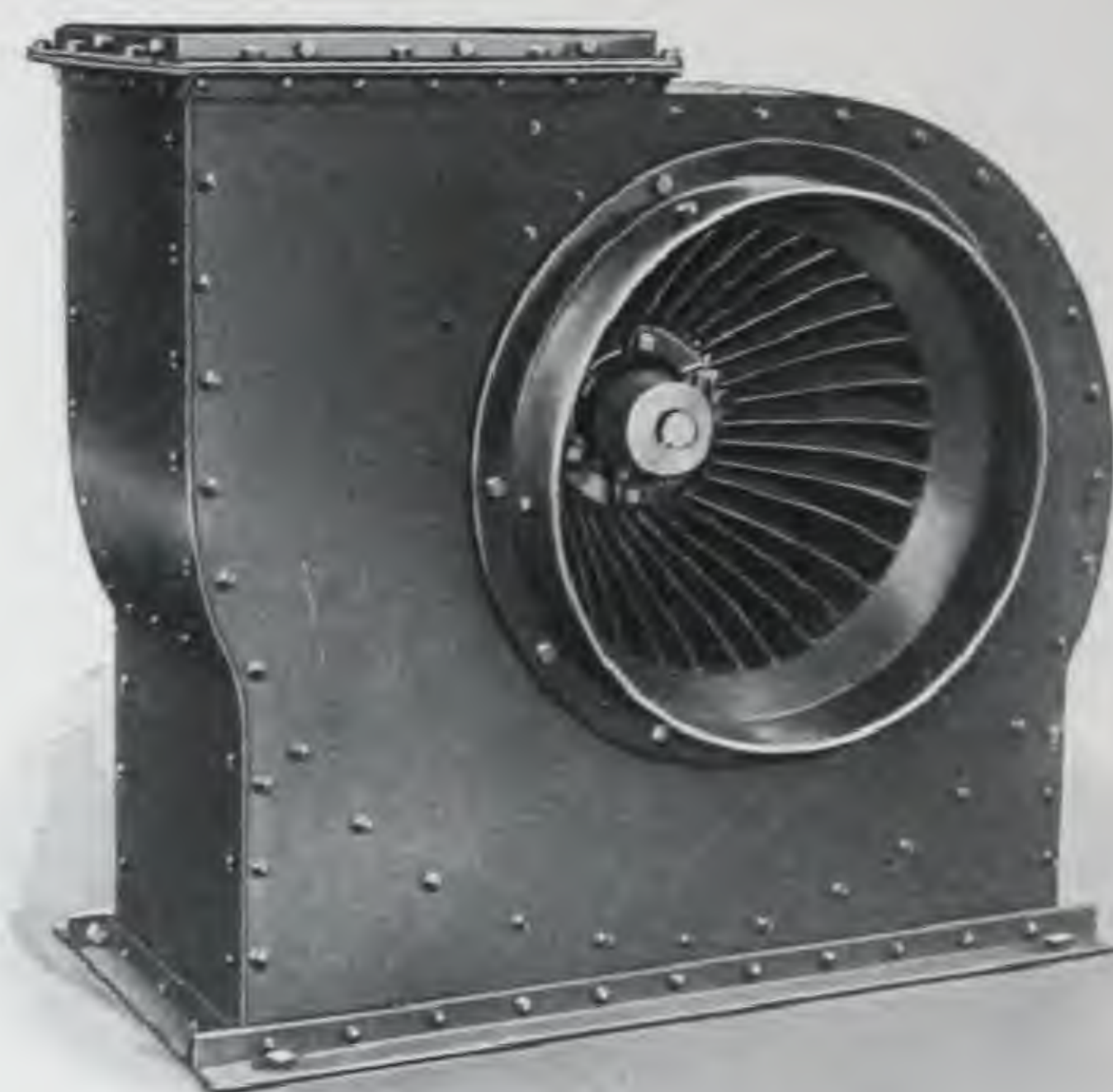


FIG. 299.—INLET SIDE OF SINGLE WIDTH KEITH FAN

KEITH FAN.

Fig. Nos. 299 and 293 show the Keith Fan complete and the wheel separate. This fan is a product of Messrs. Keith & Blackman Co., of London, England, and was only brought to its present perfect design after years of study and experimental work. We secured the Canadian rights for this fan in 1912, and the great success we have had with it in this short time substantiates the claims made for it by Messrs. Keith & Blackman in its extended use in the British Islands and over the continent of Europe generally.

It has been adopted by the British Naval Department in preference to other makes of fans, and to a certain extent by the American Navy. The Cunard S.S. Line, in 1912, installed the Keith Fan for the ventilation and cooling of the central turbine engine-room in the S.S. Lusitania, and the great engine-rooms of the S.S. Aquitania, of the same line, are equipped with these fans to supply over 16,000,000 cubic feet of air per hour.

As further evidence of superiority, we might cite the case of the Singer Building in New York City. The Keith Fan was installed in the engine-room or power-house of this building to replace another make of fan. To properly ventilate and cool this great engine-room, 7,200,000 cubic feet of air per hour was supplied at an expenditure of 22 horse power only. The installation is a complete success, the temperature never being more than 7 deg. Fahrenheit above the exterior temperature.

The points on which we claim superiority for the Keith Fan are: Large volumes of air at low speeds, noiseless operation and highest efficiency.

HEATING AND
VENTILATING
ENGINEERING.

We maintain a qualified engineering staff whose services are at the disposal of architects and engineers without charge. Our engineering department will cheerfully furnish specifications, drawings and data for heating and ventilating equipment, and co-operate with our patrons from inception to completion of installation.

HEATING AND VENTILATION OF SCHOOLS AND PUBLIC BUILDINGS.

The volume of air required for ventilation of schools, offices or public buildings should be based on the number of occupants or a suitable air change for the prevailing condition.

AIR SUPPLY.

The usual practice for school ventilation is to provide 30 cubic feet of air per minute per pupil; for churches, theatres and assembly halls 20 cubic feet of air per minute per occupant, and where the number of occupants cannot be estimated to provide for an air change every 10 to 15 minutes, except in rooms where ceilings are exceptionally high when a less frequent air change will be satisfactory. Toilet rooms, laboratories and kitchens should have an air change every 3 to 6 minutes. In such rooms exhaust ventilation should be applied to prevent escape of odors or gases into other parts of the building. It is not advisable to discharge large volumes into these rooms.

TEMPERATURE.

The temperature of the incoming fresh air should be from 72° F. to 75° F. at fresh air registers when air is for ventilation only, and temperature of air at fan outlet should be about 80° F., thus allowing for 5 to 10° drop in temperature in duct and flue system.

When air is required for heating as well as ventilation the temperature may vary from 100° F. to 140° F., dependent on heat requirements and local conditions.

FRESH AIR INTAKE.

In some localities the fresh air should be taken from above roof line of building down through vertical flue to fan room. The usual practice, however, is to provide fresh air intake directly to fan room.

TEMPERING COILS.

Where an air washer is installed for purifying and humidifying the air sufficient tempering coils should be provided to heat the incoming fresh air to a temperature sufficiently high to prevent freezing of spray water in air washer. The temperature of air leaving the air washer should not exceed 50° F., due to the fact that an efficient air washer will saturate the air at the temperature at which it leaves the air washer.

AIR WASHER.

The spray water will lower the temperature of the air from 5° to 10° F., depending on the temperature of the spray water and the temperature of the incoming air.

For description of Sheldon Spray Washer see page 4.

REHEATER.

The reheater coil, usually placed between air washer and fan, should be sufficient to heat the air from the temperature at which it leaves the air washer to a temperature 5° to 10° higher than required at registers. The air when cooled to 70 degrees will contain the desired amount of moisture.

FAN.

From the reheater coil the air passes into the fan, which in turn discharges the air into galvanized iron ducts, tunnels or flues.

In order for the ventilating system in any building to be a success it is essential that the fan be of such design that it will deliver the required capacity without noise or vibration. In fairness to the ultimate purchaser, the architect or engineer should specify the type of fan which will deliver its capacity with the least expenditure of horse power, thus reducing operating expense.

In these respects the Keith Fan excels.

It is silent in operation, best constructed, and handles large volumes of air at low power cost.

AIR DUCTS.

The air ducts to convey the air to the desired points must be of the proper size and design to carry the air noiselessly. Small ducts give high velocities which may create noise, besides increasing the resistance in the system, thus increasing the power required to deliver the air.

TABLE NO. 1.

ALLOWABLE VELOCITIES IN VENTILATING SYSTEMS FOR PUBLIC BUILDINGS.

Fresh Air Inlet	1,000 ft. per min.	Main Ducts	1,000 to 1,400 ft.
Tempering Coil	1,000 to 1,200 ft.	Branches	800 ft.
Air Washer	600 ft. per min.	Vertical Flues	600 ft.
Reheater Coil	1,000 to 1,200 ft.	Supply Registers	450 ft.
Fan Outlet	2,000 to 2,500 ft.	Exhaust Registers	350 ft.

ARRANGEMENT
OF APPARATUS.

Fig. No. 3 shows an apparatus lay-out in plan. The spacing and arrangement of the different parts of the apparatus are such as to give the air a direct and uniform flow throughout and to allow free access to all the parts. The distances between the parts should not be decreased from those shown, but can be increased to advantage in many cases, particularly the distance from the fresh air inlet to the tempering coils and from the reheating coils to the fan.

Where it is at all possible, there should be a free space of 3 feet around the apparatus, to allow of attendance and free access to any part that might have to be repaired or replaced.

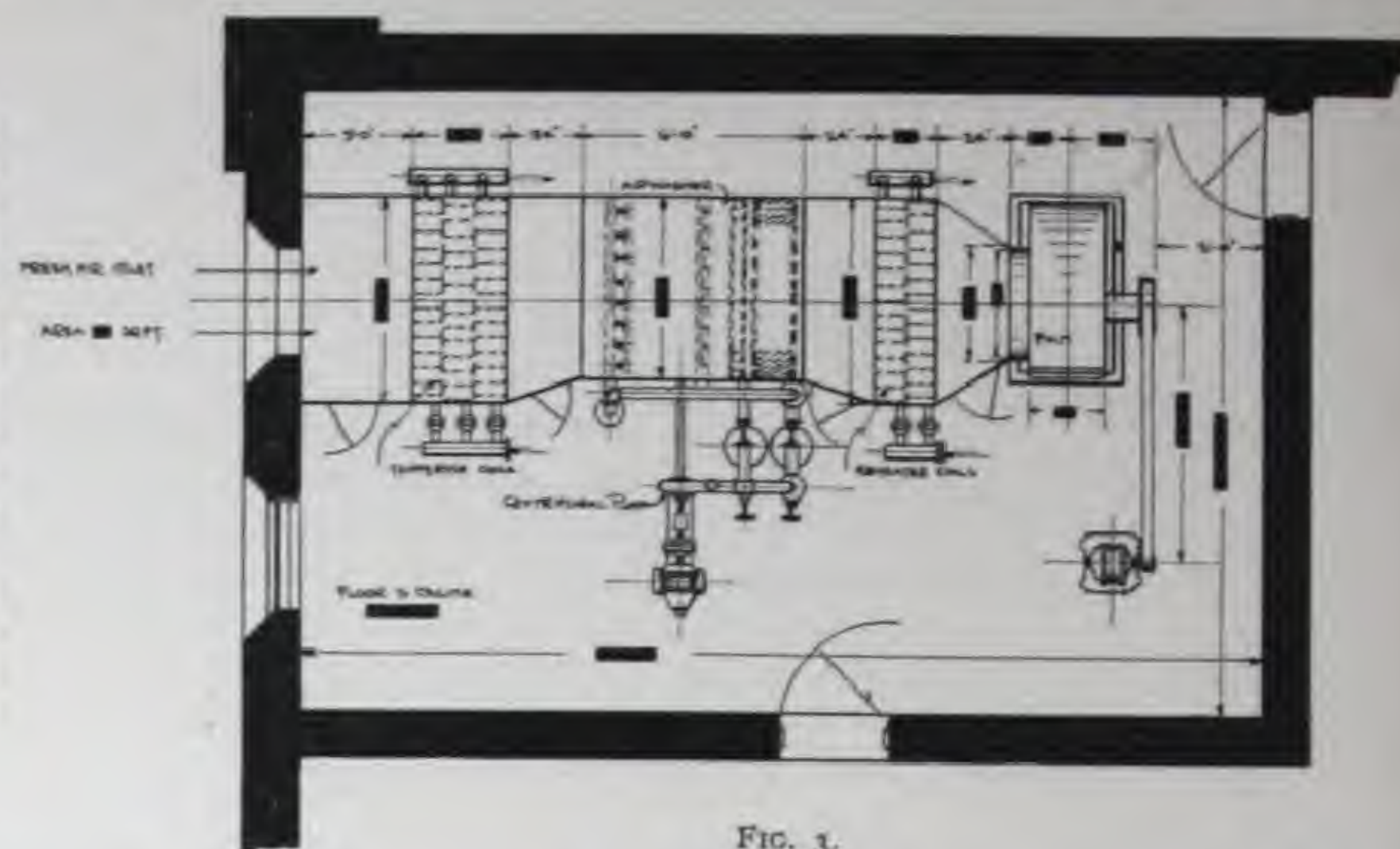


FIG. 3.

SIZE OF
APPARATUS
ROOM.

For apparatus arranged as shown and including the 3-foot space, and also for apparatus with fan direct driven, the room sizes given in Table No. 2 will be found suitable in most cases.

TABLE NO. 2.

CUBIC FEET OF AIR PER MINUTE.	APPARATUS WITH FAN BELT DRIVEN.			APPARATUS WITH FAN DIRECT DRIVEN.		
	Length. Ft.	Width. Ft.	Height. Ft.	Length. Ft.	Width. Ft.	Height. Ft.
Up to 10,000.....	24	17	9	25	13	9
10,000 to 15,000.....	26	18	10	26	14	10
15,000 to 20,000.....	27	19	10	28	15	10
20,000 to 25,000.....	28	19	11	29	16	11
25,000 to 30,000.....	29	20	11	30	17	11
30,000 to 40,000.....	30	21	12	31	18	12

For apparatus having the inlet side of the fan at right angles to the face of the re-heater coils, add 1 foot to the width of the rooms given in the table for apparatus with fan direct driven.

The above measurements are for standard installations, i.e., arranged to give highest efficiency, and in cases where the conditions make it necessary to change the design, the sizes of the rooms may vary. Where the installation does not include an air washer, approximately 8 feet may be cut off the length of the room.

IMPORTANT POINTS
IN FAN
INSTALLATION.

If fan is driven by electric motor, the motor should have a surplus power of 25%, as the characteristic performance of a fan is such that the fan will overload if the resistance against which it is working is less than that calculated.

Do not allow a fan equipment to be crowded into a small room and be erected in a haphazard manner. It is always an important installation, and you expect good results from it. Put it in, therefore, as you would an engine or steam turbine in a power-house.

BOILER HORSE
POWER REQUIRED
FOR VENTILATION
SYSTEM.

It will be understood that the foregoing literature pertains to ventilating systems only where the temperature of the air is not raised beyond 80° F. For fan heating systems higher temperatures are required.

The amount of steam required per 1,000 cubic feet of air for tempering and re-heating coils in ventilating systems may be obtained from the following table, which is based on severest conditions.

TABLE NO. 3.

LOCALITY.	Temp. of Incoming Air.	Total Coils, Sq. Ft.	Condensation per Sq. Ft. (lbs.)	Total Cond. (lbs.)	Equivalent Boiler H.P.
Maritime Provinces.....	10° below	55	1.92	106	3.6
Quebec and Northern Ontario.....	30° below	65	2.45	159	5.3
Central and Western Ontario.....	10° below	55	1.92	106	3.6
Western Canada.....	40° below	75	2.31	174	5.8
British Columbia.....	Zero	51	2.1	107	3.5

The coils referred to in the above table may be Sheldon Standard Pipe Coil Heaters or Cast Iron Vento Radiation. The quantities of square feet are not exact for every installation but are close enough to make preliminary calculations. The boiler horse power per 1,000 cubic feet of air can be relied upon for any installation.

FACTORY HEATING
SYSTEMS.

For factory heating systems, or in such systems where the entering air, besides ventilating the building, is used to heat it as well, the final temperature of the air is generally about 130° or 140° at the fan outlet, and in calculating the pipe, if it is figured at a final temperature of 140°, it will be sufficient in most cases. Where very large volumes of air are delivered into rooms, a lower temperature, such as 120°, is sufficient, as the excess of air delivered more than makes up for the fall off in temperature.

We recommend that factory heating systems be based on heat transmission and leakage as far as quantity of air and final temperature are concerned. The transmission in B.T.U. for building materials may be obtained from Kent's Mechanical Engineer's Handbook or other reliable source.

Factory heating systems may be installed in three ways: 1st, using all fresh air; 2nd, using part fresh air and part recirculated air; 3rd, using all recirculated air. Satisfactory heating may be obtained with any of the above mentioned arrangements but ventilation is obtained only by the first two methods. No ventilation is obtained when all the air is recirculated.

To architects and engineers who are not thoroughly experienced in this line of work we offer the services of our engineering department to assist them in designing the system and preparing specification.

SHELDON SPRAY AIR WASHER.

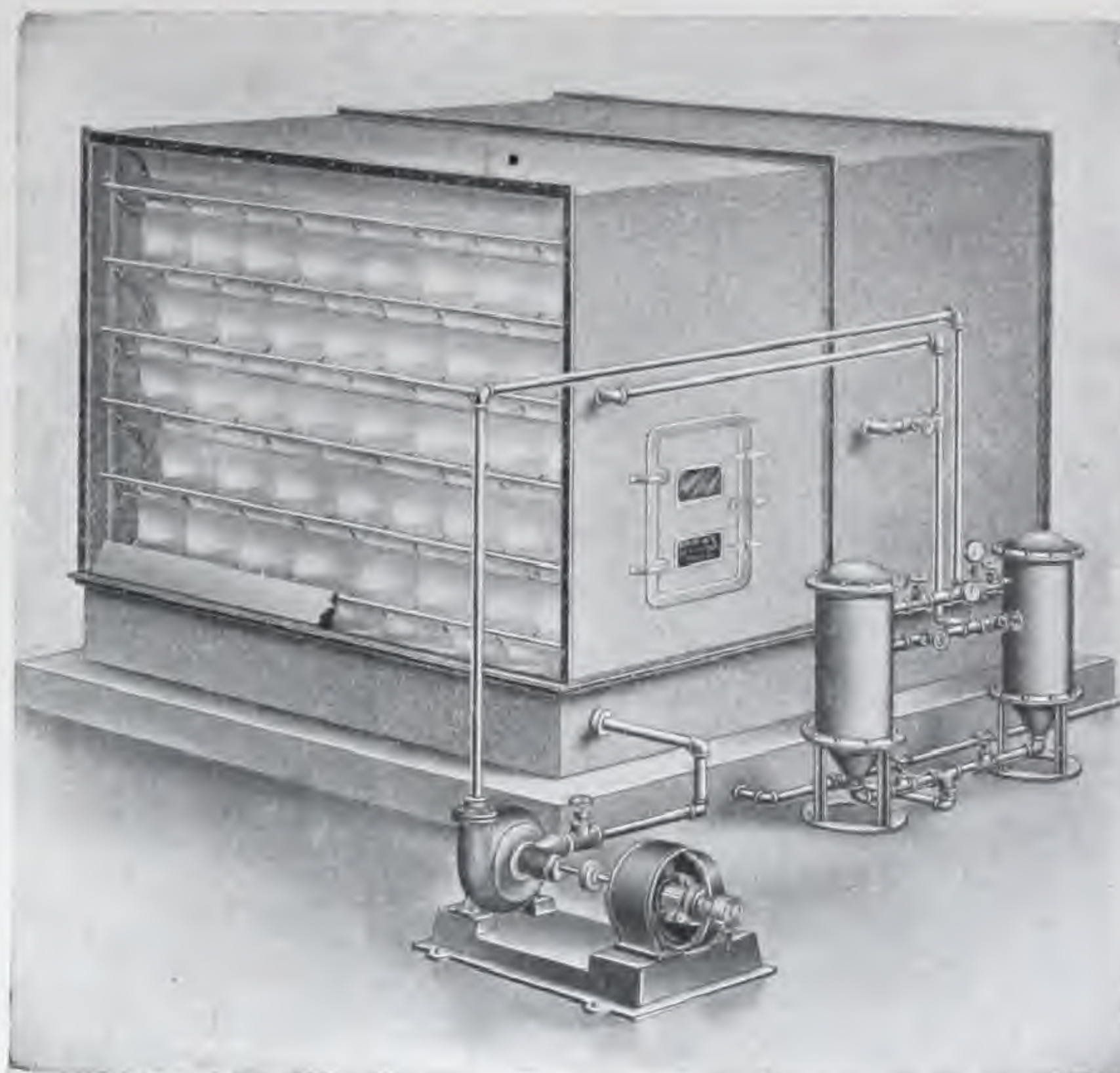
The Sheldon Spray Air Washer is meeting with an increased demand throughout Canada on account of its simplicity and ease of operation and high efficiency as an air-cleaning medium.

This modern Air Washer has been developed for application to all conditions met in the ventilation of buildings. In any kind of weather a constant supply of clean air at nearly constant relative humidity conditions is assured. It is equally adaptable with slight alterations for air-cooling and also for humidifying.

GUARANTEE.

When the washer is operating under full capacity conditions it is guaranteed to remove 99% of the suspended matter in the air as coarse as boiler soot, and 95% of the finest dust as found in ordinary air as determined by the following tests:

One pound of dry boiler soot is to be sifted into the entrance of the washer and uniformly across its face in one minute's time for each 10,000 cubic feet rating of the washer. 90% of the soot is to be washed from the air before leaving the washer as determined by a sheet of white paper not less than ten inches square, coated with a white adhesive coating, suspended at right angles to the flow of air leaving the washer.



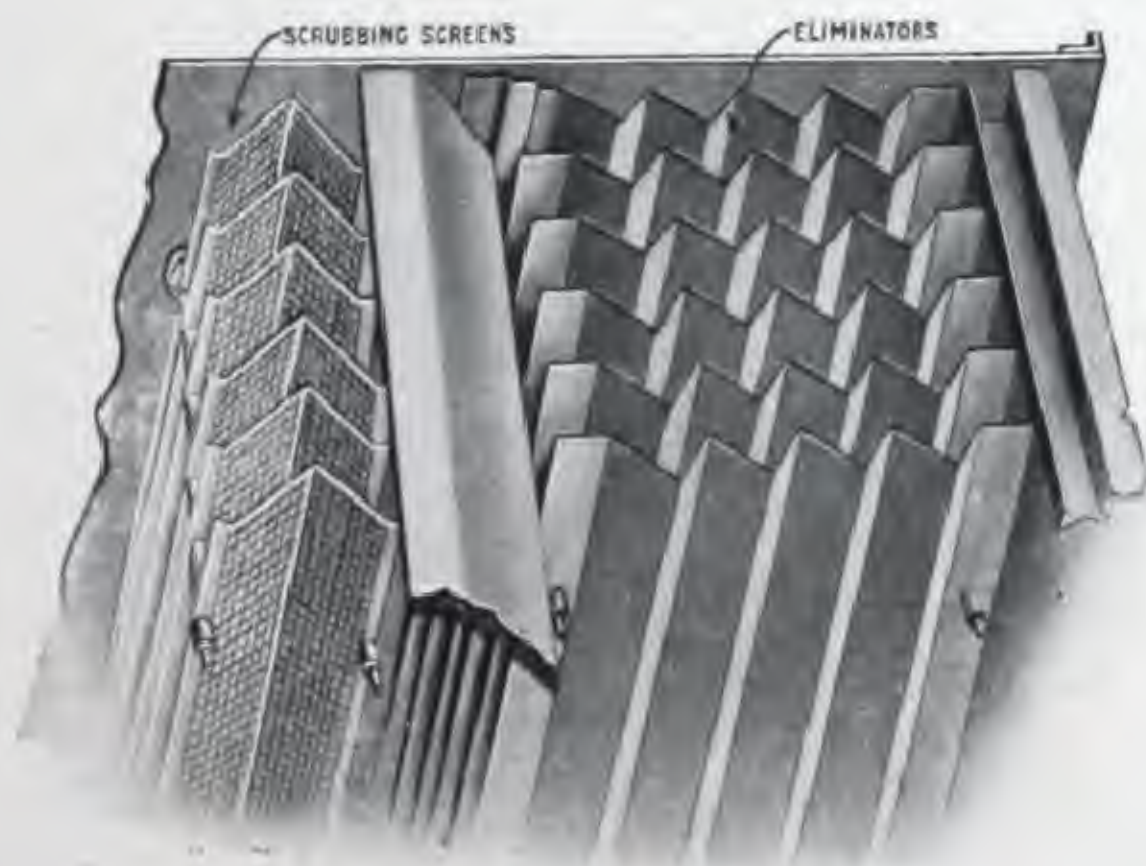
THE "SHELDON SPRAY" AIR WASHER.

PARTS FORMING NOZZLE.

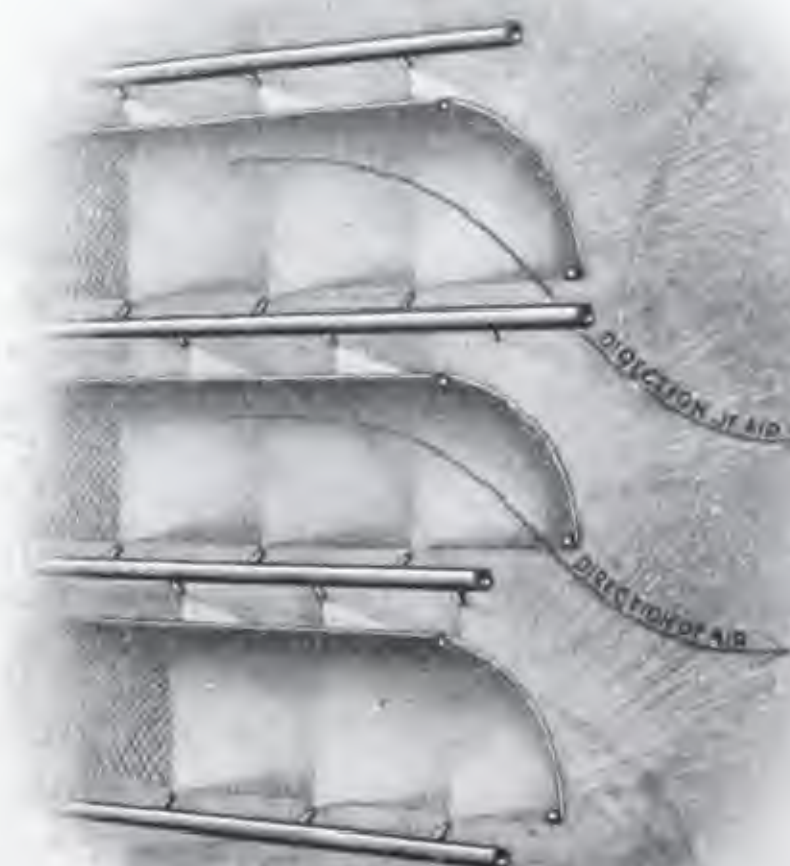
The nozzles are made of bronze, with $\frac{1}{8}$ -inch orifice, finished smooth on the inside and of such design as to make a fine mist-like spray at all pressures exceeding 10 lbs. The nozzles are arranged and distributed so as to completely fill the washing chamber with a dense mist when operating at normal pressure. The nozzles are of non-clogging design. No cleaning or flushing device is required, or no adjusting is necessary after the air washer is installed.



PARTS FORMING NOZZLE



SECTION OF ELIMINATORS.



SPRAY SCREENS.

SCREENS AND ELIMINATORS.

It has been demonstrated that efficient air cleaning cannot be accomplished where the spray and dust particles travel in parallel lines. This Air Washer is therefore so designed that the air is forced to travel *through the spray* instead of with the spray. Fine spray screens made of brass are placed at the entering end of the Air Washer which deflect the air downward and directly through the spray. A second set of spray nozzles are placed in the inside of the Washer a short distance past the centre. These are known as scrubber nozzles, and immediately behind these are the scrubbing screens and eliminators. The eliminators are made of 25 gauge aluminum plate formed in V shape and spaced $1\frac{3}{8}$ inches apart across the full width of the washer.

Full specification and drawing of any size Air Washer will be cheerfully furnished upon request.

CANADIAN SIROCCO COMPANY, LIMITED

WINDSOR, ONTARIO.

BRANCH OFFICES:

504 MCGILL BLDG.,
24 KING ST. WEST,
567 BANNING ST.,MONTREAL, QUE.
TORONTO, ONT.
WINNIPEG, MAN.

MADE IN CANADA.

"SIROCCO."

BRANCH OFFICES:

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604 CREDIT FONCIER BLDG.,
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VANCOUVER, B.C.
WINDSOR, ONT.

PRODUCTS.

AIR WASHERS, HEATERS, VENTILATING FANS, EXHAUSTERS, BLOWERS, VERTICAL SELF-OILING ENGINES, "DETROIT" TILTING STEAM TRAPS, DRYING APPARATUS, COMPLETE HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT.



TYPE E-EXHAUST FAN.



"VENTURA" FAN-WALL TYPE



SIROCCO UTILITY SET.



"SIROCCO" FANS IN A HIGH SCHOOL.



DETROIT RETURN TRAP.



"ABC" STANDARD TYPE P-STEEL PRESSURE BLOWER.



SIROCCO WHEEL-TURBINE TYPE IMPELLER.



TYPE A-AUTOMATIC ENGINE.

HEATING AND VENTILATION OF
SCHOOLS, CHURCHES, THEATRES AND PUBLIC BUILDINGS.

GENERAL.

The following hints on the successful application of "Sirocco" Heating and Ventilating Equipment are, of necessity, much abbreviated, and contain merely the general principles on which an efficient system must be based. Our service department includes a fully qualified staff of engineers, who are always ready to co-operate with the architect, assisting him in the laying out of his heating and ventilating systems.

QUANTITY
OF AIR.

Thirty cubic feet of air per minute per occupant is the accepted standard in schools, twenty cubic feet, etc., in theatres, churches and public buildings where people are assembled for a period of more than one hour duration.

In rooms where the number of occupants is unknown, a change of air every 10 to 15 minutes will be sufficient.

This amount must be changed to suit varying conditions, such as extremely low ceilings, which require more; extremely high ceilings less.

Toilet rooms, kitchens, chemical laboratories, or any rooms having obnoxious gases will require considerably more—say, a change of air every 3 to 5 minutes.

A good rule in kitchen work, where exhaust ventilation is provided in connection with hoods located over ranges or grills, is to allow not less than 500 cubic feet of air per minute per lineal foot of range, so that a range 20 feet long would require an exhaust capacity of not less than 10,000 c.f.m.

In school-rooms and public buildings, where the heat is supplied principally by direct radiation, with ventilation by fans, the incoming air should have a temperature at the register or grilles of 75 to 78 degrees.

Owing to the loss of heat through transmission in ducts, at least 5 degrees should be added for the final temperature at the fan outlet.

The velocity or speed at which the air travels to and from the various parts is of great importance where quietness is essential.

The list below will give good results in the average public building work:

Fresh air intake, 600 feet per minute.
Through coils, 1,000 to 1,200 feet per minute.
Outlet of fan, 1,500 to 1,700 feet per minute.
Main trunk duct preferably 1,200 not over 1,500.
Branch ducts or connections to vertical flues, 700 to 900.
Vertical flues (galvanized iron) in schools, 600 to 700.

Vertical flues (brick or tile) in schools, 500 to 600.
Net velocity through registers, 300 to 400 feet.
Net free area through plain lattice pattern cast iron grilles, figures approximately 70% of gross area.
Registers 8 feet or more above floor use 400 feet.
Registers under 8 feet above floor use 300 feet.

It is quite customary and considered good practice to calculate the extraction outlets in rooms supplied with fresh air having an area of 80% of the supply registers.



STATIC PRESSURE OR FRICTION ENCOUNTERED IN THE FLOW OF AIR DETERMINING THE TIP SPEED AT WHICH THE FAN SHOULD OPERATE.

There are many tables published by well-known authorities giving the loss encountered in the flow of air through pipes and the restriction in heaters, washers, etc.

The following average is based on a building corresponding in size to a 12 or 14 room school two stories in height with basement, heated and ventilated by fan system, and having the longest run of pipes in the basement not exceeding 60 feet.

<i>Air Intake.</i>	<i>Tempering Coils.</i>	<i>Washer.</i>	<i>Heating Coils.</i>	<i>Duct System.</i>	<i>Total.</i>
.05	.15	.25	.3	.15	.9

HEATERS.

The amount of heating surface can be carefully calculated from the tables in our bulletins for both the cast iron type and those built of pipe.

In calculating the amount of surface where an air washer is to be used, from 6 to 10 degrees of temperature loss must be taken care of, due to the effect of the cold water in the washer.

Many arguments are put forth for and against by-passing cold air around the heating coils in order to regulate the temperature. It should never be done immediately ahead of a washer, and our experience has been that by-pass dampers are more of a nuisance in any place than an assistance.

The casing around the coils should be at least of 16 gauge steel stiffened with angles spaced 30 inches on centres.

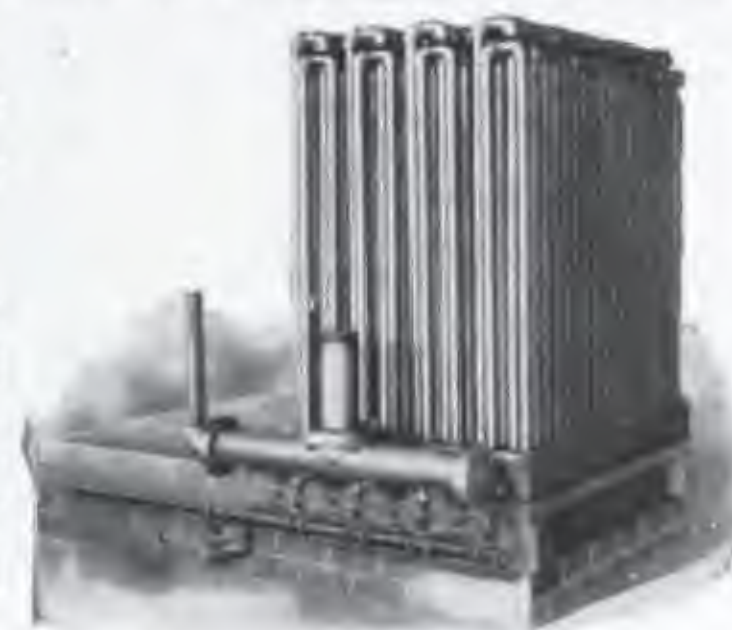
These angles should be $1\frac{1}{4} \times 1\frac{1}{4} \times 3-16$.

Any lighter material will have a tendency to buckle during operation and to make a noise.

If a gravity return is decided upon for returning the condensation back to the boiler, allow at least 28 inches difference in height between the boiler water line and the return outlet of the coils.

Do not bush the coil tappings.

If smaller connections are decided upon, make the reducer after the elbow.



PIPE COIL HEATER.

FANS.



INDUSTRIAL HEATING AND DRYING SYSTEM.

In selecting the size of fan, after the amount of air is determined and the amount of friction calculated, refer to the tables on bulletins. If space conditions permit, select the equipment operating at the lowest consistent speed due to the static pressure or friction and operating at the most efficient point.

Fans giving the best results and operating quietly with long years of service are those designed by experts after long years of experience in their manufacture.

"SIROCCO" equipment has a world-wide reputation which has been won by quality of material and the careful designing for each individual job, which has taken years of production to accomplish.

Like all good things it has been imitated by many manufacturers, but in their attempt to create equipment sufficiently different in design to list under another trade mark, they have sacrificed the finer points of its construction with a consequent loss in efficiency.

mark, they have sacrificed the finer points of its construction with a consequent loss in efficiency.

MOTIVE POWER.

"SIROCCO" equipment is designed for all classes of motive power.

Because of the strides in electrical equipment in the last few years, more units are going in having direct connected, chain drive and belt connected motors than any other, although direct connected engines in buildings sufficiently large to carry high pressure steam or steam above 20 lbs. are perhaps the quietest of all drives.

Our experience has been that flat belts of leather made endless, have provided the most satisfactory independent drives.

Direct connected motors are admirable, particularly where direct current is available.

With alternating current the speeds obtainable on the motors determine whether the units can be made direct connected.

It is always advisable where possible to install variable speed motors or electric equipment having controlling device whereby the speed can be changed from 15% to 25%. This permits a more flexible system.

MADE IN *"Sirocco"* CANADA
TRADE MARK.

AIR WASHERS.

There is probably more confusion and uncertainty in the selection of air washer equipment than any other apparatus in connection with a successful ventilating plant.

Air Washers of every description are upon the market, from the old coke and screen type down to the last word or "SIROCCO" Washer.

There are nine essentials in the construction of an air washer, as follows:—



SIROCCO AIR WASHER.

1. Mist spray from nozzles.
2. A large enough spray chamber, so that the bank of mist will be at least 3 feet deep.
3. Wet, or scrubbing surfaces of ample area.
4. Nozzles that can be easily flushed out, or cleaned.
5. Efficient strainer that is accessible for removal and cleaning.
6. Sufficient eliminator surface to remove entrainment, and at the same time so designed as to offer a minimum of resistance to the air in passing through.
7. Eliminators so constructed that they can be easily removed for painting or replacing.
8. Large cooling efficiency.
9. Substantial construction and so arranged that all exposed surfaces can be covered with non-corrosive material, and all joints made tight without the use of foreign substances.

It is impossible to describe or recommend the equipment necessary for humidifying or dehumidifying here.

Bulletins covering this can be obtained by addressing any of the offices of this Company.

FACTORY BUILDINGS.

QUANTITY OF AIR.

As the heating and ventilating of factory buildings is, in most instances, a problem of getting a standard of ventilation, the quantity of air supplied is determined from the amount of heat necessary to overcome the losses from the radiation of its various surfaces. Thus a more careful calculation of this quantity of air is required than in public building work.

A table giving constants for calculating radiation losses will be supplied upon request, together with suggestions regarding its use.

TEMPERATURE OF AIR.

Naturally, the higher the temperature of the incoming air, the less air required to heat the building. There is a limit, however, to this temperature, depending upon the class of building, how close the outlets are to the workmen, etc.

An average of from 120 to 135 degrees is customary.

VELOCITY.

The velocity permissible in factory work is considerably greater than in public building construction, particularly where the noise of the rush of air in pipes is not objectionable.

A velocity at the fan outlet of 2200 is quite permissible.

Where the outlets are close to the floor, the velocity would vary from 600 to 700.

Where these outlets are up in the trusses or blowing against glass, velocities of 900 to 1000 are permissible.

DON'TS.

Don't let your galvanized iron contractor use square elbows in the duct system. The small radius should be at least one-half the diameter or width of the pipe.

Don't permit the installation of high-speed motors making large ratios of pulleys; they give continual trouble.

Don't put the foundations of brick, concrete or wood, or the wiring of motors on your heating contractor. This belongs to the general or electrical contractor.

Don't accept everything masquerading under the name of washer as the equipment that you want or the equal of "SIROCCO."

Don't fail to request any bulletins or information covering any equipment on this subject. These are prepared for your service and the effort is wasted unless you use them.

Don't forget that "SIROCCO" is the last word in heating and ventilating equipment.



CONCRETE COLUMNS USED AS DISTRIBUTING DUCTS.

MADE IN *"Sirocco"* CANADA
TRADE MARK.

"DETROIT" RETURN TRAPS.

A return trap is used chiefly to return condensation from heaters, dryers, radiators, etc., or from feed water heaters directly to the boiler without loss of temperature. The process by which this is done is clearly shown by the following descriptions of the single and double trap systems of boiler feed.

SINGLE TRAP SYSTEM.

To use the single trap system there must be sufficient pressure in the receiver to elevate the water to the trap. The required pressure can be determined by allowing one pound to be equivalent to each two feet of height to which the water must be elevated. If the pressure available is insufficient, the double trap system, later described, should be used.

APPARATUS:—The apparatus used, as will be seen by referring to Fig. 1, consists of a trap placed above the water line of the boiler, and a receiver placed at a point low enough that all the returns can drain into it by gravity. A pipe connects the receiver to the "water inlet" of the trap. The trap is connected by two pipes to the boiler, one running from the "water outlet" of the trap to the boiler feed intake, or preferably to the blow-off line; the other from the steam dome to the "steam inlet" of the trap.

OPERATION:—The receiver fills with water, and due to gravity or pressure in the returns, the water is forced through a check valve into the trap tank, which has an automatic air vent. The trap tank is supported off centre by a nickel-plated trunnion, and is held in a horizontal or normal position by a large counterweight. The weight of the water when the tank becomes filled overbalances the counterweight and the trap tilts. This opens the steam valve, admitting boiler pressure above the water, thus equalizing the pressure in the trap tank and the boiler. Due to the position of the trap above the water line of the boiler, the water naturally flows into the boiler by gravity. To prevent the boiler pressure backing up in the water outlet pipe while the trap is filling, a check valve is placed in this line close to the trap. The above mentioned check valves are furnished with each trap.

DOUBLE TRAP SYSTEM.

APPARATUS:—The apparatus is the same as that used with a single trap system with the addition of a lower return trap which lifts the water into the upper trap. The lower trap (as shown in Figure 2) is placed at a point so low that the condensation will drain from the receiver into it by gravity. The operation of the upper trap is exactly the same as the single trap system.

NOTE:—Return traps are used for many other purposes than boiler feed. The "water inlet" and "water outlet" which enter the same hollow chamber in the trunnion bearing can be reversed, or either opening can be used for inlet or outlet, the unused opening being closed with a plug.

New book with complete information on "Detroit" traps sent upon request.

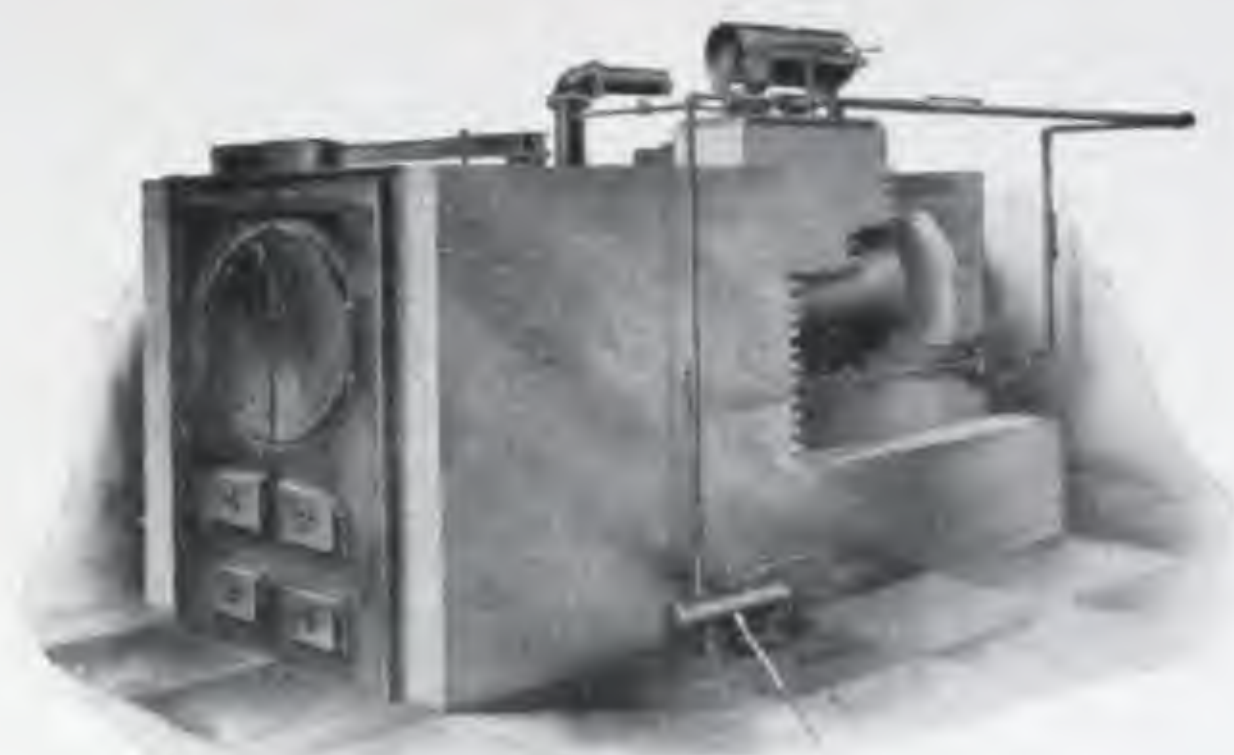


Fig. 1.
Typical method of connecting up "Detroit" Return Traps for Single Trap System. Arrows indicate direction of flow of condensation.



"A. B. C." Detroit Return Trap.

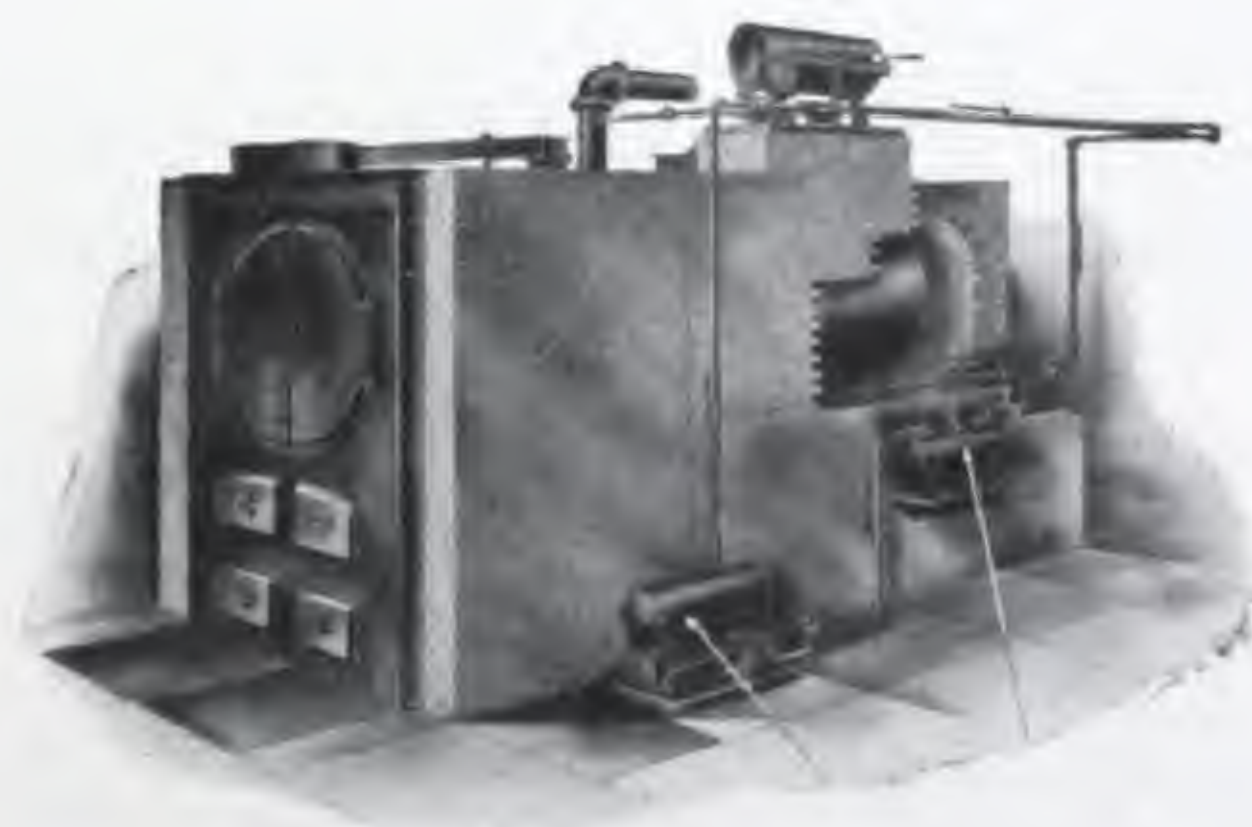


Fig. 2.
Typical method of connecting up "Detroit" Return Traps for Double Trap System.

CANADIAN BLOWER AND FORGE CO., LIMITED

HEATING, VENTILATING, DRYING AND MECHANICAL DRAFT EQUIPMENT.

KITCHENER, ONT.

TORONTO, MONTREAL, CALGARY, VANCOUVER, ST. JOHN.

PRODUCTS.

CANADIAN HEATING SYSTEMS.

HOT BLAST HEATING SYSTEMS, VENTILATING AND EXHAUST FANS, AIR WASHERS.

The Canadian heating system consists of 3 elements: the heater, the fan, and a system of distributing ducts.

CANADIAN HEATERS—The heater is in sections, each consisting of 4 rows of vertical 1-in. pipe screwed into a cast iron base. The coils are tightly enclosed on top and sides by a sheet steel casing through which the fan draws air.

CANADIAN FANS—The fan is a Canadian conoidal or planoidal, selected for the particular service required in each case.

DUCTS—The ducts that distribute the warm air are usually of sheet metal, overhead, but may be incorporated into the building construction or be placed underground.

ADVANTAGES—The advantage of the Canadian fan system of heating lies both in the flexibility of operation and economy. Direct radiation heats a building very slowly and with no uniformity; especially in high buildings its action is much like a chimney—warm air escapes through the roof and draws in cold air below.

A fan system with the proper amount of reserve can heat a building quickly and the arrangement of ducts throws the heat down into the working area.

Another advantage is that a building allowed to cool off at night can be quickly heated in the morning. The system also has a tendency to produce a slight plenum, so that the outside cold air is not drawn in as with the direct system.

The chief points of the Canadian system may be summarized as follows:

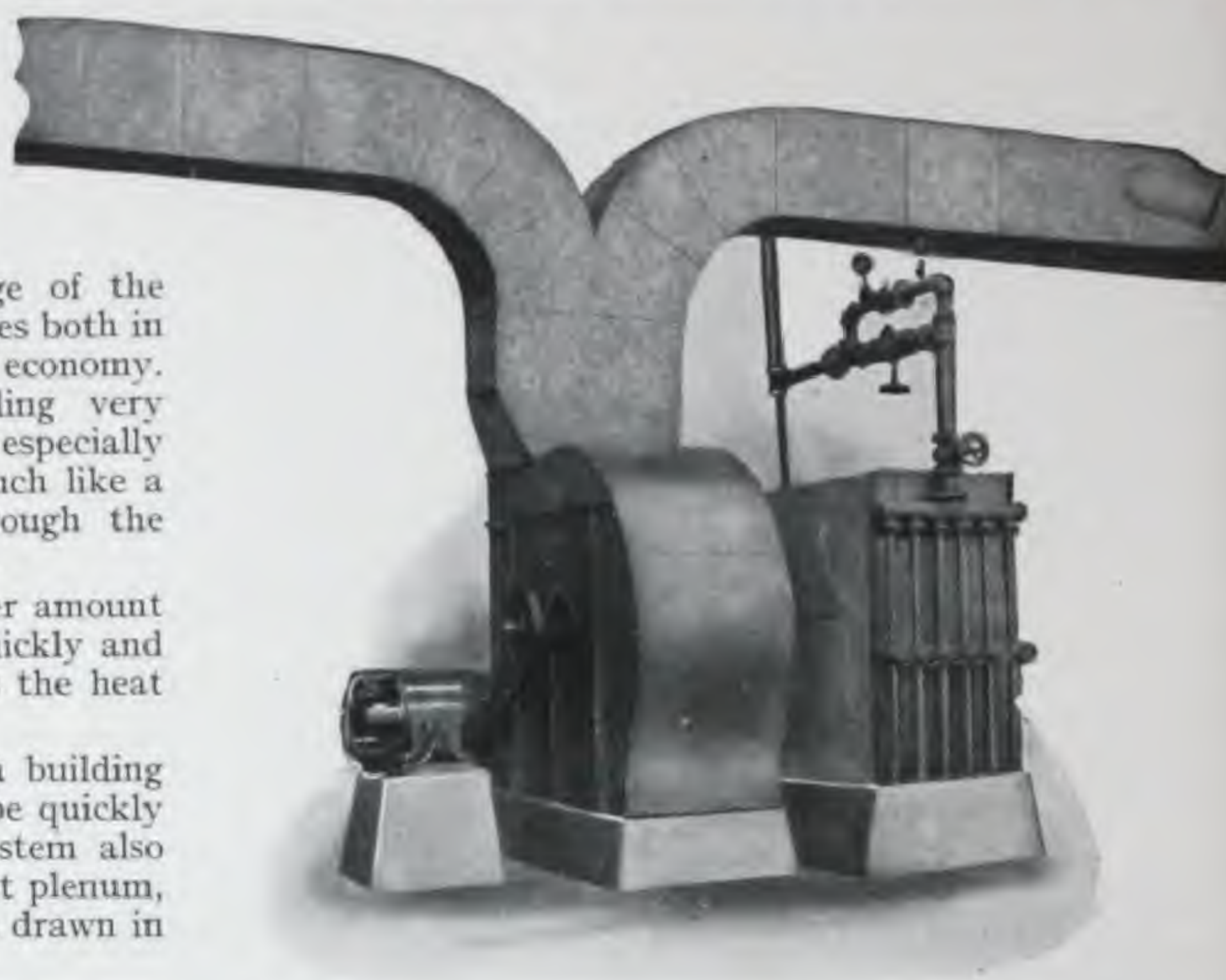
- (1) Perfect ventilation regardless of exterior conditions.
- (2) Uniform and proper distribution of heat.
- (3) High efficiency of heating surfaces (3 to 5 times that of direct radiation).
- (4) Greatest economy in operation.
- (5) Utilization of exhaust steam.
- (6) Prevention of drafts by production of a plenum.
- (7) Independent regulation of heating and ventilation effects.
- (8) Great flexibility in operation to suit varying conditions, affording maximum economy.
- (9) Ease of control, which prevents overheating.
- (10) Great compactness, affording an economy of space and reducing of cost of steam connection.
- (11) Perfect drainage, making less repairs necessary and giving a lower rate of deterioration than with direct radiation.
- (12) Lower cost of installation.
- (13) The entire apparatus is easily portable and is, therefore, a permanent asset.

Catalogue No. 700 and others give complete information.

BABY CONOIDAL FANS.

The Baby Conoidal Fan is of the high efficiency multiblade type. Housing is cast iron and can be swung around to discharge in any desired direction. This fan furnishes a large volume of air at relatively low pressure with moderate speed. The wheel is accurately balanced, insuring a smooth running, noiseless machine; its "hum" is almost inaudible.

It is unexcelled for all kinds of drying and cooling purposes, for supplying fresh, cool air to offices, homes, staterooms, telephone booths, etc., and for exhausting smoke, fumes and foul air from kitchens, restaurants, lavatories, etc.



TYPICAL CANADIAN INSTALLATION, SHOWING FAN, HEATER AND DUCTS.



THREE-QUARTER HOUSING, NIAGARA CONOIDAL FAN.



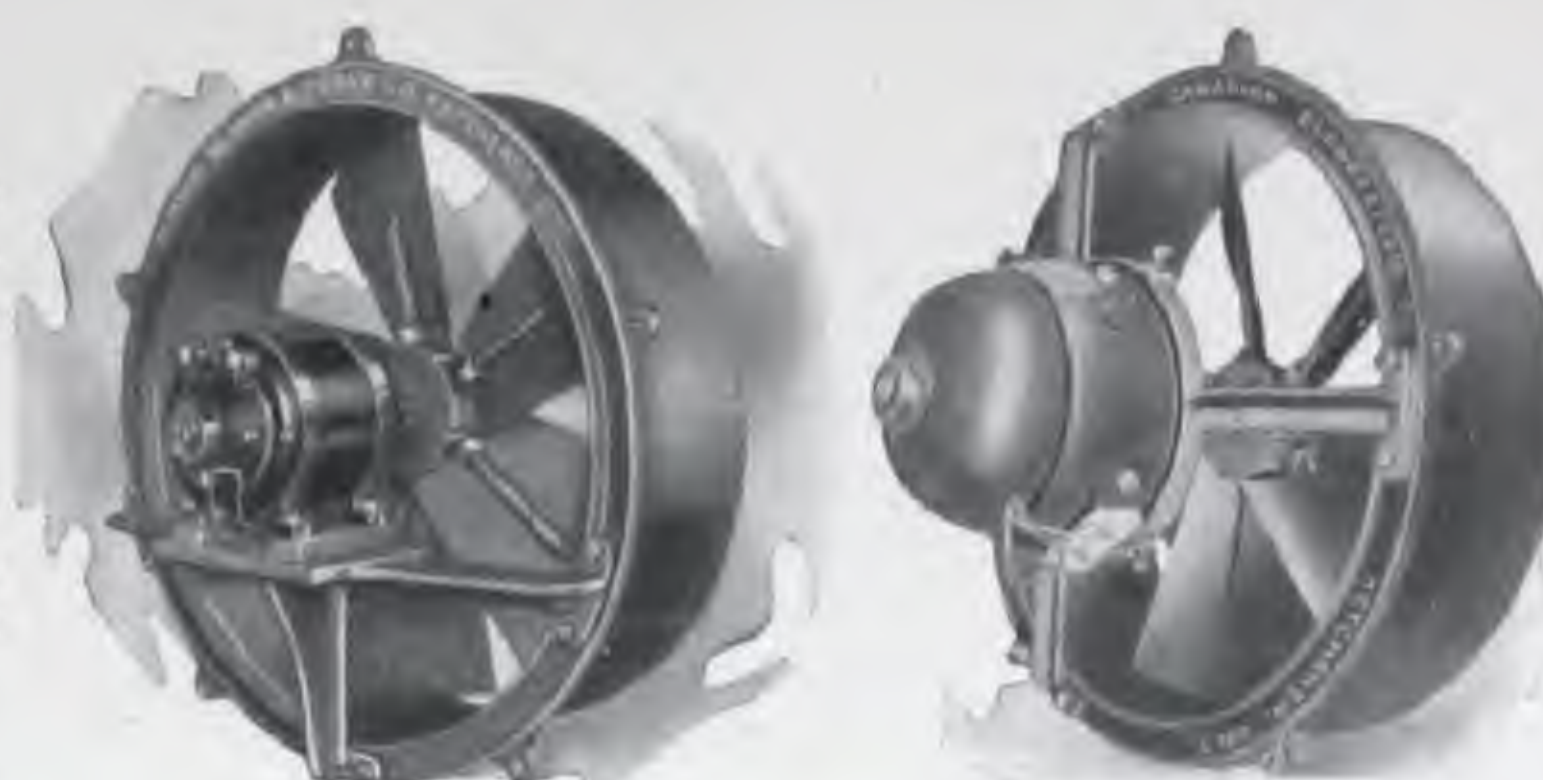
BABY CONOIDAL FAN.

CANADIAN
ELECTRIC
DISC FANS.

Produce the greatest results at lowest cost in cooling workshops, loft buildings, restaurants, kitchens, and for carrying off smoke and fumes when no ducts are needed.

The motor is secured to the frame by means of a bracket on the smaller sizes and a tripod on the larger. Floor supports are unnecessary.

Operation of fan is noiseless and no attention except occasional oiling is required.



SMALL SIZE.

DISC FANS.

LARGE SIZE

CARRIER
AIR
WASHERS.

Air washers insure clean pure air, practically free from dust. A considerable saving in fuel is also effected because a lower temperature may be used with increased comfort, because of the added humidity.

Carrier air washers consist of 3 important elements, each of which is extremely important in insuring proper control of a perfect heating system. These elements are: the spray system, the eliminators, dew-point control.

CARRIER SPRAY SYSTEM—Very simple and highly effective. The design is such that large openings may be used, which positively prevent clogging. An extremely fine spray can be had at a water pressure as low as 15 lbs. and a corresponding greater atomizing effect is obtained when this pressure is increased.

A fine spray is essential for the intimate intermingling of the water and air.

ELIMINATORS—The feature that makes the Carrier Air Washer supreme is the method of assembling the bank of eliminators. Each eliminator is made of one continuous sheet of metal and held in place without any rivets. This allows access to each eliminator without disturbing any other. Think what this means when compared to the old solid riveted bank.

DEW-POINT CONTROL—The Carrier dew-point control insures the delivery of air into buildings with just the proper amount of moisture, without variation, during the heating season.



INTERIOR CARRIER AIR WASHER.

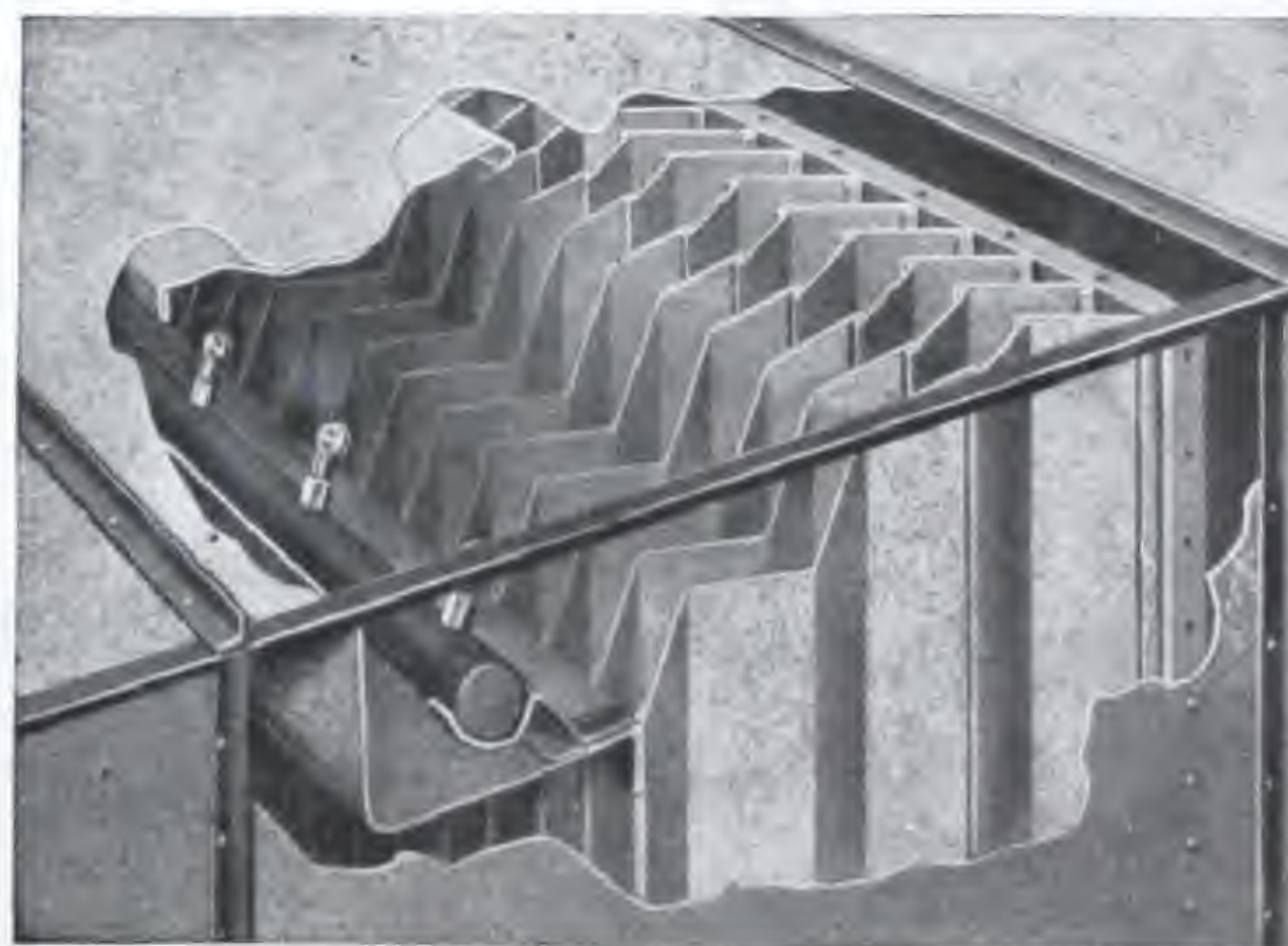
CATALOGUE.

Carrier Catalogue No. 480 gives complete data and information.

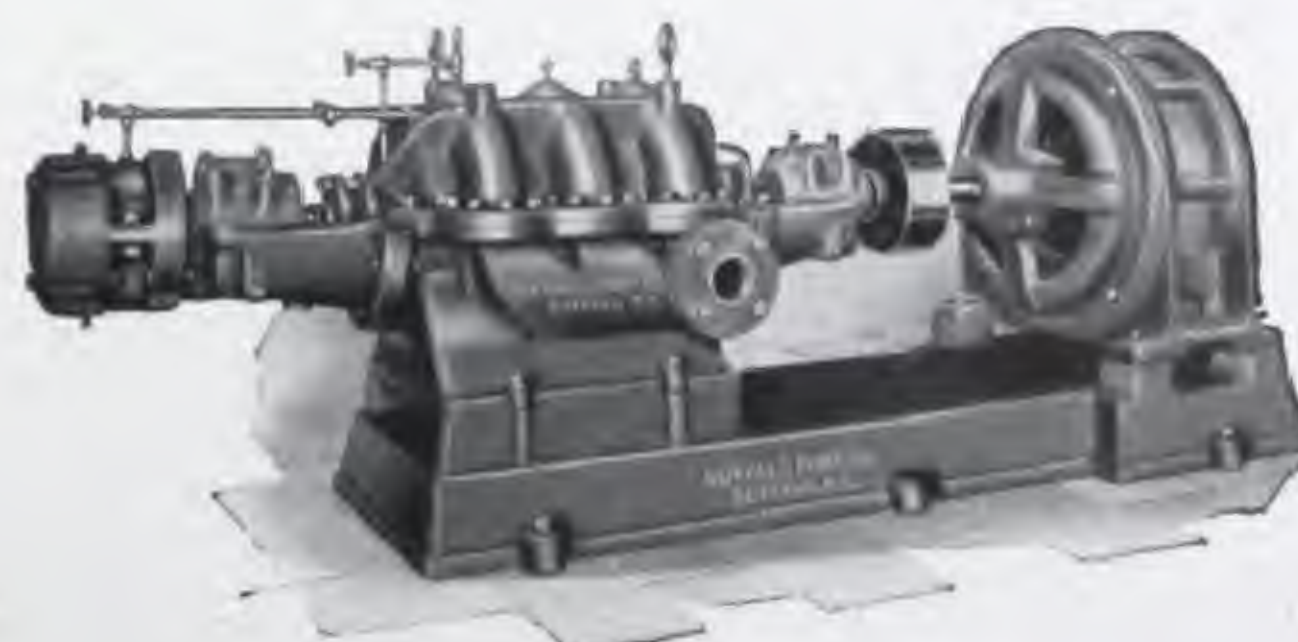
PUMPS.

BUFFALO DOUBLE SUCTION IMPELLER MULTISTAGE CENTRIFUGAL PUMPS are built in 2, 3 and 4 stages for capacities up to 2000 G.P.M. and for heads as high as 400 lbs. Suitable for direct connection to moderate speed electric motors or high speed steam turbines. Can be furnished for either right or left-hand rotation.

Water enters each side of each impeller in equal volume and pressure. With this construction all rotating parts have to be in hydraulic balance under all conditions of operation. Write for Bulletin 925-A.



PART OF CASING REMOVED, SHOWING ELIMINATORS.



3 STAGE CLASS "RDS"—MOTOR DRIVEN.

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J. E. MARTIN, Manager. Telephone No., Galt 690.



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TORONTO:—C. B. McBRIDE, Manager. Telephone, Main 7510.

All of our products are sold under the trade mark "STURTEVANT."

PRODUCTS.

HEATING AND VENTILATING EQUIPMENT.

Multivane Volume Blowers
and Exhausters.
Propeller and Disc Type
Volume Exhaust Fans.

Fuel Economizers.
Mechanical Draft Apparatus.
Turbine and Steam Engine
Generator Sets.

High Pressure, Medium Pressure
and Low Pressure Blowers.
Volume Blowers.
Planing Mill Exhausters.
Dry Kilns.

Heaters.
Air Washers.
Engines and D.C. Motors.

POWER HOUSE EQUIPMENT.

Gasoline Electric Generator
Sets.
Generator Cooling.

INDUSTRIAL EQUIPMENT.

Cupola Blowers.
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Gas Exhausters.
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Steam Engines.
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Steam Exhaust Heads.

AIR CONDITIONING EQUIPMENT.

Paper, Glue, Wood and Leather Drying,
Vapour Absorption Systems.

Dehumidifying Systems.

Air Washing, Humidifying and Dust
Removing Systems.

VACUUM CLEANING EQUIPMENT.

Stationary Plants for Home and Industrial Use. Portable Vacuum Cleaners of all sizes for all work.

PUBLICATIONS.

The STURTEVANT line is so varied that a comprehensive presentation in one publication is undesirable. We have, therefore, issued a special bulletin on each particular line, covering the mechanical details.

ENGINEERING SERVICE.

As each installation is unique, it is usually necessary that an engineer analyze the conditions before making recommendations. The engineering staff of the B. F. Sturtevant Company of Canada, Ltd., has been trained to analyze all conditions and to properly apply our apparatus accordingly. Consult them, they are at your service without obligation.

CATALOGUES.

DRYING APPARATUS.

No. 220 Lumber Drying.

No. 243 Paper Drying.

HEATING AND VENTILATING.

No. 271 Multivane Fans.

238 Multivane Fans, Performance Charts.

230 Heaters.

227 Heating and Ventilating Layouts—Blue
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201 Electric Dust Blowing Sets.

No. 237 Ready to Run Ventilating Sets.

278 Air Conditioning.

1011 Heating and Ventilating Factories.

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1015 Heating and Ventilating Book complete.

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276 Turbo Undergrate Blowers, Design 5.

256 Steam Turbines.

No. 217 D.C. Type D Motors.

259 Vertical Engines.

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No. 185 Slow Speed Low Power Planing Mill
Exhauster.233 Slow Speed Low Power Reversible and Con-
vertible Planing Mill Exhauster, Design 6.

No. 234 Steel Plate Blowers and Exhausters.

252 Steel Plate Fan Performance Chart.

261 Pneumatic Dust Collecting and Convey-
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256 Steam Turbines.

217 Type D, Direct Current Motors.

239 Steam Engine Generator Sets.

255 Gasoline Electric Generating Sets.

256 Steam Turbine Generator Sets.

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222 Fuel Economizers in Paper Mills.

223 Fuel Economizers in Textile Mills.

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258 Design 4 and 5 Pressure Blowers.

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No. 195 General Catalogue.

250 Architect's and Engineer's Data Book. Carefully prepared, giving full technical information usually required. It contains 960 pages of invaluable information covering Heating and Ventilating.

THE GOLDIE & McCULLOCH CO., LIMITED

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PRODUCTS.

RETURN TUBULAR AND WATER TUBE BOILERS, HORIZONTAL AND VERTICAL STEAM ENGINES, MARINE ENGINES, STEAM TURBINES, PUMPS AND CONDENSERS, HEATERS, TANKS, STACKS, Etc. TRANSMISSION MACHINERY, SAFES, VAULTS AND VAULT DOORS.

BOILERS.

With one of the largest and best equipped Boiler shops in Canada, we are in a position to turn out Boilers on short notice, including horizontal return tubular heating and Power Boilers, Sectional Water tube Boilers and special plate and tank work of all descriptions.

ENGINES.

We build engines to meet practically any and every condition of service. Among them the Wheelock Slow speed; Goldie Corliss; Ideal High speed; Vertical enclosed forced lubrication high speed engines; Marine engines and steam turbines.

HEATERS,
PUMPS AND
CONDENSERS.

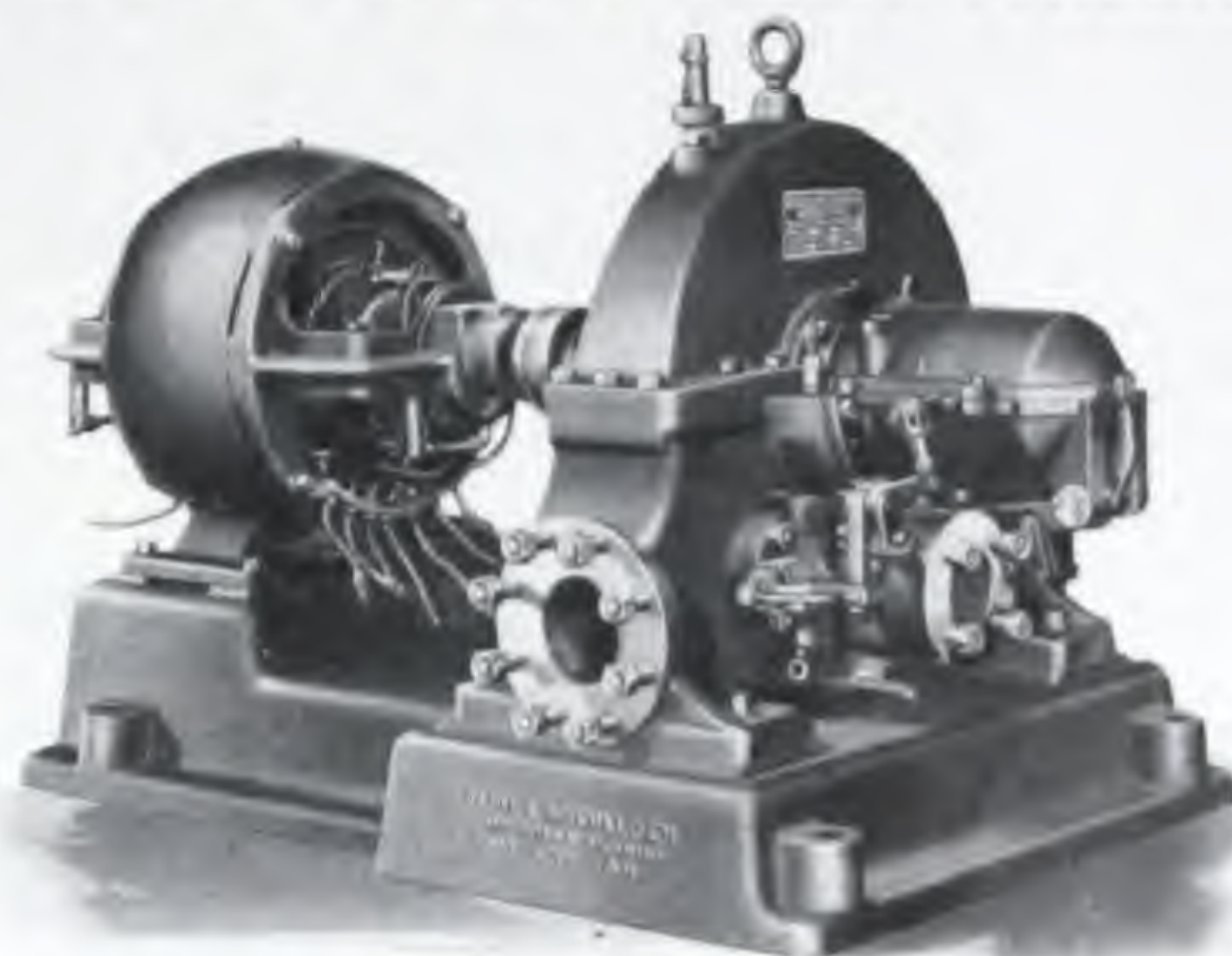
These include our Ideal Open type Feed Water heaters; Square, cast iron open type heaters; Reciprocating Boiler Feed Pumps; **REES-RO-TURBO** Centrifugal pumps, Air pumps and condensers; Vertical marine pumps; the "Contraflo" system of condensing, Feed Water Heating, Grease extracting, etc.; and Morrison's Radial Evaporators for Marine purposes.

OTHER
PRODUCTS.

In addition to the above we build a complete line of safes, vaults, vault doors, deposit boxes, etc. See our advertisement in Safe and Vault section, page 273.

CATALOGUES
AND SPECI-
FICATIONS.

We shall be glad to submit plans, specifications, catalogues, etc., to Architects and others interested. Our Engineering Department is also at your service should you require their assistance.



GOLDIE & McCULLOCH "WAIT" STEAM TURBINE DIRECT CONNECTED TO GENERATOR.



A RECENT INSTALLATION OF 8 DOUBLE DRUM G. & McC. SECTIONAL WATER TUBE BOILERS AT THE DARTMOUTH, N.S., PLANT OF THE IMPERIAL OIL CO.



3 **REES-RO-TURBO** CIRCULATING PUMPS RECENTLY INSTALLED AT THE PLANT OF THE LOG SUPPLY CO., BERTHOE, QUE.

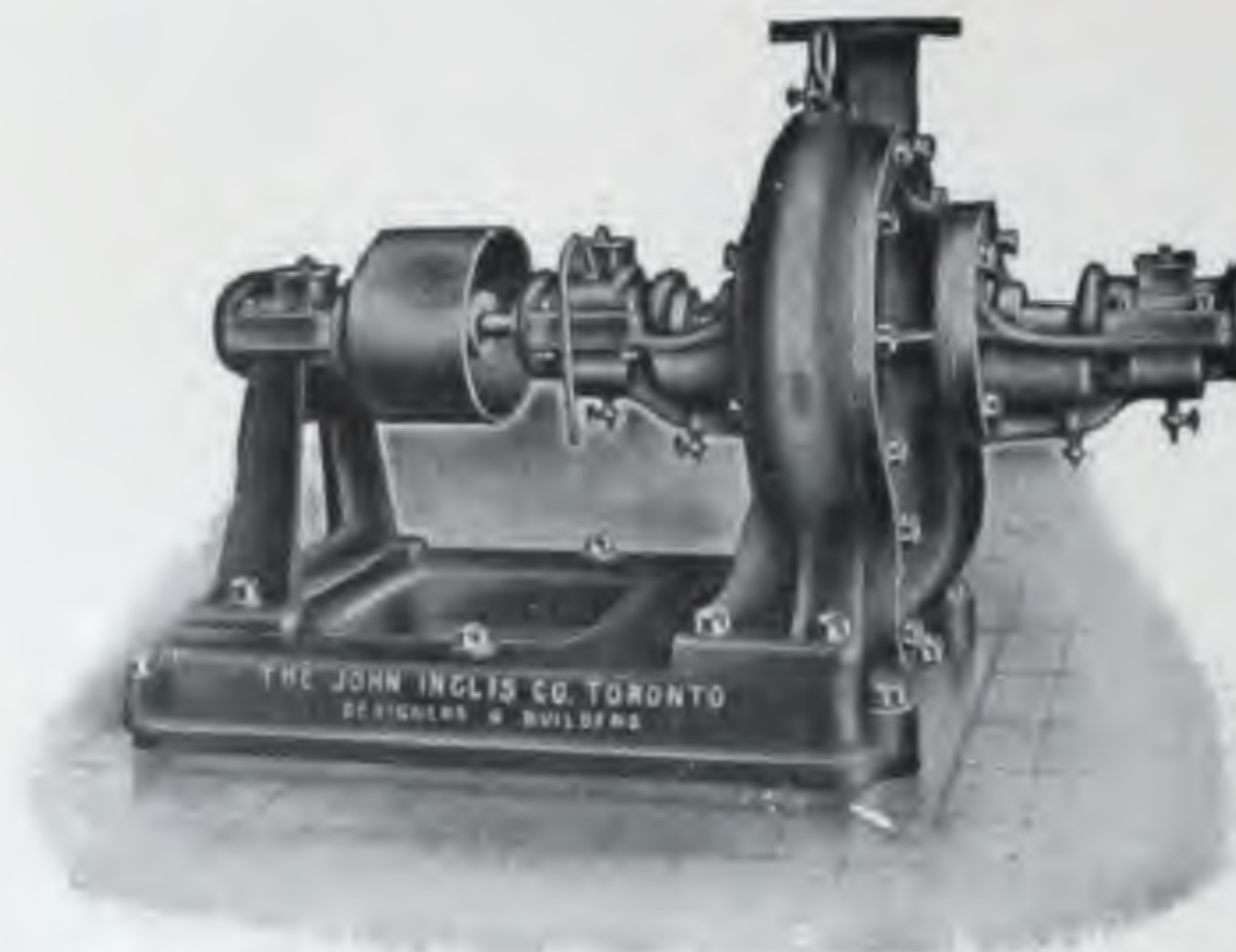
THE JOHN INGLIS CO., LIMITED
ENGINEERS AND BOILERMAKERS,
14 STRACHAN AVENUE,
TORONTO, ONT.

PRODUCTS.

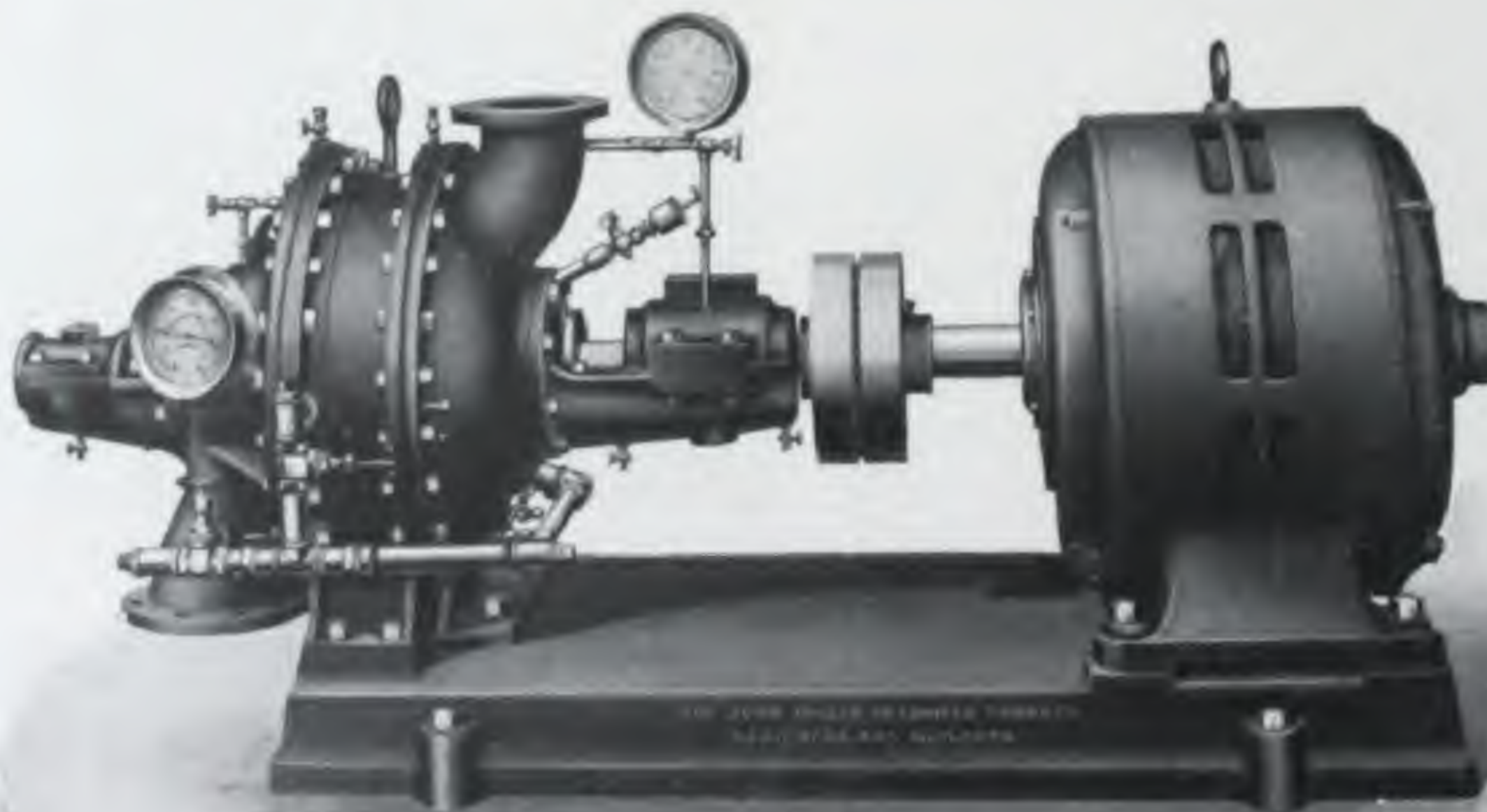
We are sole Canadian makers of ERIE CITY WATER TUBE BOILERS, Vertical and Horizontal.

We also make BOILERS of all kinds for any service—RETURN TUBULAR, FITZGIBBON, SCOTCH MARINE, SCOTCH DRYBACK, LOCOMOTIVE AND SUBMERGED TUBE.

ENGINES and PUMPS of all kinds for any service.



BELT-DRIVEN TURBINE PUMP.



INGLIS HORIZONTAL TURBINE POWER PUMP.

OTHER
PRODUCTS.

Tanks—Air, Oil, Varnish, Soap and Lye Tanks.

Plate Work—Penstocks, Stand Pipes, Steel Tanks, Stacks, etc.

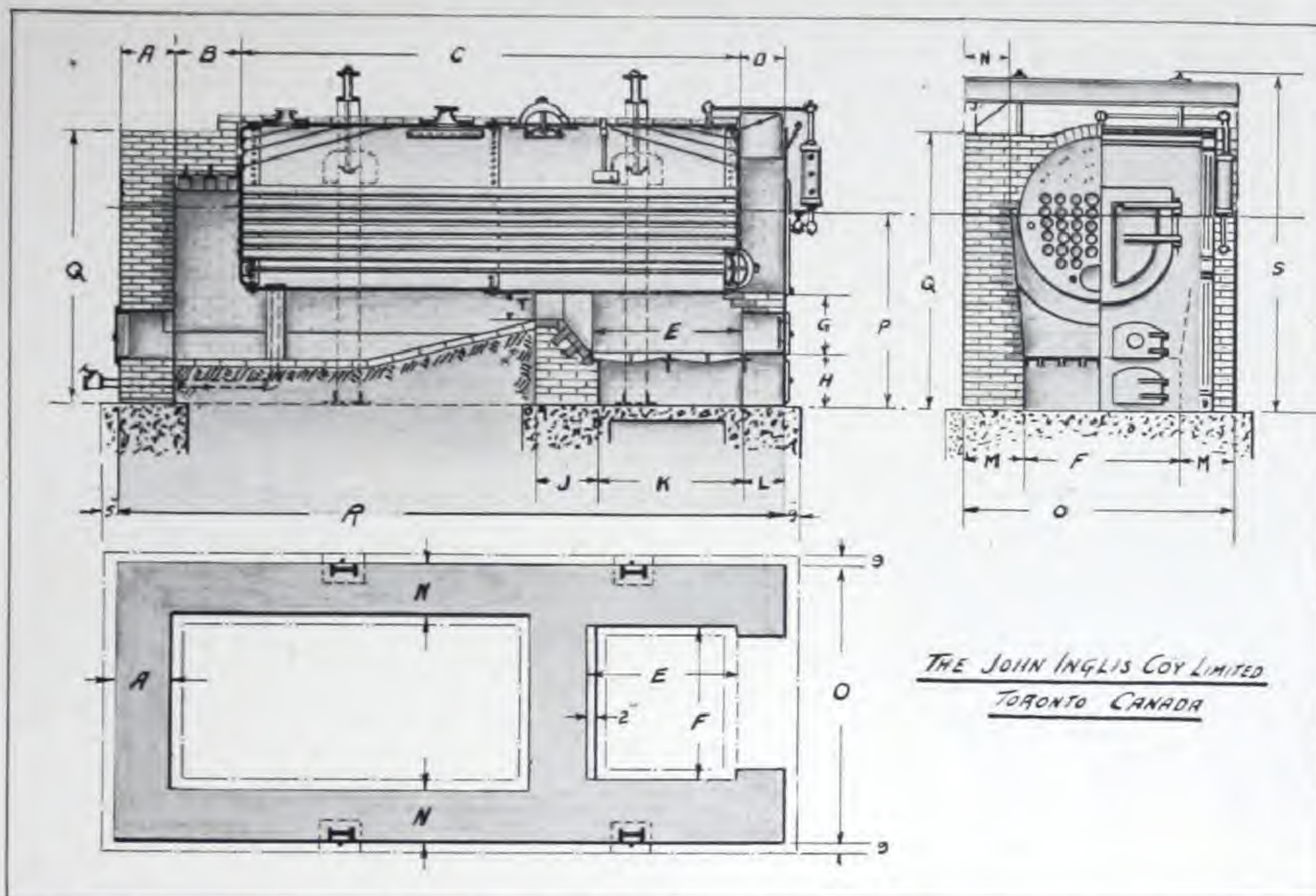
THE JOHN INGLIS CO., LIMITED

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BOILERS OF ALL KINDS FOR ANY SERVICE.



THE JOHN INGLIS COY LIMITED
TORONTO CANADA

RETURN TUBULAR BOILER SUSPENSION SETTINGS

DIMETER	LENGTH	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	NO AND SIZE OF TUBES	HEATING SURFACE	FIRE BRICK	COMMON BRICK	ADDITIONAL COMMON PIPE BRICK PER BOILER	STANDARD Q TO Q OF BOILERS
30	8-0	13½	24	96	14	36	24	30	21	22	34	12	18	13½	60	65	81	12-3½		8	22-3	174	580	5200	3500	
30	10-0	13½	24	120	14	42	24	30	21	22	40	12	18	13½	60	65	81	14-3½		8	22-3	216	620	6000	3400	
36	10-0	13½	24	120	14	42	30	30	21	22	40	14	18	13½	66	69	84	14-3½		8	32-3	305	675	7000	4300	
36	12-0	13½	24	144	14	48	30	30	21	22	46	14	18	13½	66	69	84	16-3½		8	32-3	365	725	8000	4700	
42	10-0	13½	24	120	14	42	36	30	21	22	40	14	18	13½	72	72	93	14-3½		9	38-3	363	875	8300	5000	
42	12-0	13½	24	144	14	48	36	30	21	22	46	14	18	13½	72	72	93	16-3½		9	38-3	434	930	9300	6700	
42	14-0	13½	24	168	14	48	36	30	21	22	46	14	18	13½	72	72	93	18-3½	117	9	38-3	504	980	10300	7500	
48	12-0	18	24	144	16	48	42	30	23	22	46	18	18	13½	78	77	97	16-10	125	10	44-3	503	1100	10400	7800	5-8
48	14-0	18	24	168	16	48	42	30	23	22	46	18	18	13½	78	77	97	18-10	125	10	44-3	584	1200	11500	8000	5-8
54	12-0	18	24	144	18	48	48	36	26	27	46	18	18	13½	84	89	108	17-0	140	10	56-3	628	1300	14000	8500	6-2
54	14-0	18	24	168	18	48	48	36	26	27	46	18	22½	18	93	89	108	19-0	140	10	56-3	730	1400	15600	9000	6-2
54	16-0	18	24	192	18	54	48	36	26	27	52	18	22½	18	93	89	108	21-0	140	10	56-3	846	1475	17200	11200	6-2
60	12-0	18	28	144	18	48	54	36	22	27	46	16	22½	18	99	88	110	17-4	142	10	70-3	774	1400	16700	11000	7-2
60	14-0	18	28	168	18	54	54	36	22	27	52	16	22½	18	99	88	110	19-4	142	10	70-3	899	1470	18000	11900	7-2
60	16-0	18	28	192	18	60	54	36	22	27	58	16	22½	18	99	88	110	21-4	142	10	54-3½	937	1550	20000	13300	7-2
66	12-0	18	28	144	19	48	60	42	24	27	46	18	22½	18	105	99	125	17-5	158	10	72-3½	977	1550	19000	12500	7-8
66	14-0	18	28	168	19	54	60	42	24	27	52	18	22½	18	105	99	125	19-5	158	10	72-3½	1156	1625	21000	14500	7-8
66	16-0	18	28	192	19	60	60	42	24	27	58	18	22½	18	105	99	125	21-5	158	10	72-3½	1217	1700	23300	16000	7-8
66	18-0	18	28	216	19	66	60	42	24	27	64	18	22½	18	105	99	125	23-5	158	10	54-4	1353	1775	26000	18400	7-8
72	14-0	22½	28	168	19	54	66	42	24	27	52	18	27	22½	120	102	132	19-9½	168	12	90-3½	1344	1675	23000	15800	8-2
72	16-0	22½	28	192	19	60	66	42	24	27	58	18	27	22½	120	102	132	21-9½	168	12	90-3½	1471	1750	25000	17800	8-2
72	18-0	22½	28	216	19	66	66	42	24	27	64	18	27	22½	120	102	132	23-9½	168	12	72-4	1555	1850	27300	19500	8-2
72	20-0	22½	28	240	19	72	66	42	24	27	70	18	27	22½	120	102	132	25-9½	168	12	72-4	1724	1970	29700	21000	8-2

SPECIFICATIONS AND DATA RE OUR RETURN TUBULAR BOILERS.

INFORMATION. Write us for complete information.

E. LEONARD & SONS, LTD.

BRANCHES:

1790 ST. JAMES STREET, MONTREAL, QUE.
62 WATER STREET, ST. JOHN, N.B.

HEAD OFFICE AND WORKS:

(EST. 1834, LONDON, CANADA.)

AGENTS:

ARTHUR S. LEITCH CO., LTD. 1001-2 Kent Bldg.
Toronto, Ont.

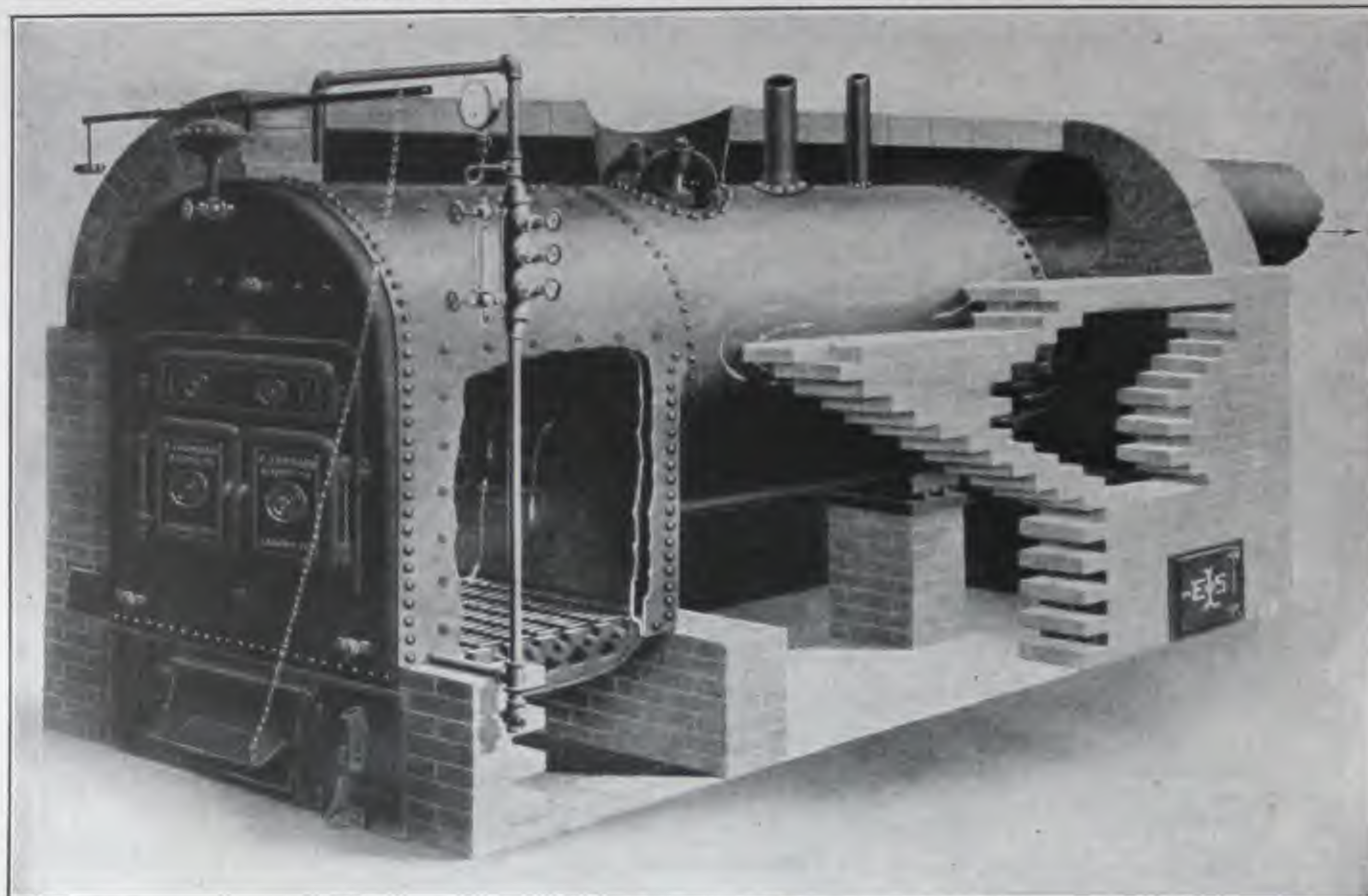
WM. W. HICKS, 567 Banning St., Winnipeg, Man.

GEORGE STEWART, 5 Lineham Block, Calgary, Alta.

VANCOUVER MACH'RY DEPOT, LTD., Vancouver, B.C.

THOS. A. PIPPY, Waldegrave Street, St. John's, Nfld.

LEONARD FIRE BOX BOILERS. For Steam or Hot Water Heating.



LEONARD FIRE BOX BOILER (BRICK SET TYPE).

GENERAL ARRANGEMENT AND BRICK SETTING.

NOTE: BREECING CONNECTION TO STACK MAY BE EITHER AT FRONT OR REAR OF BOILER.
SUBJECT TO LOCAL CONDITIONS WHEN CONNECTION IS AT FRONT OF BOILER, BRICKWORK
FINISHES IN REAR OF STEAM OUTLET AND MEETS BRICK SHELF PER DOTTED LINES.

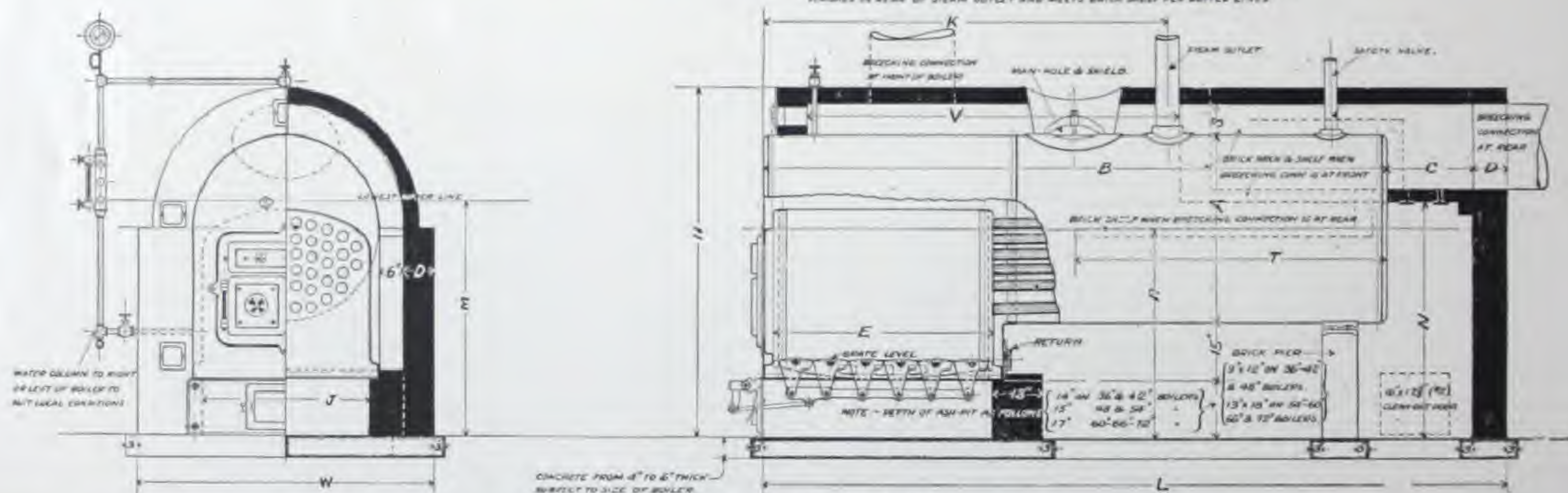


TABLE OF DIMENSIONS.

Number of Boiler	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Dia. of Boiler	A	30"	30"	30"	36"	36"	42"	42"	42"	48"	48"	48"	54"	54"	60"	60"	66"	66"	72"	72"
Length of Boiler	B	6'6"	7'6"	8'6"	7'6"	9'0"	10'6"	8'4"	9'10"	11'4"	10'4"	13'4"	13'10"	16'4"	15'4"	17'10"	16'0"	18'0"	16'0"	18'0"
Capacity, Steam, sq. feet		900	1050	1200	1400	1700	2000	2200	2600	3000	3500	4000	4500	5500	6500	7500	8700	10000	12000	14000
Capacity, Water, sq. feet		1500	1700	2000	2300	2800	3300	3600	4300	5000	5800	6600	7400	9100	10700	12400	14400	16500	19800	23100
Rear Space	C	17"	17"	17"	17"	17"	17"	22"	22"	22"	22"	22"	22"	24"	24"	24"	24"	24"	28"	28"
Thickness Wall	D	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	9"	13"	13"	13"	13"	13"	13"	13"
Grate Length	E	26"	32"	38"	32"	38"	44"	38"	44"	50"	44"	50"	56"	56"	62"	62"	68"	62"	68"	74"
Width Ash-pit	J	25"	25"	25"	31"	31"	31"	36"	36"	43"	43"	43"	49"	49"	54"	54"	60"	60"	66"	66"
Total Height	H	70"	70"	70"	77"	77"	77"	83"	83"	83"	90"	90"	90"	96"	96"	108"	108"	114"	114"	120"
Steam Outlet Location	K	4'0"	4'8"	5'6"	4'11"	5'11"	6'11"	7'0"	7'6"	8'0"	7'8"	8'8"	9'2"	9'2"	9'8"	10'10"	9'8"	10'8"	9'9"	10'9"
Height of Water Line	M	52"	52"	52"	55"	55"	55"	58 1/2"	58 1/2"	61"	61"	61"	66"	66"	73"	73"	80"	80"	86"	86"
Height of Side Flue	N	52"	52"	52"	55"	55"	55"	58 1/2"	58 1/2"	61"	61"	61"	66"	66"	73"	73"	80"	80"	86"	86"
Dia. of Breecing Conn.	O	12"	14"	16"	16"	18"	20"	20"	22"	22"	24"	24"	28"	28"	32"	32"	32"	32"	36"	36"
Height of Brick Shelf	R	44"	44"	44"	47"	47"	50"	50"	54"	54"	54"	54"	57"	57"	62"	62"	65"	65"	68"	68"
Top Flue Space	S	6"	6"	6"	7"	7"	7"	7"	7"	8"	8"	8"	8"	8"	10"	10"	10"	10"	10"	10"
Length of Brick Shelf	T	30"	38"	44"	36"	42"	54"	36"	48"	60"	54"	66"	80"	84"	102"	90"	108"	90"	108"	102"
Length of Arch	V	36"	44"	54"	47"	59"	71"	72"	78"	84"	80"	86"	92"	98"	98"	96"	102"	102"	110"	110"
Total Length	L	8'7"	9'8"	10'8"	9'8"	11'2"	12'8"	10'11"	12'5"	13'11"	12'11"	14'5"	15'11"	16'11"	19'5"	18'5"	20'11"	19'1"	19'5"	21'5"
Total Width	W	60"	60"	60"	66"	66"	72"	72"	72"	78"	78"	78"	92"	92"	98"	98"	104"	104"	110"	110"
Width of Double Setting	Z	9'3"	9'3"	9'3"	10'3"	10'3"	10'3"	11'3"	11'3"	11'3"	12'3"	12'3"	12'3"	14'3"	14'3"	15'3"	15'3"	16'3"	17'3"	17'3"
Weight of Boiler	F & F	2500	2800	3100	3300	3700	4200	4800	5400	6000	6700	7300	8000	10600	11900	14400	16000	17800	20000	23500
Number of Common Brick		1600	1700	1800	2000	2300	2400	2500	2800	3000	3200	3500	3700	5500	5700	6000	6500	6700	7100	8000
Common Brick for Two Boilers		2800	3000	3100	3500	4000	4100	4400	4900	5000	5500	6000	6400	9600	10000	10500	11300	11600	12400	14000

LEONARD

THE SUPERHEATER COMPANY, LIMITED

TRANSPORTATION BUILDING,
MONTREAL, QUE.

WORKS:
SHERBROOKE, QUE.

BRITISH COLUMBIA REPRESENTATIVES:
THE TAYLOR ENGINEERING CO., LIMITED, VANCOUVER, B.C.



DESIGNING ENGINEERS AND MANUFACTURERS OF "ELESco" STEAM SUPERHEATERS
AND PIPE COILS FOR ALL PURPOSES.

PRODUCTS.

ELESco Superheaters for all types and sizes of Stationary Boilers; Separately Fired Superheaters for all purposes; Superheaters for locomotives and steam shovels; Superheaters for marine service. PIPE COILS AND ELESco SUPER COILS for all purposes.

ENGINEERING SERVICE.

The Engineering Department of this company is at the service of those interested in the advantages or application of Superheated Steam.

ELESco SUPERHEATERS.

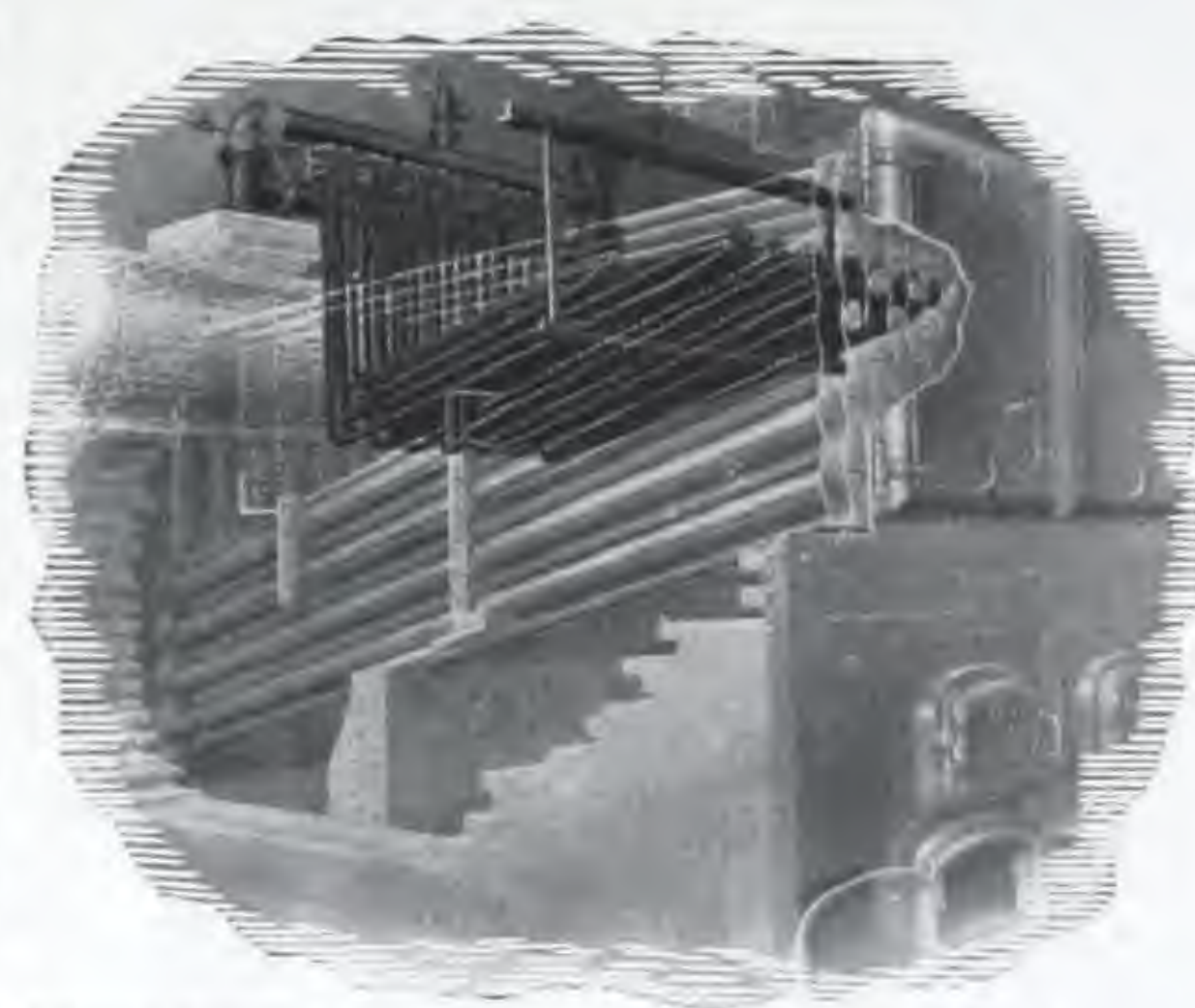
Elesco Superheaters are suitable for all types of boilers without changes to the boiler setting. They reduce fuel consumption, increase boiler efficiency, reduce condensation in steam lines, reduce steam consumption in engines and turbines, and increase the capacity of the plant.

Their design and construction provides freedom from leaks, ease of application and accessibility for inspection and repairs, and maximum length of service without renewal.

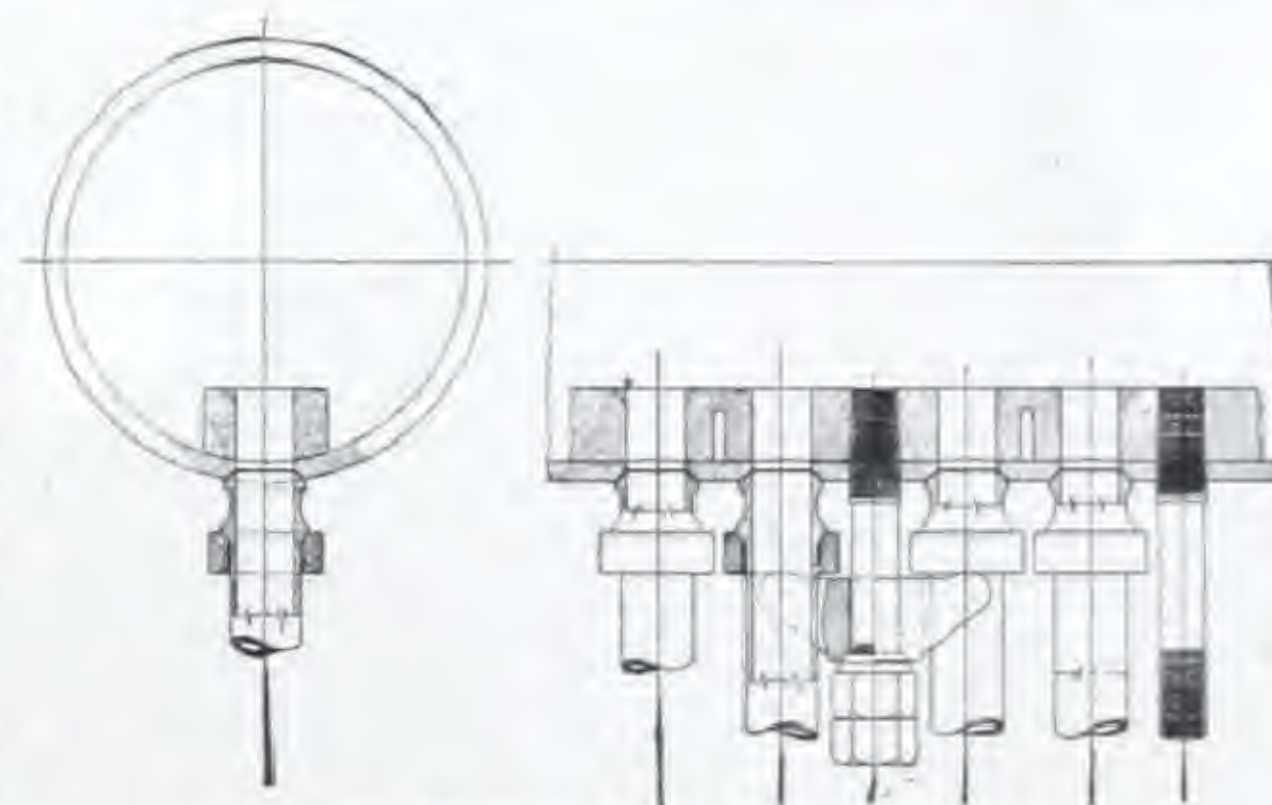
The Elesco Superheater consists in general of two headers, one acting as the distributor for the saturated steam coming from the boiler, and the other as a "Superheated" header for collecting the steam after it has been superheated; and the necessary connecting units in which the actual superheating takes place. The headers are made of steel and located out of the path of the hot gases, and in most cases, outside of the boiler setting proper, affording easy access for inspection and cleaning.

Units are of heavy cold drawn seamless steel tubing located in the advantageous gas temperatures, giving a large ratio of superheating surface, an even distribution to the flow of the gases, and a proper distribution to the steam through the superheater. The units present a smooth surface to the gases, thereby tending to prevent an accumulation of soot and ashes, and are thus easily cleaned. Because of their small diameter and proper distribution they offer a minimum obstruction to the gases.

A metal to metal ball joint forms the connection between the units and the headers, giving a positive tight joint, and avoids the use of hand holes and gaskets.



ELESco SUPERHEATER INSTALLED IN A WATER TUBE BOILER.



SECTION SHOWING HEADER CONSTRUCTION.

SEPARATELY FIRED SUPERHEATERS.

This company designs and manufactures separately fired superheaters for all purposes and for process work, for pressures from atmospheric up to 1,000 lbs. per sq. in., and for temperatures up to 1,000° F. The special features of accessibility, regulation, long life and high efficiency are incorporated in these designs.

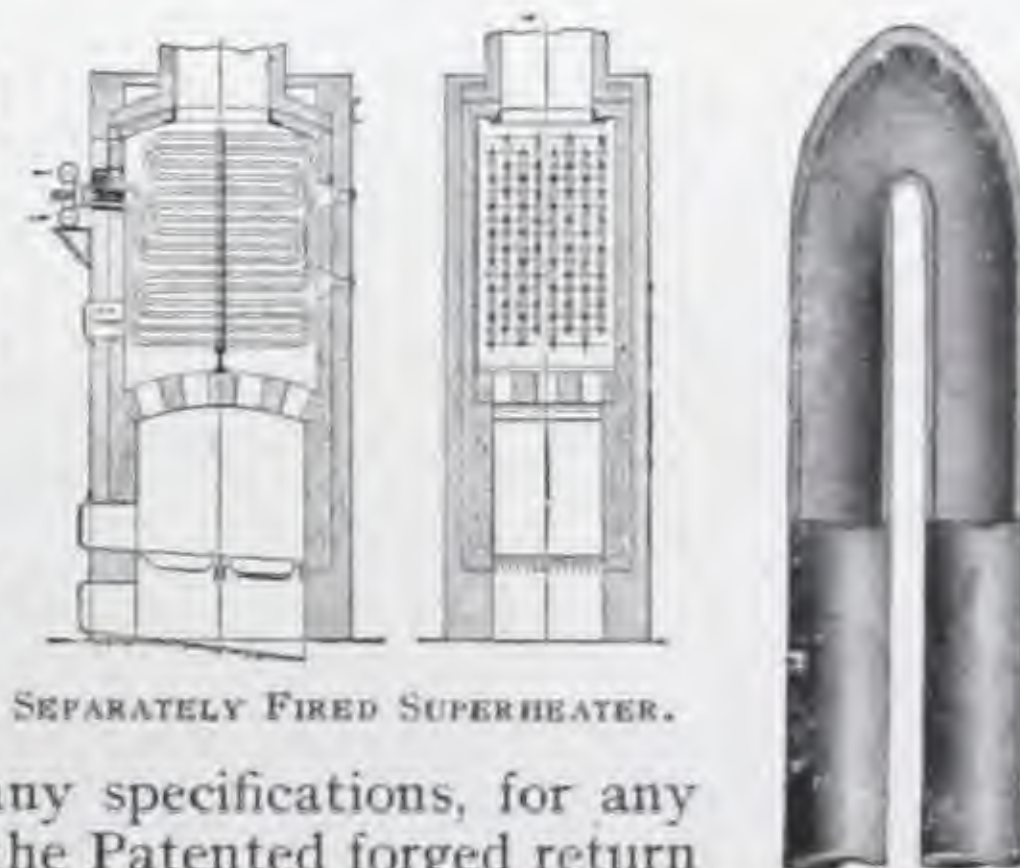
SUPERHEATERS FOR STEAM SHOVELS.

Elesco Superheaters, easily installed in steam shovels, reduce fuel consumption at least 25%. As high a saving in water is also possible.

ELESco PIPE COILS.

The coils are designed and manufactured to practically any specifications, for any purpose. The feature of these coils involving a return bend is the Patented forged return bend, which results in a coil of practically a continuous pipe, without threaded or acetylene welded joints; greatest surface within a given space possible; absolutely leak-proof.

Full descriptive literature on all ELESco Products.



SEPARATELY FIRED SUPERHEATER.

PIPES BONDED BY FORGED RETURN BEND.

THE UNDER-FEED STOKER CO. OF CANADA, LTD.*

QUEBEC AND MARITIME PROVINCES: 81 VICTORIA STREET, TORONTO, ONT.
 THE CLEATON CO. (CANADA) LIMITED, ALBERTA AND SASKACHEWAN:
 CORISTINE BUILDING, MONTREAL, QUE. J. TWOMEY, CAMROSE, ALTA.

BRITISH COLUMBIA:
 E. A. EARLE LIMITED,
 739 HASTINGS ST. W., VANCOUVER, B.C.

PRODUCT.

THE JONES UNDER-FEED MECHANICAL STOKER.

DESCRIPTION.

The under-feed principle—originated in the Jones Stoker—makes possible remarkable fuel and labor economy, smoke abatement, regularity of steam pressure, and increased boiler capacity.

This principle is illustrated by the cross-sectional view. The green fuel enters from below the combustion zone and is slowly moved rearward and upward through the retort.

During the travel of the green fuel all volatiles are thoroughly driven off and completely burned as soon as released in connection with coke in the incandescent fuel bed.

The supply of air and fuel are automatically proportioned to insure correct combustion and respond automatically to any change in steam demand. Consequently, steam pressure is constant regardless of load variations.

Rugged simplicity is a Jones characteristic. An installation merely consists of the proper number of the retorts shown above. A heavily oversized steam cylinder is mounted immediately below the hopper, and a ram is connected to the piston of this cylinder. The coal falls in front of this ram and is forced into the retort. Note that the simple pusher rod is the only moving part within the furnace, and that it is buried deep in the green fuel. The travel of the fuel bed is a mechanical and not a gravity movement. The slope of the retorts is not great enough to cause avalanching, holes in fire, etc.



SECTIONAL VIEW THROUGH JONES "A-C" STOKER, SHOWING COUNTER BALANCED DUMP PLATE IN POSITION.

ADVANTAGES.

SIMPLICITY.—Minimum of moving parts. No complicated dumping mechanism.

LOW MAINTENANCE.—No moving parts in fire. Tuyere blocks always covered by green fuel, minimizing replacements. No shearing pins to fail and cause breakage. Unequalled accessibility.

HIGH EFFICIENCY.—The scientific application of the under-feed principle, first made successful in the Jones.

AUTOMATIC-CLEANING (IN "A-C" TYPE).—Thorough burning of fuel. Travel of fuel bed is mechanical and not a gravity movement.

PREVENTION OF SMOKE.—Combustion is so complete that there is no smoke.

PREVENTION OF CLINKERS ON SIDE AND BRIDGE WALLS.—Due to the design of the tuyeres, the absence of gravity movement and the "automatic-cleaning" feature.

HEAVY OVERLOAD CAPACITY.—Results from the perfect fuel bed, and responsive control of fuel and air.

MINIMUM OF MOVING PARTS.—Reducing maintenance.

INDIVIDUAL CONTROL OF RETORTS.—Producing an excellent fire at all times.

AUTOMATIC CONTROL OF FUEL AND AIR.—Insuring even steam pressure regardless of load fluctuations.

FUEL ECONOMY.—Because of the complete combustion assured by the system of automatic control of fuel and air, a saving of at least ten per cent. of the fuel is obtained. Additional fuel economy is obtained through the ability of the Jones stoker to burn all fuels.

PULP AND PAPER MILLS.

The Jones Under-Feed Stoker is easily adaptable to utilizing mill waste in connection with coal as fuel for generating steam. When the refuse enters steadily the supply of coal may be cut down; when waste comes slowly coal may be fed more steadily.

TYPES.

The Jones Stoker is made in two types, "A-C" high-duty automatic-cleaning stoker and "Standard" direct-cleaning; both types have a wide range of application.

INSTALLATIONS.

Jones Under-Feed Stokers are operating successfully throughout the world. Following are a few prominent Canadian users:

Nashwaak Pulp & Paper Co., St. Johns, N.B.
 Banff Springs Hotel, Banff, Alberta.
 T. Eaton Co., Winnipeg, Manitoba.
 St. Regis Paper Co., Granby, Quebec.
 Canadian Cottons, Ltd., Hamilton, Ont.
 Winnipeg Joint Terminals, Winnipeg, Man.
 R. H. Comey Co., Toronto, Ont.
 Laing Produce & S. Co., Brockville, Ont.
 Provincial Paper Mills, Port Arthur, Ont.
 Canada Creosoting Co., Sudbury, Ont.
 Otis-Fensom Elevator, Hamilton, Ont.
 Fort Francis Pulp & Paper Co., Fort Francis, Ont.
 Brown Corporation, La Tuque, Quebec.
 Fisher Body Corporation, Walkerville, Ont.
 International Harvester Co., Hamilton, Ont.
 Frazer Companies, Ltd., Edmundston, N.B.



JONES "STANDARD" STOKER—SECTIONAL VIEW.

CATALOGS, SERVICE.

The Under-Feed Stoker Company of Canada, Ltd., will send catalogs of "A-C" and "Standard" Stokers. Its engineering department will gladly give assistance in the handling of power plant plans involving the possible use of stoker equipment, experience enabling it to solve unusual combustion problems whether applied to steam boilers, heating furnaces, drying ovens, or other special work.

*The Under-Feed Stoker Company of Canada, Ltd., replaces the former Jones Under-Feed Stoker Co., Ltd. The reorganization preserves the experience of the older organization and adds the engineering resources of the Under-Feed Stoker Co. of America. Jones Stokers are made in Canada by Canadians and are sold for Canadian money at par.

MURPHY IRON WORKS

MAKERS OF MURPHY AUTOMATIC FURNACE
DETROIT, MICH.

SANFORD RILEY STOKER CO.

MAKERS OF RILEY UNDERFEED STOKERS.
WORCESTER, MASS.

BOSTON. NEW YORK. PHILADELPHIA. PITTSBURGH. BUFFALO. CLEVELAND.
CINCINNATI. CHICAGO. ST. PAUL. DENVER.

GENERAL.

The type of Stoker you need is determined by the size of your boilers, fuel, load conditions and other local factors. Naturally, one type will not meet all these conditions, but in the Riley Underfeed Stoker and Murphy Automatic Furnace you have a choice that will meet practically any condition.

For the plant with large boiler units or with smaller units that are to be forced above rating or where reserve capacity is essential, the Riley Underfeed Stoker meets the conditions.

MURPHY AUTOMATIC FURNACE.

DESCRIPTION.

The correctness of the principle upon which the construction of the Murphy Automatic Furnace is based has been demonstrated by 43 years of stoker experience. Improvements have been made from time to time which have increased its efficiency and durability. With the Murphy Automatic Furnace, complete combustion prevents smoke and ensures high CO₂ results. All ash and refuse are removed automatically. This means a clean fire and high efficiency at all times. The Murphy Furnace does away with the necessity for opening furnace doors and thereby eliminates the admission of cold air; the coal supply to the furnace is under absolute control and automatic regulation; it is a Natural Draft Furnace and requires no expensive fan or blower equipment.

ADAPTABILITY.

The Murphy Furnace is designed for any type of boiler and units from 50 h.p. up to the larger units for which the multiple retort underfeed stoker is best suited. It is exceedingly flexible and efficiently handles variable loads and overloads up to 200% of boiler rating with minimum attention and without forced draft.

MAINTENANCE.

Maintenance cost is low; averaging about 10 cents per horsepower per year. The magazines and fronts are protected by fire brick; the coking plates by air passing under them; and the clinker grinder, grate bearer and grates by exhaust steam and air, thus ensuring ample protection to all working parts.

RILEY UNDERFEED STOKER.

CONSTRUCTION.

The Riley Stoker is made up of standardized retort units. Its unique feature is reciprocating retort sides which keep the fuel bed active and even. The coal feed and air supply are automatically controlled to meet load demands. The dumping of refuse is continuous and automatic. A safety connecting rod for each plunger absolutely prevents damage to stoker in case plunger is blocked.

FLEXIBILITY.

Moving, air supplying grates break up the banked fire and instantly admit the air, giving rapid combustion. Riley Stokers will raise a boiler from banked fire to 250% of rating in five minutes.

EFFICIENCY.

The boiler capacity which can be obtained with the Riley Stoker depends upon the number of retorts that can be installed. With boilers fired from one end 300 and 350% of rating are obtained during peaks. In other cases where boilers are fired by two stokers set back to back 500 and 600% of rating are possible.

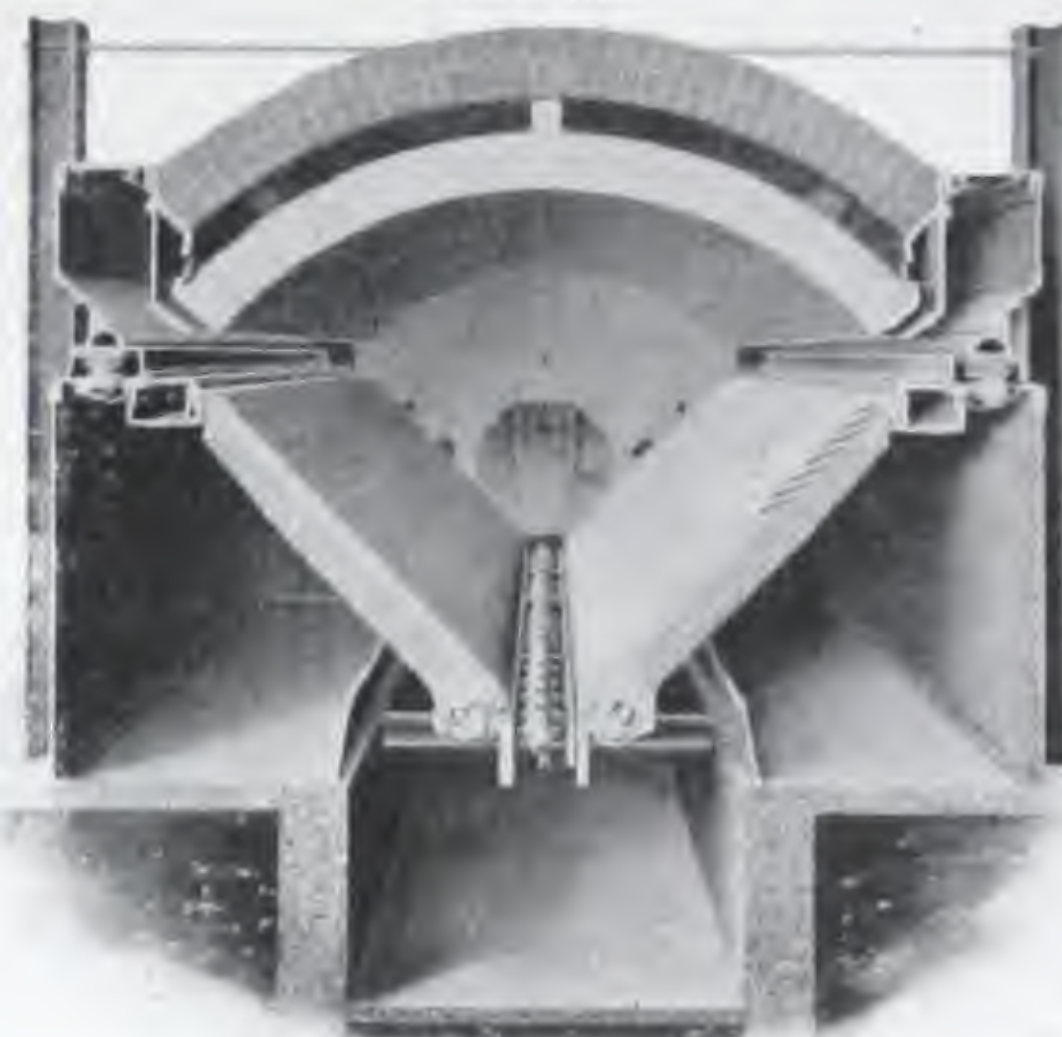
INSTALLATIONS.

MURPHY FURNACES.

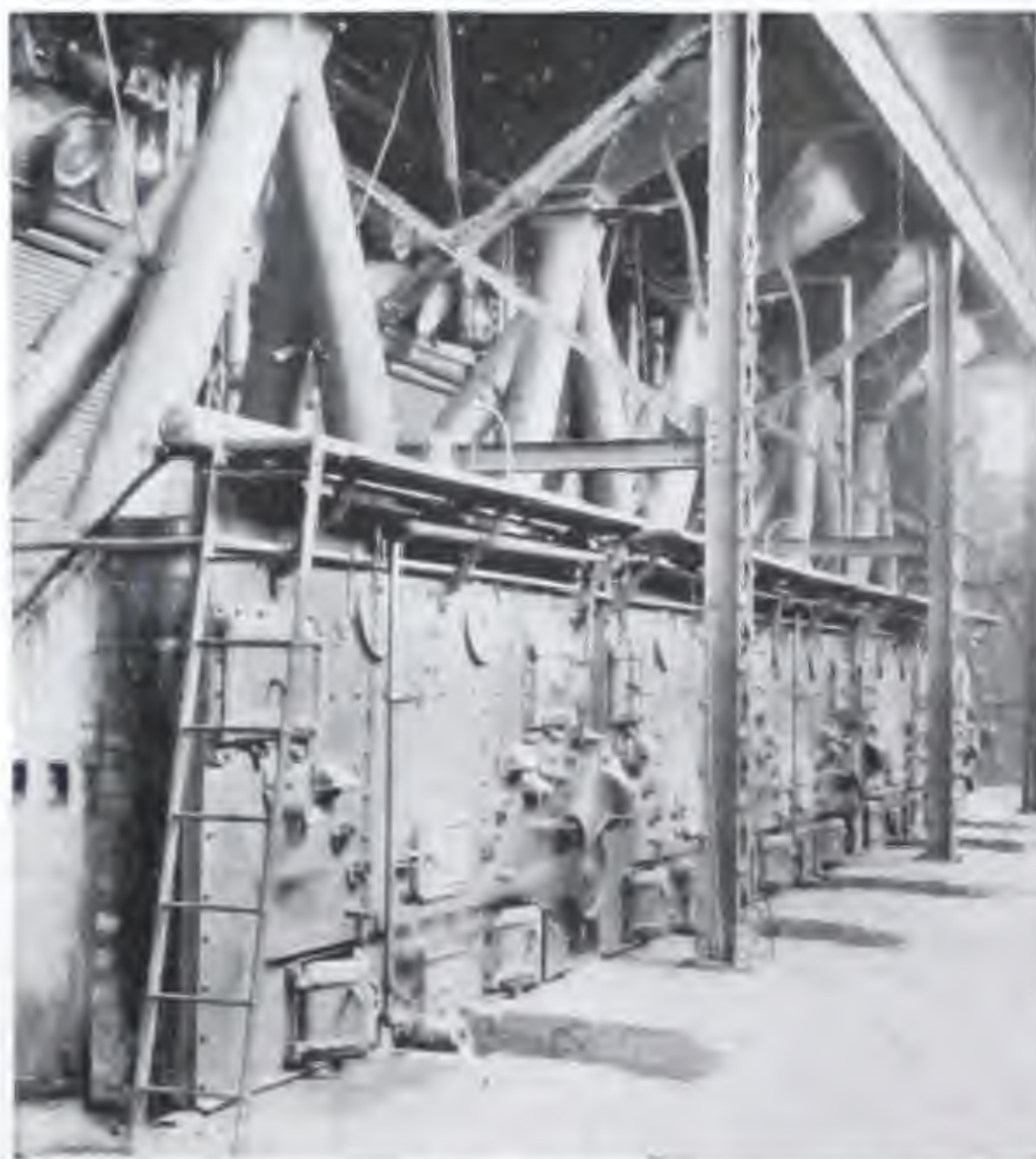
Montreal General Hospital.
Canadian Locomotive Works.
Canadian Kodak Co.
Sherwin-Williams Co.
St. Lawrence Sugar Refining Co.
Laurentide Company, Ltd.
Belgo-Canadian Pulp & Paper Co.
National Cash Register.
Ontario Paper Co., Ltd.
Donnacona Paper Co., Ltd.
University of Toronto.
Montreal Steel Works.
Parliament Bldgs.
Canadian Pacific Railway.
Spanish River Pulp & Paper Co.
Montreal High School.
Bank of Montreal.
Canadian Bridge Co., Ltd.

RILEY STOKERS.

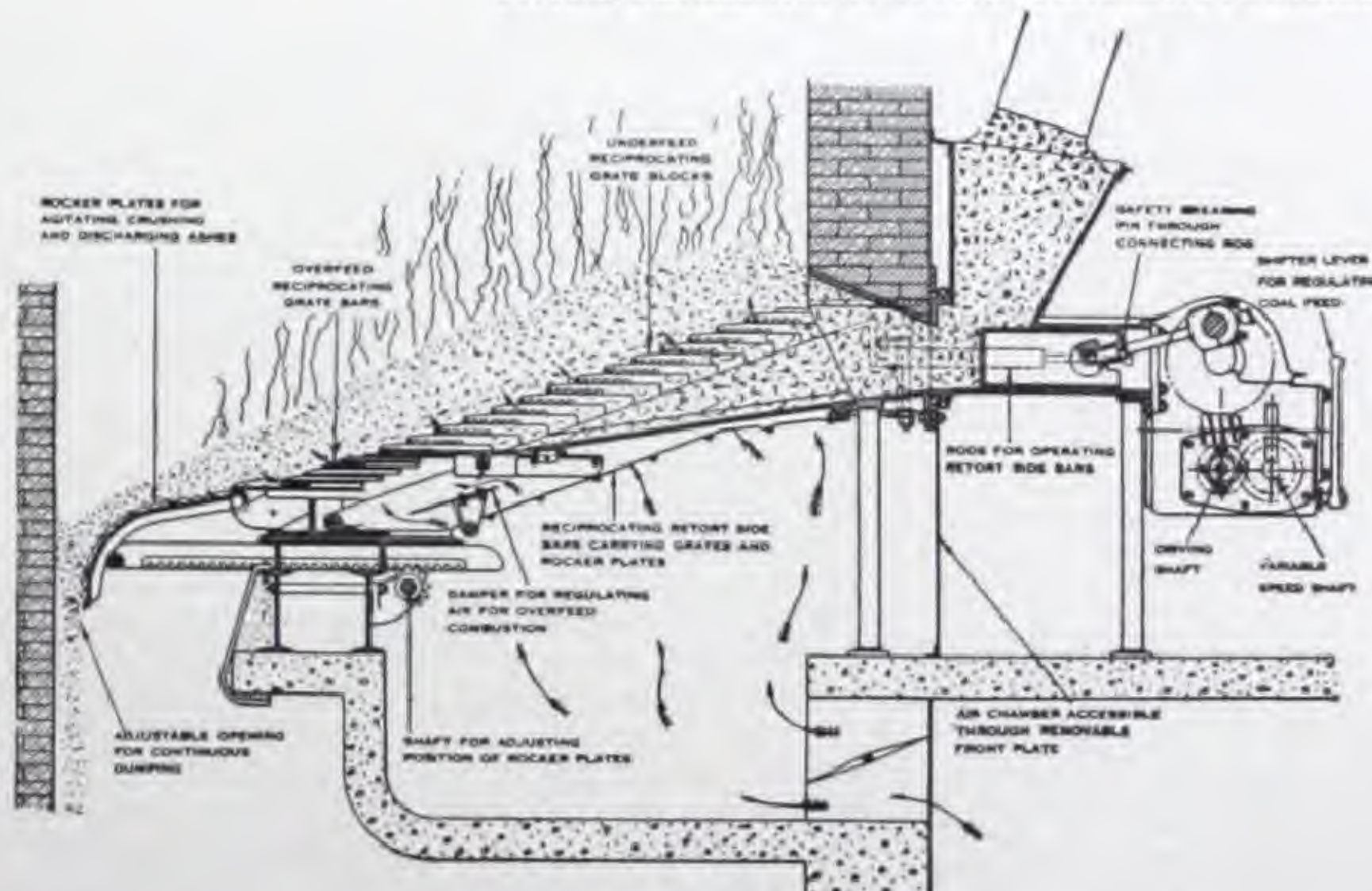
General Chemical Co.
Regina Municipal Plant.
Toronto Electric Light Co.
Canadian Cottons Co.



TRANSVERSE SECTION THROUGH THE MURPHY AUTOMATIC FURNACE, SHOWING PRINCIPLE OF CONSTRUCTION. REAR VIEW.



TYPICAL INSTALLATION OF MURPHY AUTOMATIC FURNACES.



Illustrated catalog MSD gives details of the Murphy Furnace and catalog RSD of the Riley Stoker.

THE CANADIAN KELLOGG CO., LIMITED

MONTREAL OFFICE:
84 ST. ANTOINE STREET.

MANUFACTURERS OF PERFORATED RADIAL BRICK CHIMNEYS.

140 CEDAR STREET, NEW YORK, N.Y.

TORONTO OFFICE:
ARTHUR S. LEITCH CO.,
KENT BLDG., TORONTO.

PRODUCTS.

SERVICE.

KELLOGG
PERFORATED
RADIAL BRICK
CHIMNEYS.

PERFORATED RADIAL BRICK CHIMNEYS.

THE CANADIAN KELLOGG COMPANY has erected some of the finest chimneys in Canada and the United States during the last twenty years, and is ready to share the results of that experience with engineers and architects who are engaged in problems where chimney construction is required. This company's engineers will be glad to advise on types, sizes, shapes, etc., of chimneys for any condition that may arise.

No artificially produced material for the construction of the modern factory chimney compares with refractory clay. This raw material is put through a variety of scientific treatments by skilled hands and especially designed machines before it comes from the kilns in the form of perforated radial brick ready for shipment, and for use in chimney construction.

Each brick is formed to occupy a certain position in the circular and radial lines of the chimney, as shown by the drawing on this page, and is sound ringing, hard and well burned.

Bricks are made to conform closely with the circular and radial lines of the shaft and are weather- and acid-proof.

Total amount of perforations does not exceed one-fourth of the cross area of the brick, which are tested to a crushing strength of not less than 6,000 lbs. per sq. in.

The perforations in the radial bricks form a dead air space about the core of the chimney. This has a marked effect in reducing amount of fuel used, in preventing sudden changes of temperature within the chimney, and in reducing radiation. Thus a uniformly maximum draft is maintained in any kind of weather.

A trained superintendent of construction, familiar with all the details of the plans and specifications of the chimney, accompanies the shipments of radial brick, to supervise unloading and stacking in the order of their use. Throughout the entire construction the bricks of each tier reach their final place under his direction.

An expert mortar man supervises the preparation and use of all of the mortar. The tensile strength of the chimney, its ability to withstand heat and cold and to defy all sorts of weather from without and all sorts of gases from within, depend largely upon this mortar. Each brick is laid in so full a bed of mortar that the latter enters the perforations of the brick from 1 in. to 1½ ins. The joints are struck both inside and out.

A crew of trained men in scientific chimney construction carry forward the erection of the chimney from start to finish, insuring careful construction and the proper grading and matching of brick throughout.

For the convenience of Architects or Engineers wishing to write a specification for a modern chimney we have prepared the following:

STANDARD
SPECIFICATIONS
FOR PERFORATED
RADIAL BRICK
CHIMNEYS.

SCOPE—The work included under this contract is to consist of all labor and material necessary for the erection complete of one radial brick chimney in accordance with this specification, which shall become a part of the contract. The proposal shall include all scaffolding, cartage, unloading of material and removal of rubbish necessary to leave the chimney in a first class condition ready for operation.

DELIVERY—The chimney will be built at located on the railroad.

Material may be unloaded on owner's siding, which is within of the chimney site.

SPACE—Sufficient storage room for chimney contractor's materials will be provided adjacent to chimney as well as unobstructed access from transportation delivery to the site of chimney for delivery and removal of materials and tools. At least one side of chimney will be left free and open by the owners for hoisting and working space until the chimney is completed.

WATER—The owners will provide the chimney contractor with necessary water within 50 ft. of the site of the chimney free of expense to the chimney contractor. From this point the chimney contractor will make his own hose connections, if required.

WORKMANSHIP AND MATERIALS—All workmanship and materials shall be first class.

The chimney contractor shall furnish a competent foreman under whose supervision the chimney will be built. Chimney must be built in a thorough, complete and workmanlike manner.

TIME OF COMPLETION—The chimney contractor shall state in bid the guaranteed number of working days in which he will finish the chimney after receipt of signed contract and approved drawings.

FOUNDATION—Proper foundation will be built by the owner from plans and specifications to be furnished by the chimney contractor, who will, upon completion, give in writing his approval of the foundation as being sufficient to sustain the chimney and fulfil the guarantee.

Note—In case, however, it is desired to have chimney contractor build the foundation, the following may be used: The chimney contractor shall furnish a concrete foundation of proper depth and spread to safely sustain the chimney. The foundation shall be not loaded to more than tons per sq. ft., which is the safe bearing value as determined for this work.

Excavating shall be done by contractor for foundation.

The concrete shall be composed of cement, sand, stone or gravel in the proportion of 1 part cement to 2½ parts sand and 5 parts of stone or gravel. It shall be deposited in the forms in layers not to exceed 6 in. in thickness and thoroughly rammed into place. Concrete shall be a wet mixture.

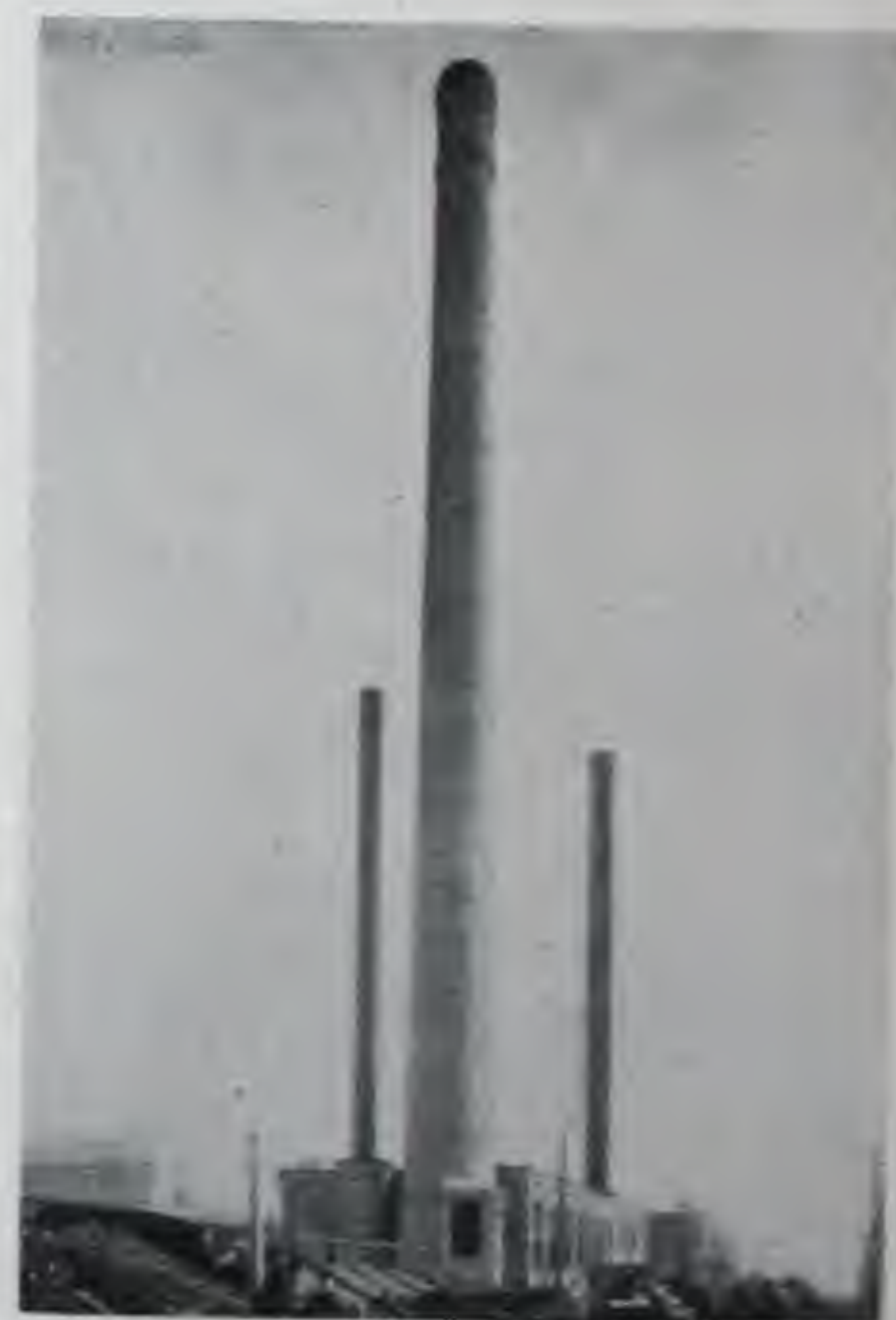
DESIGN—The design of the chimney shall conform to the following dimensions as shown on drawing attached:

Height above top of foundation ft. ins.
Minimum internal diameter ft. ins.

The wall of the column shall have one straight and true batter from top to bottom. The wall thickness and section lengths to be as shown on drawing. In case the contractor's standard wall thickness should not be exactly as shown, a variation of 3% will be allowed in either direction.



DOMINION POWER CO., HAMILTON, ONT.
250' x 12'



CANADIAN PACIFIC RAILWAY—CALGARY HOTEL
200' x 10' TOP DIAM.

**STANDARD
SPECIFICATIONS
FOR PERFORATED
RADIAL BRICK
CHIMNEYS—
(Continued).**

BASE—If chimney is to be built with base and column construction, use the following:
The base of the chimney shall be built [here fill in shape of base] in shape ft. high, of the dimensions shown on drawing, of straight, hard, well burned, well shaped common building brick laid in full bed of cement lime mortar as herein specified.

Note—If round for the entire height, specify as follows:

The chimney shall be built of perforated radial brick for the entire height, as hereinafter specified.

RADIAL BRICK—All radial brick shall be best quality, moulded from refractory clay, sound ringing, hard, well burned, well shaped, of reasonably even color; made to closely conform with the circular and radial lines of the shaft, and shall be weather- and acid-proof. They shall have a water absorption of not less than 5% nor more than 12% of their dry weight after immersion for a period of 24 hours; and shall have a crushing strength of not less than 6000 lbs. per sq. in. The total amount of perforations shall not exceed one-fourth of the cross area of the brick. One cu. ft. of radial brickwork shall weigh not less than 120 lbs. The outside faces of the brick shall be of regular size, so that the general appearance of the brickwork will be neat and uniform.

LINING—The chimney shall have an expansion lining built of perforated radial fire brick $4\frac{1}{4}$ ins. thick, ft. high from a point 2 ft. below the bottom of the flue opening. The lining prevents flue gases from coming in contact with the solid masonry of which the shell is built, and shall be separated from same by an air space of not less than 2 ins.

The lining shall be built after the chimney is finished, and exceptional care must be taken to keep the air space clear and free of loose mortar and other dirt.

Rack out the shell of the chimney approximately 2 ins. above lining, to form a ledge for the purpose of diverting the falling soot when the chimney is in operation.

MORTAR—All brickwork shall be laid in cement lime mortar, as hereinafter specified, with courses level and with full joints throughout. Face brickwork and backing to be laid up at the same time with joints of reasonably even thickness, not exceeding $\frac{1}{2}$ in. The mortar to be used in the chimney shall consist of 1 part Portland cement, 2 parts fresh burnt limp lime mortar and 5 parts clean, sharp sand. The cement to be added to the sand and lime mortar as the mortar is required, and no mortar having taken an initial set is to be used. The cement must not be added until the lime is cool. The sand shall be clean and sharp, free from loam, vegetable matter and large pebbles. If necessary, it must be both screened and washed.

BOND—All common brickwork shall have every fourth course a header course.

Radial brickwork shall be bonded every three courses.

BREACHING OPENING—One opening shall be provided in chimney. The opening to be lined on the reveals with refractory material. The masonry above the opening to be supported by heavy I-beams set on steel plates, with air spaces at each end for expansion. Under these I-beams a flat masonry arch shall be built to properly protect the beams from the effect of the gases. The flue opening shall be reinforced laterally by heavy tie rods and plates over the top and at the bottom.

Three-eighths by 3-in. steel bands to be placed in the masonry above and below opening.

The opening shall be wide by high, the bottom of which shall be approximately above foundation.

REINFORCING RINGS—The chimney contractor shall place in the brickwork at every change in wall thickness steel bands $\frac{3}{8}$ in. thick by 3 ins. wide.

If the contractor should furnish perforated radial brick having corrugated sides, these bands may be omitted.

HEAD—The head of the chimney shall be neatly corbeled out and fitted with a heavy annular retaining ring set in full bed of cement mortar.

CLEAN-OUT DOOR—Provide and place in base of chimney where directed by owner a cast iron clean-out door and frame properly hinged and fitted with latch. Said door to be approximately 24 ins. wide by 36 ins. high.

LADDER—Build on the interior of the chimney a ladder to consist of $\frac{3}{4}$ -in. galvanized iron rungs, spaced approximately 15 ins. center to center and securely anchored to the masonry from top to bottom. These ladder irons to be in the shape of a "U" with hooked ends.

LIGHTNING CONDUCTOR—The lightning conductor is to consist of copper points, $\frac{3}{4}$ in. in diameter by 8 ft. long, with $1\frac{1}{2}$ -in. platinum tips. The points to be anchored to the top of the column and extend from the bottom of the corbeling upward. The lower ends of the points to be connected by a loop of copper cable encircling the chimney. From this loop there is to be $1\frac{1}{2}$ -in. 7-strand No. 10 Stubbs' wire gauge copper cable, carried down the side of the chimney and connected to copper ground plate of the 3-winged type as best for the proper distribution of charge. The points to be securely fastened to the top of the chimney and the cable to be anchored every 7 ft. in height with brass anchors, so designed that they will support the weight of the cable. The ground plate shall be buried by the contractor for the foundation when it is built.

LETTERING (WHEN DESIRED)—Work into the column on [one or two] sides as directed the letters [here insert the desired legend] to be made in permanently colored kiln burnt brick. Letters to be true to size and shape and to be in a true vertical line.

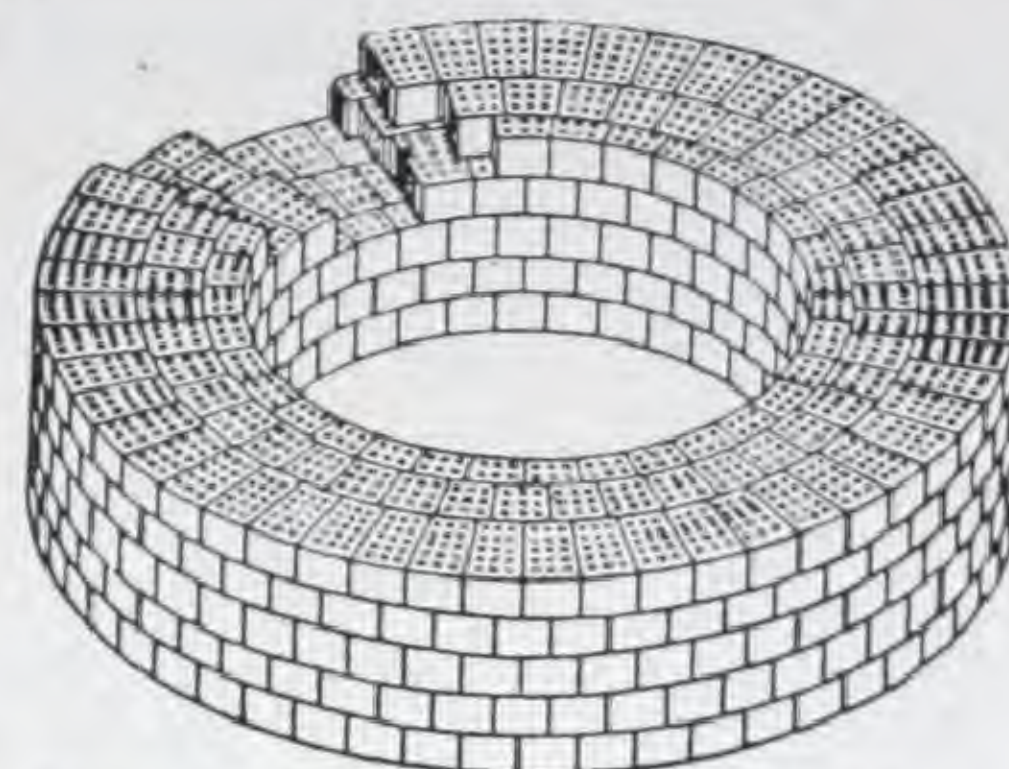
TRIMMINGS (IF ANY)—All necessary stone or terra cotta shown on drawing will be furnished without charge by the building contractor to the chimney contractor, who will set same. No one piece should weigh over 200 lbs.

INSURANCE—The chimney contractor shall carry at his own expense, during the entire period of construction, liability insurance, insuring the men in his employ and the public in general, in case of damage due to accidents.

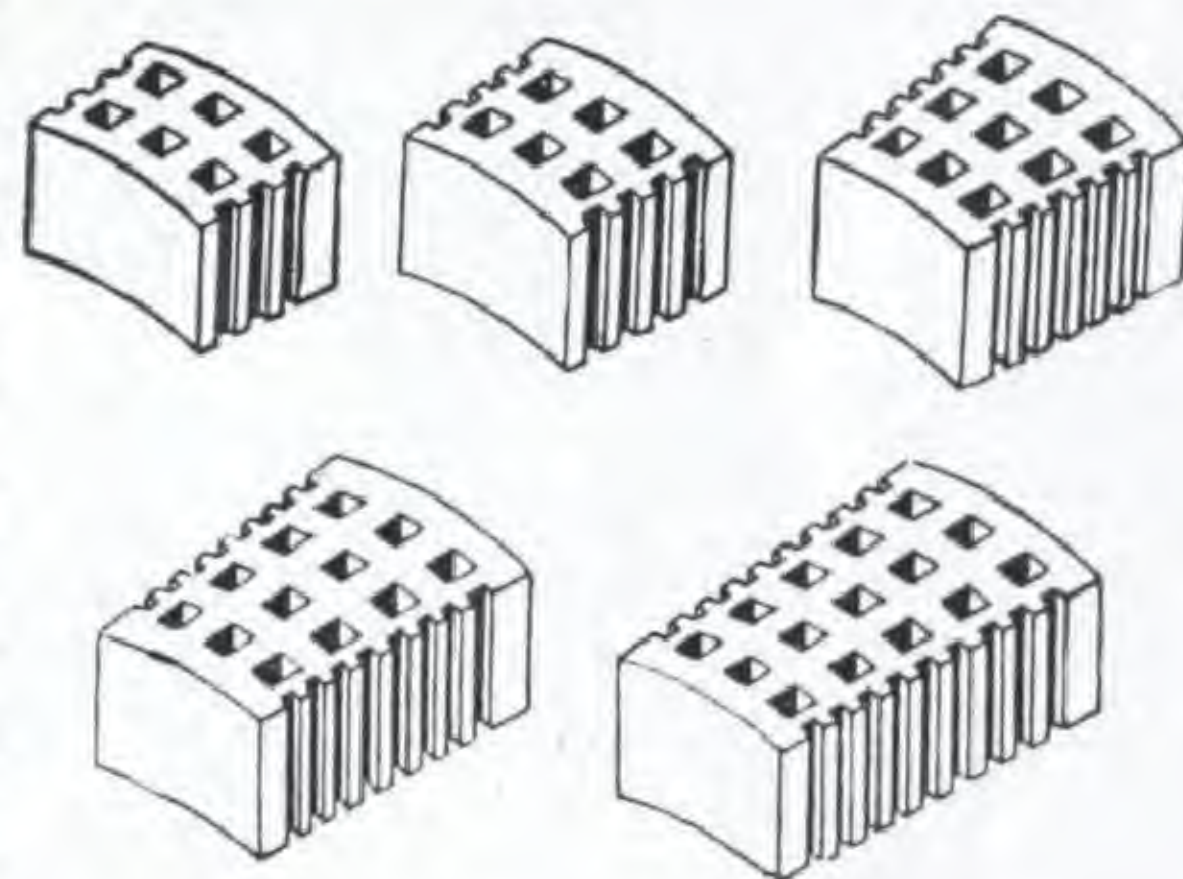
GUARANTEE—The chimney contractor shall guarantee the chimney for a period of 5 years from date of completion. The guarantee shall cover any defects that may arise within this period due to faulty design, construction, material, weather, and the products of combustion up to 800° Fahr.; and shall further guarantee to make good at his own expense all defects that may arise from any of the above conditions within the specified period.

The chimney shall be designed for a wind velocity of not less than 100 miles per hour.

NOTE—The chimney shall be built according to THE CANADIAN KELLOGG COMPANY, LTD. [or equal] system of construction. The insertion of this clause would be greatly appreciated on account of the advertising value to us on future work.



METHOD OF USING KELLOGG'S PERFORATED RADIAL BRICK IN CHIMNEY CONSTRUCTION.



REFERENCES.

ONTARIO:

Brunner, Mond, Ltd.
Brunner, Mond, Ltd.
Canadian Copper Co.
Canadian Copper Co.
International Harvester Co.
Dominion Power & Transmission Co.
Mattagami Pulp & Paper Co.
St. Michael's Hospital.
Lever Brothers Limited.
Palmolive Co. of Canada, Ltd.

QUEBEC:

Wayagamack Pulp & Paper Co.
The Ha Ha Bay Sulphite Co., Ltd.
Brompton Pulp & Paper Co. (1st order).
Brompton Pulp & Paper Co. (2nd order).
Can. Pacific Ry. Co., Place Viger, Montreal.
McDonald College.
Shawinigan Cotton Mills.
ALBERTA:
Canadian Pacific Railway Co., Calgary.
City Incinerator, Calgary.
Canada Malting Co., Calgary.

SASKATCHEWAN:

City Incinerator, Moose Jaw.
Saskatoon Destructor, Saskatoon.

MANITOBA:

Insane Asylum, Brandon.
Canadian Pacific Railway Co., Transcona.
Winnipeg Electric Railway Co., Winnipeg.
T. Eaton Co., Winnipeg.

NEW BRUNSWICK:

Can. Pacific Ry. Co. (Algonquin Hotel).
Atlantic Sugar Refineries.
T. McAvity & Sons, Ltd.

GRINNELL COMPANY OF CANADA, LIMITED

TORONTO, ONT., 2440 DUNDAS ST. WEST.
WINNIPEG, MAN., 910 SOMERSET BLDG.

MONTREAL, QUE., 370 BEAUMONT AVE.
VANCOUVER, B.C., 1140 HAMILTON ST.

PRODUCTS.

GRINNELL AUTOMATIC SPRINKLER SYSTEMS, STEAM AND HOT WATER HEATING EQUIPMENT, POWER PIPING INSTALLATIONS, WROUGHT, CAST IRON AND BRASS PIPING, FITTINGS, HANGERS, VALVES, Etc.

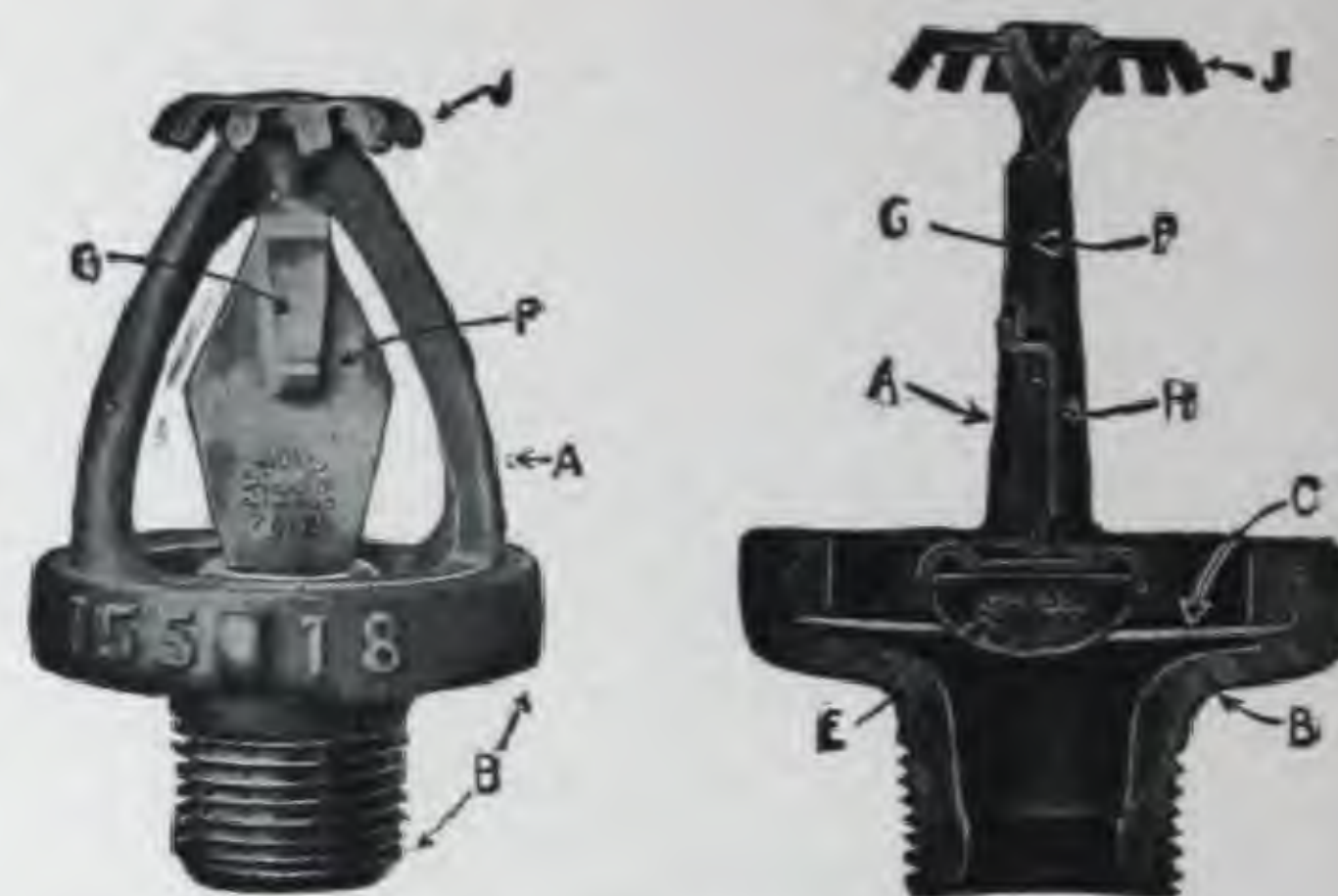
GRINNELL AUTOMATIC SPRINKLER SYSTEM.

Before the invention of automatic sprinklers the average loss per fire was more than \$7,300.

Grinnell Automatic Sprinklers have operated successfully in over 21,000 fires and have kept the average loss to \$289.38 per fire.

Because of the reduction in fire danger, insurance companies reduce their rates from 40 to 90% when this system is installed.

We gladly submit estimates and proposals on cost of a sprinkler equipment upon request and without cost or obligation. Special co-operative service to architects and engineers.



THE GRINNELL SPRINKLER HEAD.

COMPLETE.

A—Yoke.
B—Body.
C—Diaphragm.
E—Glass Valve.

EXPLANATION:

CROSS SECTION.

F—Main Strut Piece.
G—Hook on Strut.
H—Key on Strut.
J—Deflector.

STEAM AND HOT WATER HEATING EQUIPMENT.

Over fifty years of actual experience in installing heating equipments has given us a practical knowledge of this work which we believe you will find of invaluable assistance.

Grinnell Steam and Hot Water Heating Systems have successfully demonstrated their superiority over other types through actual use in large community housing projects and factories.

While architects and engineers are thoroughly familiar with the several vital factors entering into the heating problem, many of them are finding our new booklet, "Five Factors in Heating Costs," of value in discussing the heating question with their clients. Copy of this booklet will be sent free on request.

POWER PIPING INSTALLATIONS.

Grinnell Company is especially well equipped to handle power, process and miscellaneous industrial piping of any kind. Work of this nature requires a proper engineering organization, special manufacturing facilities, an expert road force and a fund of practical experience. In the Grinnell organization you find this rare combination which allows us to offer a type of piping service which cannot be duplicated in Canada.

We are ready at all times to send competent engineers to make a study of conditions and offer plans for improvement in already existing equipments and to co-operate to an unusual degree with architects and engineers in working out details for new equipments.

CAST IRON FITTINGS.

The completion of our new million dollar foundry and machine shop at Toronto now allows us for the first time to offer the Canadian trade an unlimited supply of standard and flanged "Grinnell" Fittings. This large addition to our facilities was made necessary by a rapidly increasing demand for these fittings from those who have found from experience that "'G' Fittings Mean Better Jobs With Less Labor."

These fittings were especially developed to meet our own large contracting needs in sprinkler, heating and general piping work and are, we believe, the highest quality product on the market. They are eminently worth specifying.



45° ELBOW.



90° ELBOW.



REDUCING ON OUTLET TEE.



REDUCING ON RUN TEE.



TEE.



CROSS.

GRINNELL ADJUSTABLE PIPE HANGERS.

Our complete line of adjustable hangers, like our fittings, grew out of our own contracting needs. Straight pipe lines that can indefinitely be kept straight by the simple turn of a nut are made possible by these hangers. They have saved us untold trouble in our pipe work. We know they will do the same for others. The line is complete—an adjustable hanger for every purpose—including pipe coils and radiators.



The illustration at the left is a typical example of Grinnell Adjustable Pipe Hangers. Drawings at the right show how adjustments are easily and quickly made.

Figure 1 is a dimensional drawing of the Grinnell Adjustable Pipe Ring. The principal advantage of this type of ring is that it provides for easy and quick adjustment after pipe is erected. The ring is made in two parts,—the ring itself and an adjusting nut which is machine threaded to take a hanger rod. This nut provides for an adjustment of approximately one-half inch up or down by simply turning the nut to the left or right, without lifting or in any way disturbing the pipe, as is necessary with other makes of hangers.

Figure 2 is a dimensional drawing of the Grinnell Adjustable Swinging Type of hanger ceiling flange. This, with hanger rod, is used in conjunction with Adjustable Pipe Ring for hanging pipe from pitched roofs where adjustment is necessary. It is also useful in hanging overhead coils from roofs of the same type.

It is possible to obtain approximately the same amount of adjustment with the hanger flange as with the adjustable pipe ring.

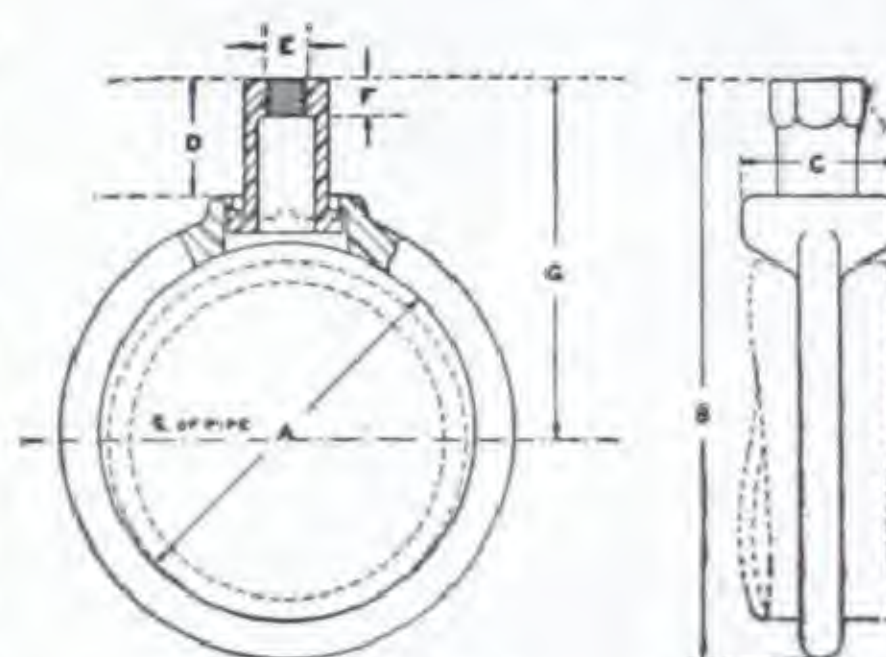


FIG. 1.

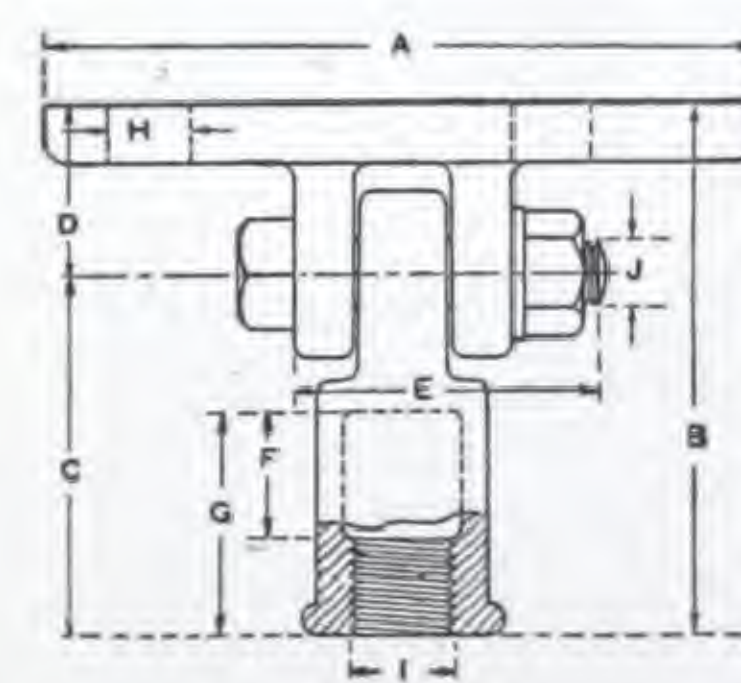


FIG. 2.

Send for our hanger booklet. By picture and dimensional drawings it describes the complete Grinnell Adjustable Hanger line.

WELDING AND PIPE FABRICATING.

Grinnell Company is splendidly equipped to make welded headers, pipe bends or cut and thread pipe to sketch. In addition to such work in our own plants, we can do welding on the job—our facilities including skilled men and the proper portable machinery for this important field work.

In fact, when you have piping work of any kind, you will find the Grinnell Company a service organization of long experience and exceptional facilities in everything that has to do with industrial piping.

THE RIC-WIL COMPANY

522 GUARDIAN BUILDING,
CLEVELAND, OHIO.

CANADIAN REPRESENTATIVES:—

W. W. HICKS, 567 Banning St., Winnipeg, Manitoba.
E. T. FLANAGAN, 229 College St., Toronto, Ont.W. H. CAMPBELL, St. John, New Brunswick.
J. J. CONLIN, 284 Beaver Hall Hill, Montreal, Que.

PRODUCTS.

RIC-WIL UNDERGROUND CONDUIT AND RIC-WIL UNDERGROUND PIPE COVERING
USED IN THE "RIC-WIL METHOD" OF INSULATING UNDERGROUND STEAM, HOT WATER OR OIL PIPES.THE RIC-WIL
METHOD.

The RIC-WIL METHOD of insulating underground steam, hot water or oil pipes to prevent heat losses, presenting practical advantages in the utility and ease of construction, appeals to every engineer and large steam user.

After the trench is dug and the levels determined, it is usual to begin the RIC-WIL METHOD with a concrete foundation on which the base drain is to be laid. The concrete foundation is of such a character that the levels are easily maintained.

BASE DRAIN.—The base drain is both a base for supporting and aligning the conduit, and a drain for carrying away the water which might otherwise accumulate around it. It has, in all cases, ample free drainage area and is made the same length as the conduit, but the joints of base drain and conduit alternate, thus making an interlocking construction which preserves conduit alignment. The joints of the base drain are not sealed, but are left open, and crushed rock or coarse gravel is banked up along each side to act as a filter and keep dirt from entering the base drain and thereby prevent drainage by clogging it up. The base drain is connected at various intervals with a sewer or other free outlet. The base drain is the most important single factor in the success of RIC-WIL METHOD.

CONDUIT.—The conduit is sectional, vitrified, salt glazed tile—the upper half being provided with a projecting lip to protect the longitudinal joint—in which is molded before shipment a pipe covering of high efficiency, same prepared from a highly siliceous natural mineral. The conduit is readily split lengthwise on the job before installing same. *RIC-WIL is the only sectional underground pipe covering manufactured where the waterproof casing and insulation are integral.*

Generally, further insulation is provided with RIC-WIL filler when a steam pipe or a number of pipes conveying fluids at different temperatures are installed in the same conduit. This loose insulating material is packed around the pipe or pipes so as to entirely fill the hollow space between same and the insulation which is molded to the inside of the tile. When properly installed, the filler will not settle or shrink and same is sufficiently elastic so that it will not interfere with the free expansion or contraction of the iron pipes. The insulation around the inside of the tile, together with the filler that is inserted, makes a continuous and efficient insulation.

PIPE SUPPORTS.—Pipe supports are usually placed 12½ feet apart, entirely enclosed in the conduit. These pipe supports are of a practical and strong design, consisting of a malleable iron guide with pockets supporting steel spindles, on which rustproof rollers are free to turn. The guide has a large bearing surface and projecting pins which insure the keeping of same in its proper relation to the pipes and conduit.

CEMENT.—Cement for sealing the bell joints of the conduit may be either RIC-WIL Elastic and Waterproof or Portland. In all cases the longitudinal joints are sealed with Portland Cement.

INSTALLATION.—RIC-WIL METHOD is complete; it is the easiest underground system to install and its durability and efficiency are established.

SIZES.

Conduits are made in sizes from 4 to 22 ins. inside diameter; sizes up to and including 20 ins. carried in stock, larger sizes made to order only. All sections of conduits are 2 ft. 6 ins. long, except the 4-in. and 6-in. sizes, which are 2 ft. long.

Base drain made in 3 sizes: small for conduits 4 and 6 ins. in diameter; medium for conduits 8 to 14 ins. in diameter, inclusive; large for conduits 16 ins. and up.

FITTINGS.

RIC-WIL insulated fittings are carried in stock in all sizes up to and including 14 ins. inside diameter of tile in the form of elbows 45 degrees or 90 degrees, reducers or increasers and tee branches. Larger sizes and other shapes made to order.

SHUTTERS.

Specially designed RIC-WIL shutters are used to close the ends of the conduit when entering buildings, manholes and anchor boxes.

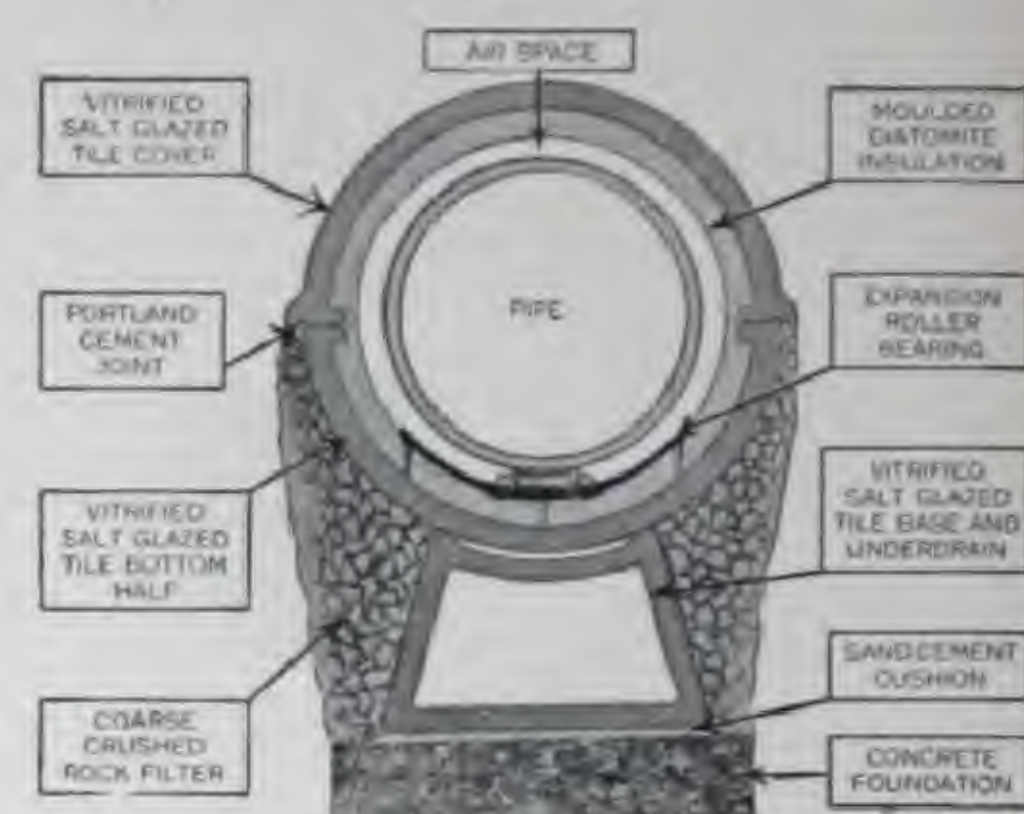
SPECIFICATIONS.

In preparing the subdivision of the heating specifications which embraces the conduit and insulation, it is recommended that the engineer communicate with this company in regard to sizes of conduit and standard equipment therefor, which will allow the installation of certain size pipe combinations required for the work contemplated. State the conditions under which the pipe system is to be operated, whether steam, hot water or oil, and if the former state the pressure and if any superheat is to be carried, and, if so, how much. It would be well to state clearly the kind of service for which each pipe is intended and if position of any pipe or pipes is definitely fixed in relation to any other pipes. With the foregoing information to hand valuable suggestions based on a wide range of observation, contact and experience will be given.

Representative will be sent, if desired.

CATALOGUE.

Bulletins describing RIC-WIL Classes DA and DF materials; also, bulletin giving complete standard and typical specifications will be sent on request.



RIC-WIL CLASS DA.
CROSS SECTION SHOWING PRINCIPLE OF CONSTRUCTION.



DE LAVAL STEAM TURBINE CO.

TURBINE EQUIPMENT CO., LTD.,

73 KING STREET WEST, TORONTO, ONTARIO.

BUILDERS OF STEAM TURBINES, CENTRIFUGAL PUMPS, BLOWERS AND COMPRESSORS, SPEED-REDUCING GEARS AND SPECIAL CENTRIFUGAL MACHINERY.

STEAM
TURBINES.

In the production of steam turbines of all sizes up to 15,000-h.p., we offer the combined advantages of standardized design and quantity production, combined with a sufficient selection of types to suit each user's requirements.

Where there is use for the exhaust steam, the simple velocity-stage impulse turbine is recommended.

Where economy is more important, we supply pressure-stage turbines, in some cases combined with velocity stages, to give the highest obtainable efficiencies.

De Laval Turbines are built to suit all steam conditions, as high pressure, condensing and non-condensing, back-pressure, bleeder and mixed flow service. They are also adapted to driving machines at all speeds, either directly connected or through the De Laval double-helical speed-reducing gear. All details of construction have been worked out with a view to reliability in service.

CENTRIFUGAL
PUMPS.

De Laval Centrifugal Pumps are built in the single-stage and multi-stage types, for all heads and capacities and for all services, including combined steam-turbine-driven boiler feeders in one casing, belt and motor-driven pumps, geared-turbine-driven pumps for water works and general supply service, etc.

CENTRIFUGAL
BLOWERS
AND
COMPRES-
SORS.

De Laval Centrifugal Blowers and Compressors are built in all capacities and for all pressures up to 120 lb. per sq. in. Except for very low pressures, the speeds permit of direct connection to steam turbines. In electric motor-driven compressors for high pressures, efficiency and economy are improved by the use of speed-increasing gears. Close regulation, either for constant pressure or constant volume, is secured by sensitive but simple and rugged governors.

SPEED-
REDUCING
GEARS.

De Laval Speed-Reducing Gears are of the double-helical type and are the result of over 25 years' experience in building reduction gears for steam turbine service. The cutting methods employed are such that the correct pitch, angle and tooth contour are produced and quiet running and long life are secured.

All De Laval machinery is characterized by horizontally split casings, moderate peripheral speeds, large running clearances and ample bearing surfaces and shaft sizes. All apparatus is built on a limit-gauge, interchangeable basis, and is subject to rigid inspection, both as to materials and workmanship, during the process of manufacture. The performance of every machine is guaranteed, both as to capacity and efficiency, and a complete test is carried out at the shops before shipment.

Engineering suggestions and special publications will be sent upon receipt of letter describing your conditions.



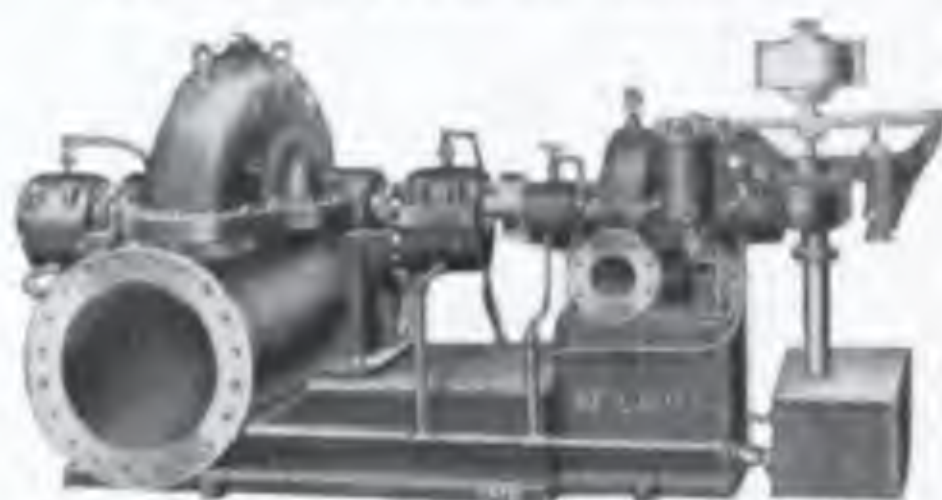
1200 KW. GEARED-TURBINE-DRIVEN ALTERNATOR
INSTALLED AT TORONTO.



GEARED-TURBINE-DRIVEN CENTRIFUGAL PUMP;
30,000,000 IMP. GAL. PER DAY AGAINST 210 FT.
HEAD. INSTALLED AT MONTREAL WATER WORKS.



CENTRIFUGAL COMPRESSOR DRIVEN BY ELECTRIC
MOTOR THROUGH GEAR; 25,000 CU. FT. AGAINST
16 LB. PRESSURE. INSTALLED BY GRADY MINING,
SMELTING AND POWER CO., ANKON, B.C.



VELOCITY STAGE TURBINE DRIVING GAS
BLOWER; 11,000 CU. FT. OF FREE AIR
PER MIN. AGAINST 33-IN. WATER COLUMN.



TURBINE-DRIVEN FIRE PUMP.



SINGLE-STAGE CIRCULATING PUMPS IN CONNE-
CTION WITH HOT-WATER HEATING SYSTEM

ESTABLISHED 1867.

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MANUFACTURERS OF ICE MAKING AND REFRIGERATING MACHINERY, STEAM ENGINES, ETC.

MAIN OFFICE AND WORKS: 845-863 CLINTON STREET,
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VILTER ICE MAKING AND REFRIGERATING MACHINERY; AMMONIA VALVES AND FITTINGS; AMMONIA CONDENSERS; BRINE COOLERS; VILTER ROLLING MILL AND GIRDER FRAME CORLISS ENGINES; POPPET VALVE ENGINES.

VILTER HIGH SPEED AMMONIA COMPRESSORS.

All accepted principles of refrigerating machinery construction, and all subsequent, consistent developments and improvements find embodiment in Vilter Horizontal High Speed Ammonia Compressors. They are specially designed for direct connection to the newest types of high speed prime movers, and particularly adapted for direct connection to synchronous motors, a method of drive which is proving so highly economical and efficient.

VILTER ROLLING MILL TYPE COMPRESSOR.

A horizontal double acting ammonia compressor, with rolling mill frame. Its very appearance gives assurance and proof of its strength and durability. All parts of the base rest upon the foundation, giving a uniform distribution of the load and insuring maximum stability and rigidity. Stuffing box of the double packed type, with oil seal and pressure release. Inlet and outlet valves located in cylinder heads, and designed to obtain maximum area. Simple compressors built direct connected to Corliss engines, in sizes from 6 to 400 tons refrigeration per 24 hours; also direct connected to tandem compound Corliss and poppet-Corliss engines in sizes from 100 to 400 tons refrigeration per 24 hours. Duplex compressors built direct connected to cross compound Corliss or poppet-Corliss engines in sizes from 100 to 800 tons refrigeration per 24 hours. Also in simple or duplex arrangement for belt or rope drive from electric motors or other type of prime movers.

VILTER LOW TEMPERATURE COMPRESSION SYSTEM.

A system for efficiently producing extremely low temperatures with compression refrigerating machinery, by means of multi-stage compressors and liquid cooling, which reduces the power per ton of refrigeration. Send for special literature.

VILTER SMALL CAPACITY TWIN CYLINDER AMMONIA COMPRESSORS.

A vertical single acting compressor specially designed for users of comparatively small quantities of refrigeration. Staunchly built, with a view to operation with a minimum amount of attention. Built in sizes from 1 ton to 20 tons capacity per 24 hours.

VILTER CORLISS AND POPPET VALVE ENGINES.

The rolling mill frame Corliss engine is of exceptionally massive construction and adapted to any class of service, from the steady belted load to direct connected electric service, in which the engine is subjected to heavy and extremely variable loads. Built for high steam pressures and high rotative speeds. The valve gear is of the high speed type, and all valves are double ported. Built in all sizes, either simple, tandem compound, or cross compound.

The girder frame Corliss engine is strong and rigid and designed to take shocks and overloads without possibility of misalignment. Adapted to any class of ordinary service, and recommended for steam pressures up to 100 lbs. Made in 26 sizes, from 25 H.P. up.

The poppet valve engine operates with high steam pressures and superheat, and is remarkable for its low steam consumption. Valve gear is of special design, reducing the number of working parts to about 60% of the number used in other designs.

AMMONIA FITTINGS, Etc.

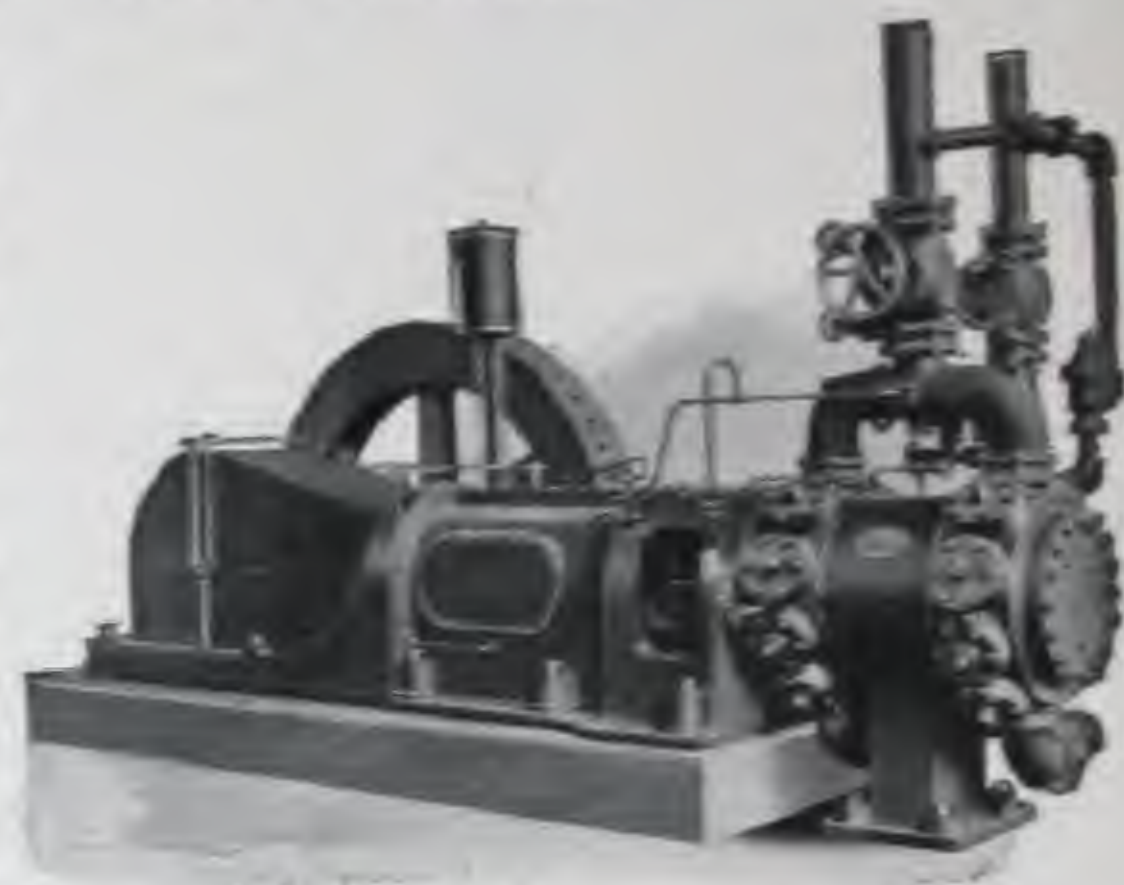
A full line of ammonia valves and fittings, condensers, separators, receivers, brine coolers, etc., to fill any requirements.

CANADIAN REFERENCES.

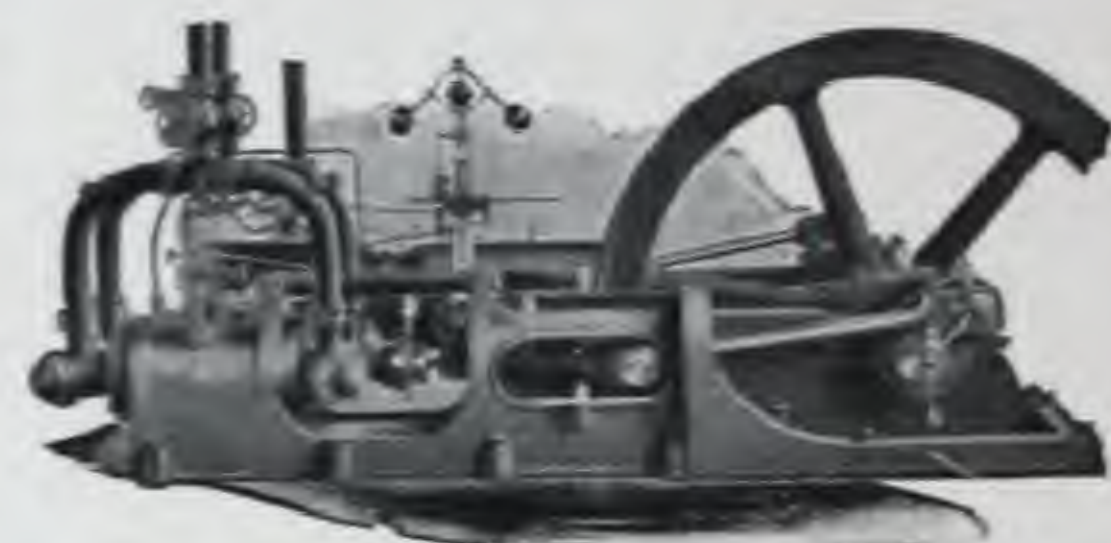
We have installed complete plants, from the smallest to the largest, in all parts of the Dominion. Send for name of user in your vicinity.

LITERATURE.

Bulletins, catalogues, and full data regarding our products will be mailed on request.



VILTER HIGH SPEED AMMONIA COMPRESSOR.



VILTER DUPLEX AMMONIA COMPRESSOR, DIRECT CONNECTED TO CROSS COMPOUND CORLISS ENGINE.



VILTER TWIN CYLINDER AMMONIA COMPRESSOR, SMALL CAPACITY.



SIMPLE COMPRESSOR, DIRECT CONNECTED TO TANDEM COMPOUND ENGINE WITH HIGH PRESSURE POPPET VALVE CYLINDER AND LOW PRESSURE CORLISS CYLINDER.

CANADIAN ICE MACHINE CO., LIMITED

HEAD OFFICE: TORONTO.

WINNIPEG AND MONTREAL.

"YORK" ICE MACHINES.

"CIMCO" SUPPLIES.

PRODUCT.

REFRIGERATING AND ICE MAKING MACHINERY AND SUPPLIES, with other Special Apparatus for lowering and holding constant Temperatures and Humidities.

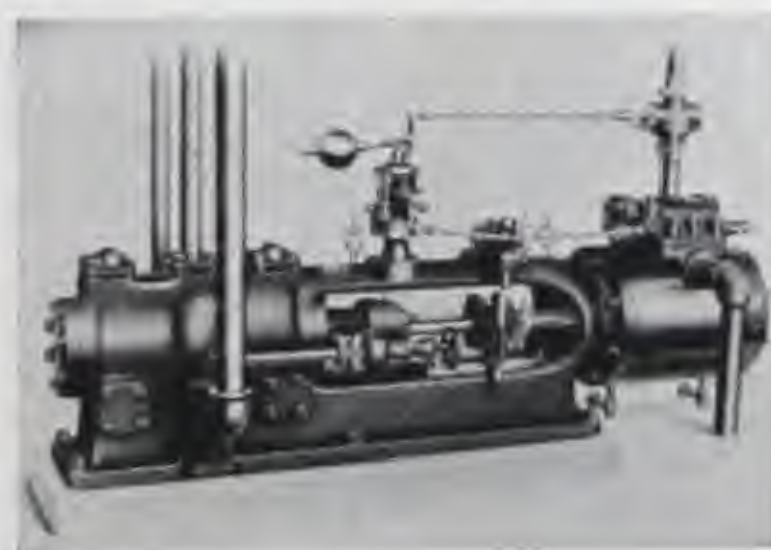
TYPE OF EQUIPMENT.

Sizes in Single Units from $\frac{1}{4}$ to 600 tons Ice Melting Capacity per 24 hours, in following types, suitable for all Ordinary and Special Purposes:—BRINE
OR
DIRECT
EXPANSION
SYSTEM.YORK
AMMONIA
COMPRESSION
MACHINES.YORK
CARBONIC
ACID
MACHINES.YORK
AMMONIA
ABSORPTION
MACHINES.VERTICAL COMPRESSORS.
HORIZONTAL COMPRESSORS.
HIGH SPEED
ENCLOSED COMPRESSORS.VERTICAL COMPRESSORS.
HORIZONTAL COMPRESSORS.LIVE STEAM.
EXHAUST STEAM.DIRECT
CONNECTED ON
COMMON
BASEPLATE
OR
BELTED
TO.DOUBLE PIPE.
SHELL AND COIL.
SHELL AND TUBE.YORK
STEAM ENGINES:
SLIDE VALVE.
PISTON "
CORLISS "
POPPET "
POPPET UNIFLOW.
ELECTRIC MOTOR.
INTERNAL
COMBUSTION ENGINE.

IN FOLLOWING INDUSTRIES:—

ICE MAKING.
DAIRIES.
CREAMERIES.
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SUGAR REFINERIES.
OIL REFINERIES.
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GLUE FACTORIES.
DYE WORKS.
PAINT WORKS.
PARAFFINE WORKS.
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TEXTILE INDUSTRIES.
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ISINGLASS.
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SKATING RINKS.
SHAFT SINKING.
MORGUES.VERTICAL HIGH SPEED COM-
PRESSOR AND SLIDE VALVE
ENGINE.

VERTICAL COMPRESSOR BELTED.

HORIZONTAL COMPRESSOR
WITH CORLISS ENGINE.VERTICAL HIGH SPEED
BELTED COMPRESSOR.VERTICAL COMPRESSOR
WITH POPPET VALVE ENGINE.VERTICAL HIGH SPEED
BELTED COMPRESSOR.

AQUA AMMONIA PUMP.

VERTICAL HIGH SPEED COMPRESSOR
WITH UNIFLOW ENGINE.PACKING HOUSES.
MEAT MARKETS.
CANNING.
LEATHER MFG.
YEAST MFG.
SOAP MFG.
CHEESE MFG.
GELATINE WORKS.
CHEMICAL WORKS.
DRINKING WATER SYS-
TEMS.
PUBLIC BUILDINGS.
HOSPITALS.
MEDICAL TREATMENT.
STEAMSHIPS.
FISHING BOATS.
DREDGES.
BAKERIES.
CIDER MFG.
MINERAL WATER.
SYRUP MFG.
MALT EXTRACTS.
PERFUMERY MFG.
CANDLE MFG.
EXPLOSIVE MFG.
FLORISTS.
NURSERYMEN.
STEEL WORKS.
CELLULOID WORKS.
ALUMINIUM WORKS.
PHOTO. MATERIAL.

SERVICE.

We maintain an efficient service corps and carry a complete line of "CIMCO" supplies in stock for the convenience of our customers.

ARMSTRONG CORK & INSULATION COMPANY, LIMITED

902 MCGILL BUILDING,
MONTREAL.11 CHURCH STREET,
TORONTO.

INSULATING MATERIALS.

NONPAREIL
CORKBOARD, FOR
COLD STORAGE
INSULATION.

To meet the demands of modern cold storage construction, a good insulating material must be:

- A good non-conductor of heat.
- Non-absorbent of moisture and therefore durable in service.
- Sanitary and odourless.
- Compact—occupying but little space.
- Structurally strong and therefore easy to install.
- Slow burning and fire-retarding.
- Reasonable in cost.

NONPAREIL CORKBOARD meets these requirements to a greater degree than any cold storage insulation that has yet been devised, for in cork, nature herself has supplied a material particularly well-suited for this purpose.

Use NONPAREIL CORKBOARD for the insulation of Cold Storage Warehouses, Ice Plants, Breweries, Packing Plants, Fur Storage Vaults, Dairies, Creameries, Ice Cream Plants, Refrigerators, Freezing Tanks, etc.

NONPAREIL CORK
COVERING.

NONPAREIL CORK COVERING, for cold pipes, is designed especially for the insulation of brine, ammonia, ice water, beer and cold water lines, accumulators, coolers, cylindrical tanks and filters. It consists of pure granulated cork, compressed and baked in moulds of proper shape to fit the different sizes of pipes and the various fittings in ordinary use. It is coated inside and out with mineral rubber finish and is applied with waterproof cement on the joints, thus rendering them impervious to moisture.

Nonpareil Cork Covering is manufactured in four thicknesses to meet different service conditions.

NONPAREIL
HIGH PRESSURE
STEAM COVERING.

The increasing tendency to use steam at high pressure and the growing popularity of superheated steam, has created a demand for a more efficient type of insulation for steam lines—a demand which is fully met by Nonpareil High Pressure Covering. This Covering is distinctive because it is the only covering made of diatomaceous earth and asbestos.

Compared with other high pressure covering, Nonpareil High Pressure Covering is not only a better non-conductor of heat, but will withstand higher temperatures without calcining or disintegrating. Moreover, it will bear repeated wetting and drying without injury, and for this reason is the ideal form of insulation for underground steam lines. It is easy to apply and reasonable in price.

NONPAREIL
INSULATING
BRICK.

For many years there has existed a real need for a heat insulating material which would combine low heat conductivity with sufficient strength to enable it to be built in as part of the structure it is designed to insulate. Nonpareil Insulating Brick fulfill all these requirements; they will withstand a crushing load of more than ten tons to the square foot and their insulating efficiency is exceptionally high. They are easy to install, being made in standard size $9" \times 4\frac{1}{2}" \times 2\frac{1}{2}"$.

Nonpareil Insulating Brick are especially suitable for the insulation of boiler settings, furnaces, bake ovens, gas plants, enamelling ovens, etc.

CORK TILE
FLOORS.

Cork Tile is composed solely of cork, no foreign binder is used in its manufacture. It is furnished in three shades, light, medium and dark brown. Cork Tile is durable, sanitary, non-slippery, warm and noiseless to the tread. Cork Tile is used in Banks, Court Houses, Hospitals, Libraries, Churches, Theatres, Offices, etc.

CORK BRICK.

An ideal material for flooring cow stalls, calf, bull and sheep pens, piggeries, etc.

Cork brick is composed of clean granulated cork and refined asphalt. The mixture is heated, moulded into brick form $9 \times 4 \times 2$ inches and then subjected to heavy pressure. It is warm to the touch—summer and winter—easy under foot, never slippery—wet or dry—non-absorbent and thoroughly sanitary, durable in service and easy to install in old or new barns.

LINOTILE FLOORS.

Linotile is a composition in which powdered cork, wood flour and linseed oil predominate. It comes in tile form, one-quarter inch thick, and in various shapes and sizes. It is applicable to any base—wood, concrete or metal. There are eleven colours and almost any design can be made to suit requirements.

Linotile is a flooring material which combines the durability of concrete, the qualities of marble and the attractiveness of glazed tile. The combination of all these features makes Linotile an ideal flooring for Offices, Stores, Churches, Banks, Lobbies, Billiard Rooms, Kitchens, Pantries, etc.



INSTALLATION OF NONPAREIL CORKBOARD.



CORK BRICK.

THE WM. RUTHERFORD & SONS CO., LIMITED

LUMBER AND MILLWORK.

425 ATWATER AVENUE,
MONTREAL, QUE.SOLE DISTRIBUTERS IN QUEBEC AND MARITIME PROVINCES FOR CAREY PRODUCTS.
CONTRACTS UNDERTAKEN IN ALL PARTS OF THIS TERRITORY.INSULATING
PAPER.*Fibreweave*
INSULATING

CAREY FIBREWEAVE INSULATING PAPERS are made from special jute stock base, which is carefully and thoroughly treated with pure, high-grade, odourless asphalts, compounded in our own refineries, resulting in a finished product possessing unusual strength. In comparative tests on the Mullen Testing Machine, Carey Fibreweave Papers will show an average of 10 pounds greater tensile strength than any similar paper on the market. This fact demonstrates its greater density and solid texture as well as its efficiency in resisting air penetration.

Carey Fibreweave Papers are furnished in rolls 36 inches wide, containing 500 or 1,000 square feet, and in various weights and finishes.

DAMP-PROOFING
COMPOUND.**DAMP-PROOFING
PERCOPROOF
COMPOUND**

CAREY PERCOPROOF DAMP-PROOFING COMPOUND is an ideal preparation and fulfills the highest expectations of architects, engineers and builders. Percoproof comes prepared for use and requires no thinning material, such as oil. It forms a complete, unbroken, even, elastic and permanent film when applied to concrete, brick, stone, stucco, tile, or plaster. It closes all the pores and prevents moisture and dampness from coming through. Under all conditions this compound remains elastic, and is always thoroughly set, but not brittle.

EXPANSION
JOINTS.*Elastite*

CAREY ELASTITE EXPANSION JOINT consists of a heavy body of special asphalt compound sandwiched between two layers of a special grade of asphalt saturated wool felt, the whole being firmly bonded together by a special process. This joint saves time and labour, eliminates waste and absolutely prevents a faulty job, either from carelessness or oversight. It ensures full depth joints, provides for all temperature changes, requires no investment in equipment and reduces labour cost. Elastite Expansion Joint is used effectively in concrete walls, floors, roofs, bridges, sidewalks—in fact, in any construction work where it is necessary to provide for expansion of materials.

PIPE
COVERINGS.*Magnesia and
Asbestos*
INSULATING

The following is a list of CAREY PIPE COVERINGS, all of which are specially designed to give the highest possible efficiency:—

1. CAREY 85% MAGNESIA COVERING—For medium and high pressure steam lines where maximum economy is desired.
2. CAREY SERRATED ASBESTOS COVERING—For superheated steam, vibration or rough usage.
3. CAREY CAROCEL COVERING—For medium or low pressure steam and lines given rough usage.
4. CAREY DUPLEX COVERING—For hot water heating systems.
5. CAREY ASBESTOS AIRCELL COVERING—For low pressure steam or hot water, where price must be restricted.
6. CAREY IMPERVO COVERING—For cold pipe lines to prevent sweating, and ice water line insulation.
7. CAREY PROTECTO COVERING—For cold water lines to prevent freezing.
8. CAREY ARGENTUM COVERING—For low pressure steam or hot water pipes exposed to moisture.

UNDERGROUND
INSULATION.

The Carey System of Insulation for Underground Steam Pipes consists of the three essential elements: Insulation, Expansion Rollers, and Waterproofing. The accompanying cut shows the construction and method of assembling the Carey System. The Argentum shells are cut on one side only and applied by springing over the magnesia covering. There is only one seam to seal in each Argentum shell, which permits all work to be done at the top of the covering, where it can be satisfactorily inspected.



CUT SHOWING CAREY SYSTEM OF UNDERGROUND INSULATION.

See also our advertisement on page 62.

BEVERIDGE SUPPLY CO., LIMITED

628-630 ST. PAUL ST. W., MONTREAL, P.Q.

LOCAL AGENTS FROM COAST TO COAST.

MILL SUPPLY DEPARTMENT.

CONCRETE
HARDENER
AND
WATERPROOFER.
ROOFINGS.

FLINTEX—Made in Canada. Makes concrete as hard as flint. "Just flush it on." Makes concrete floors, walls, tanks, etc., wearproof, dustproof and moistureproof. The first cost is the last cost. Also an integral quality for mixing with dry cement for waterproofing foundations, dams, etc. Also an Accelerator for use during winter months.

Our STORMPROOF and STORMKING RUBBER ROOFINGS with nails and cement are recognized as best value.

PLASTIC and LIQUID ROOFINGS. Also Sheathings, Tarred Papers, etc.

EXTERIOR
BOILER
COATINGS.

PYRO-HERMETIC COATING and SEAL for coating boiler brickwork. They fill up present cracks and prevent new ones forming. Makes settings air-tight.

FURNACE
GRATES AND
BOILER
COMPOUND.

SHELL-BAR GRATES, revolving and anti-clinker.

BOICO Boiler Compound. A water treatment made when necessary to suit local water conditions.

PYRO SCALINE. A metal treatment for all feedwaters.

PLIBRICO
FURNACE
LINING.

PLIBRICO Jointless Fire Brick. A highly refractory Plastic One-piece furnace lining for Boilers, Baffles, Dutch-oven constructions, Cupolas, Retorts, Enamelling Furnaces, Oil-Fired Forges, Furnaces, Muffles and wherever High-Grade Fire Brick is required. Will withstand 3100° F. Replaces fire brick and fire clay for all purposes, and is being used by the largest plants in the Dominion.

PLIBRICO
BONDS HIGH
TEMPERATURE
CEMENTS.

PLIBRICO BOND is a product which gives a perfect bond between fire bricks, and does not allow the fire to burn out the joints as in the case where fire clay is used, and forms a permanent bond between the bricks. Three grades: 101 for wide joints, 102 dipping or as a plaster, 103 for Silica bricks.

FACTORY
WALL
PRESERVATIVES.

ROCKFACE. White Water Paint. Superior to White-wash as it will not rub or scale off stone, brick or cement.

SOLPAR. Cold Water Paint for wood and plaster. White and colors.

SOLIGNUM and LETTENEY. The well-known wood preservatives and stains. Used all over the world for last forty years. In a class by themselves. Replace paint at a fourth cost.

METALLIC
PACKING.

AMBEST METALLIC PACKING.

Ambest is made in long pliable filaments from an anti-friction metallic alloy in combination with a mineral lubricant.

It will stand service up to 600 degrees temperature, high speed and heavy pressure, without hardening, fusing or softening, always remaining plastic, and it cannot scratch, score, or bind any rod, whether brass, iron or steel.

It is just as suitable for low pressure and low temperature, as extremes of heat and cold do not affect it, neither does it lose any of its packing or lubricating qualities with age. Not affected by ordinary acids and alkalis.

As a packing for Ammonia it has no equal.

It does away entirely with carrying a varied assortment of packings in stock. From a single supply, in fact, from the same can you may pack engine and pump rods, air compressors (both steam and air ends), steam hammers, throttle stems and valve or valve stem large or small.

BEARING
METAL.

AJAX BULL BEARING ALLOY.—A general purpose lining metal giving splendid satisfaction in many different industries and under all normal operating conditions. Replaces Genuine Babbitt, at a lower price.

CINCH
ANCHORS.

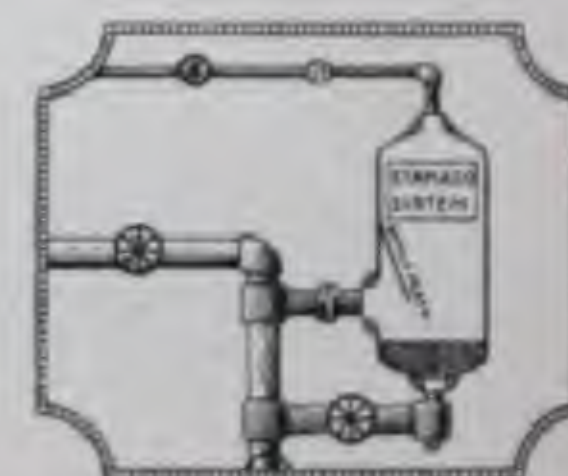
CINCH ANCHORING SPECIALTIES.—Selling Representatives for Quebec and Maritime Provinces.

STAMACO
TRAPS.

STAMACO SYSTEM.—For keeping boilers automatically and continuously clean.



IS FURNISHED IN LOOSE ROPE FORM, SLIGHTLY TWISTED.
EASILY SEPARATED TO SUIT ANY SIZE ROD AND BOX.



JOHN T. HEPBURN, LIMITED

ENGINEERS AND IRON FOUNDERS.

18-40 VAN HORNE ST.,

TORONTO.

GREY IRON CASTINGS.

BUILDERS SUPPLIES.
GRATE BARS.
COLUMNS.

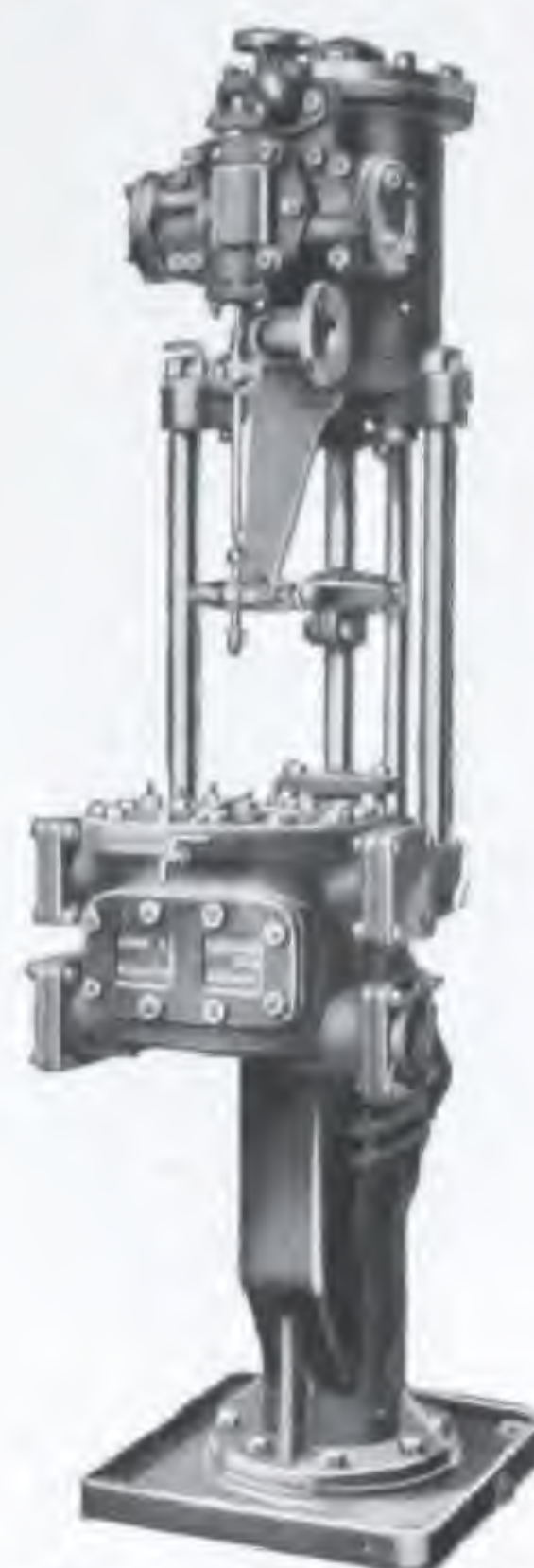
BLACKSMITH WORK.

HEAVY AND LIGHT FORGINGS.
ACETYLENE WELDING.
SPECIAL MACHINE WORK.

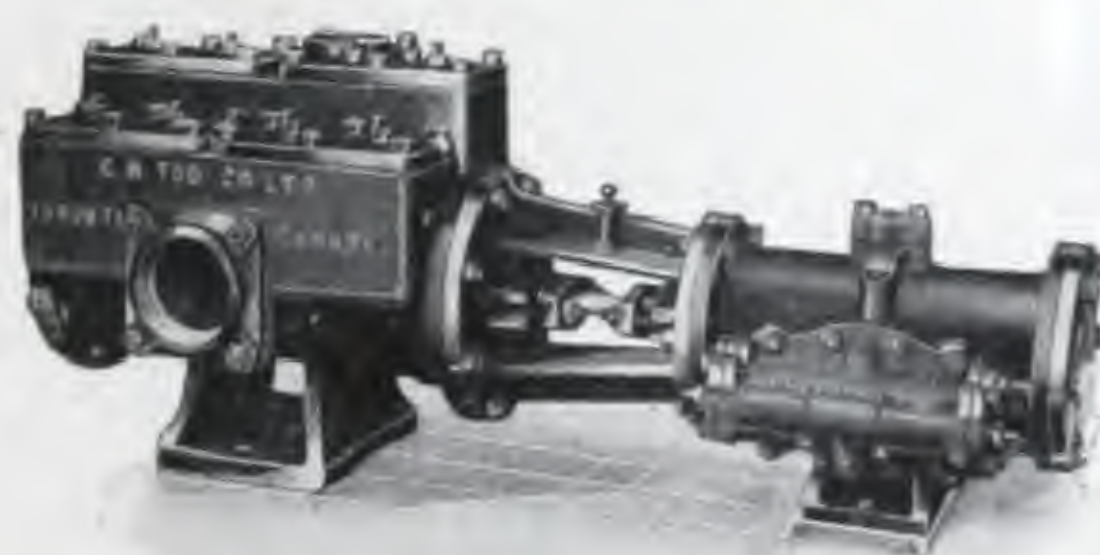
HAND OVERHEAD CRANE.

For factory and warehouse use.
Can be supplied with hand chain
block or electric hoist as shown.STOP VALVES.
For water mains.

ELECTRIC DERRICK.

The most modern derrick for builders and contractors,
where electricity is available. Single motor drive, and
easy to operate. Sizes up to 6 ton capacity.

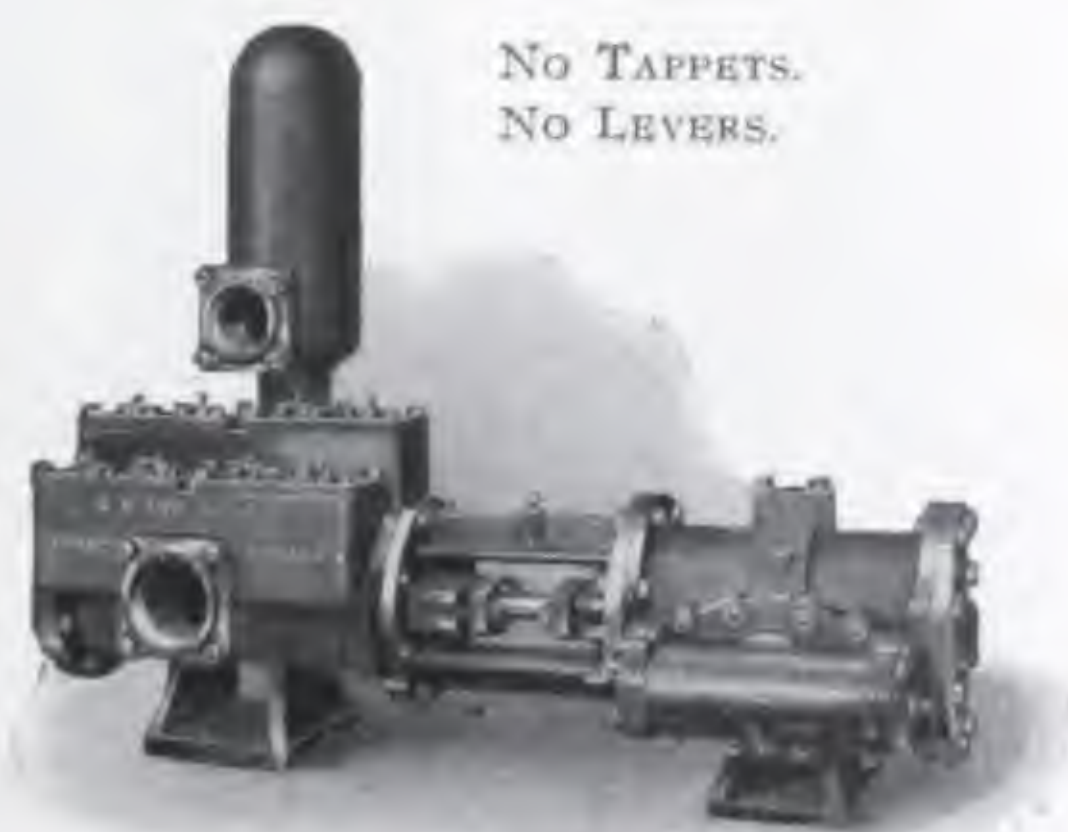
VERTICAL RAM FEED PUMP.

Specially designed for high pres-
sures and for water of high temper-
ature. It has only one gland on the
ram to need attention; takes little
floor space, and is a most efficient
pump in every way.NO TAPPETS.
NO LEVERS.

VACUUM PUMP.

For heating systems; both high and low pres-
sure. Valves are accessible and of the Pot
Valve Type.

HAND DERRICK.

Equipped for both hand and
power. Built in sizes from 1/2
ton to 6 ton capacity.NO TAPPETS.
NO LEVERS.

FEED PUMP.

Simplex type with Patent Valve Motion.
The only self-draining pump made in Canada.
Long strokes for efficiency.

HYDRANT.

Standard size for 6"
water mains and 6'-0"
trench. Made com-
plete with frost jackets
and foot pipes.

HALIFAX OFFICE:
3 Simson Bldg.
J. A. THOMPSON, Manager.

OTTAWA OFFICE:
71½ Sparks Street.
CHARLES V. CLARK, Manager.

TORONTO OFFICE:
77 York Street.
H. J. CHURCH, Manager.

DARLING BROTHERS LIMITED

ENGINEERS,
MANUFACTURERS AND FOUNDERS.

Head Office and Works:

120 PRINCE STREET, MONTREAL, P.Q.

QUEBEC OFFICE: 203 St. John Street. W. J. BANKS, Agent.

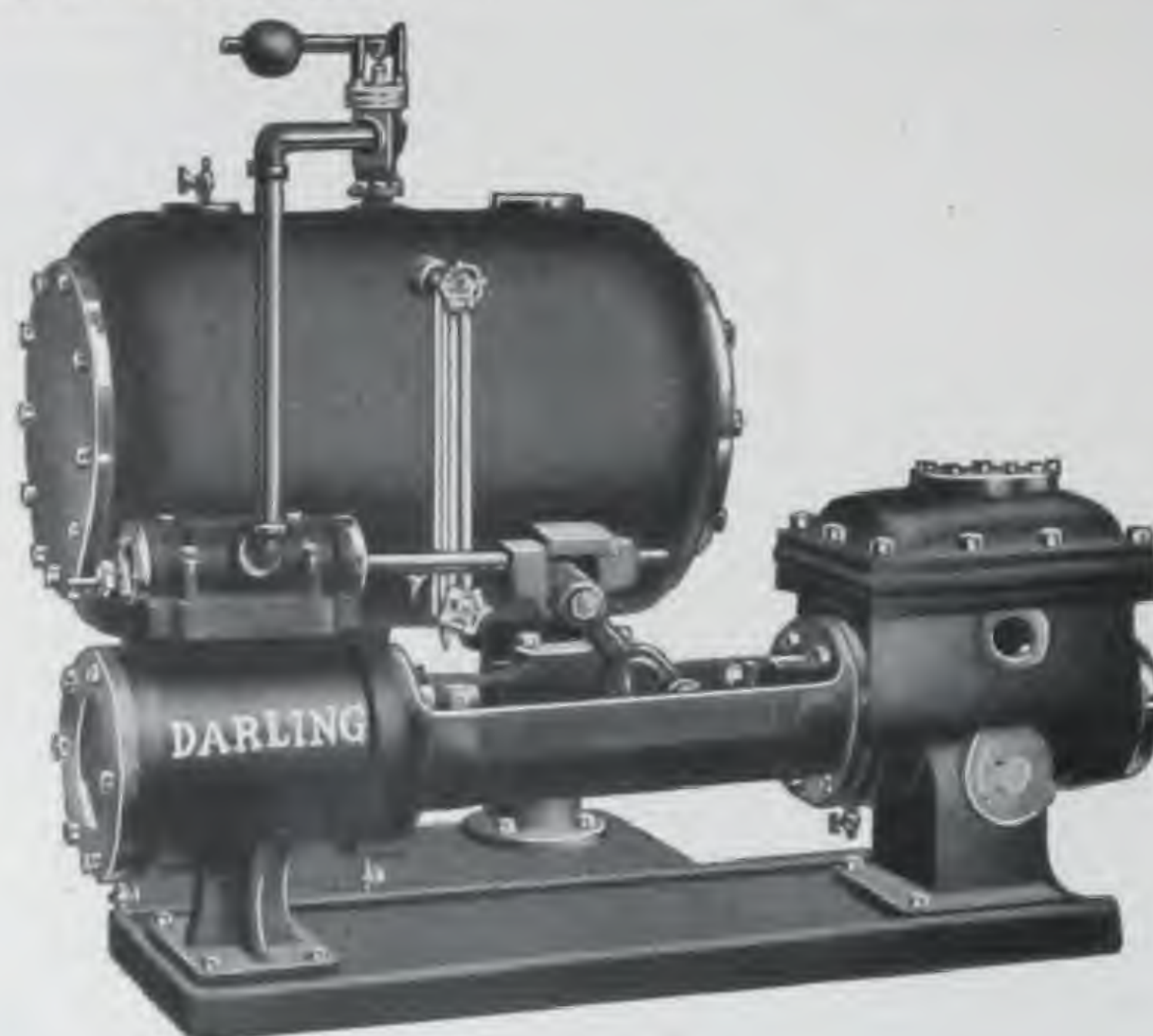
WINNIPEG OFFICE:
104 Princess Street.
CHARLES A. SARGENT, Manager.

CALGARY OFFICE:
605 Second Street West.
S. S. CLARKE, Agent.

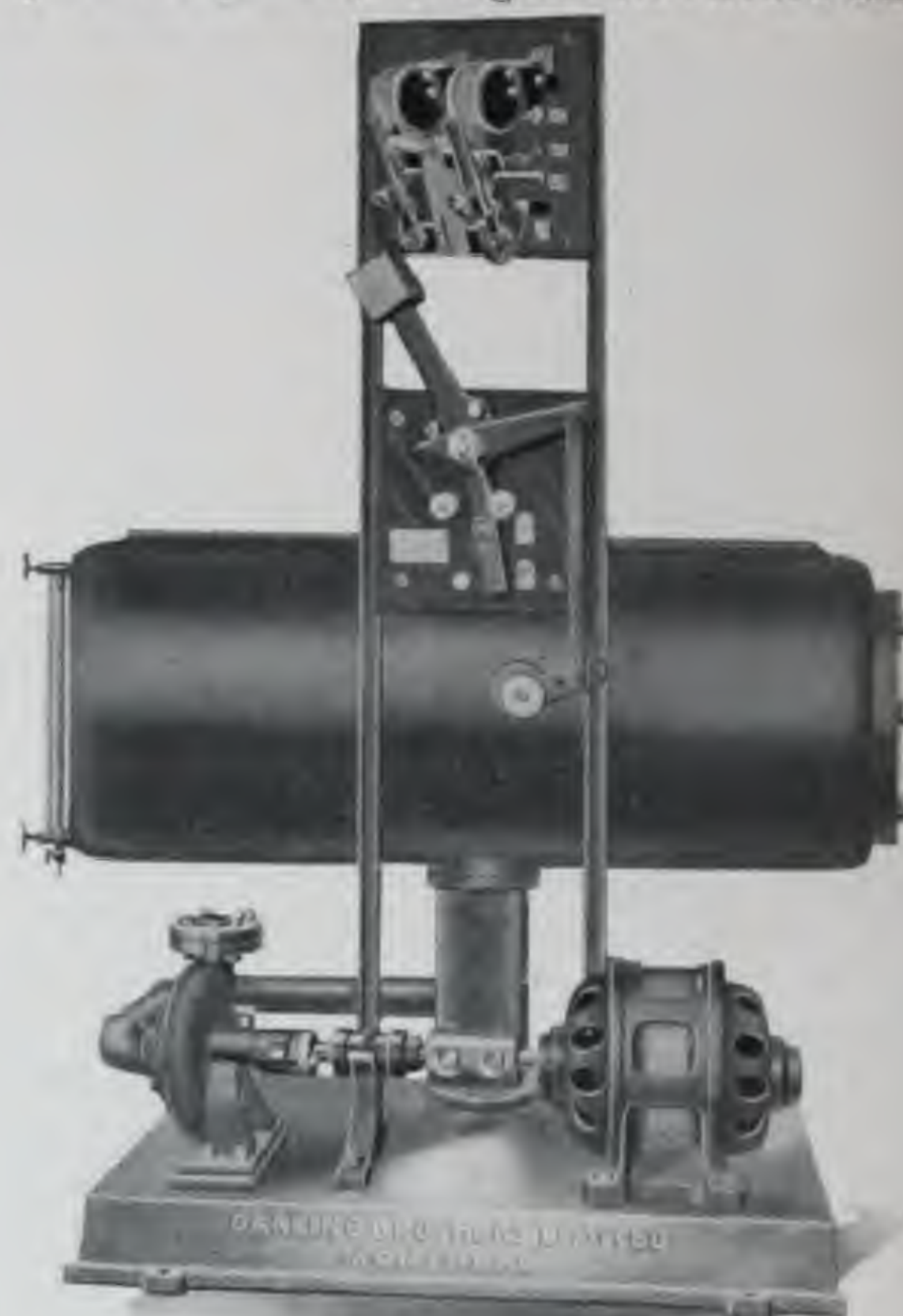
VANCOUVER OFFICE:
1144 Homer Street.
FRANK DARLING & CO. LTD., Agents

ILLUSTRATIONS.

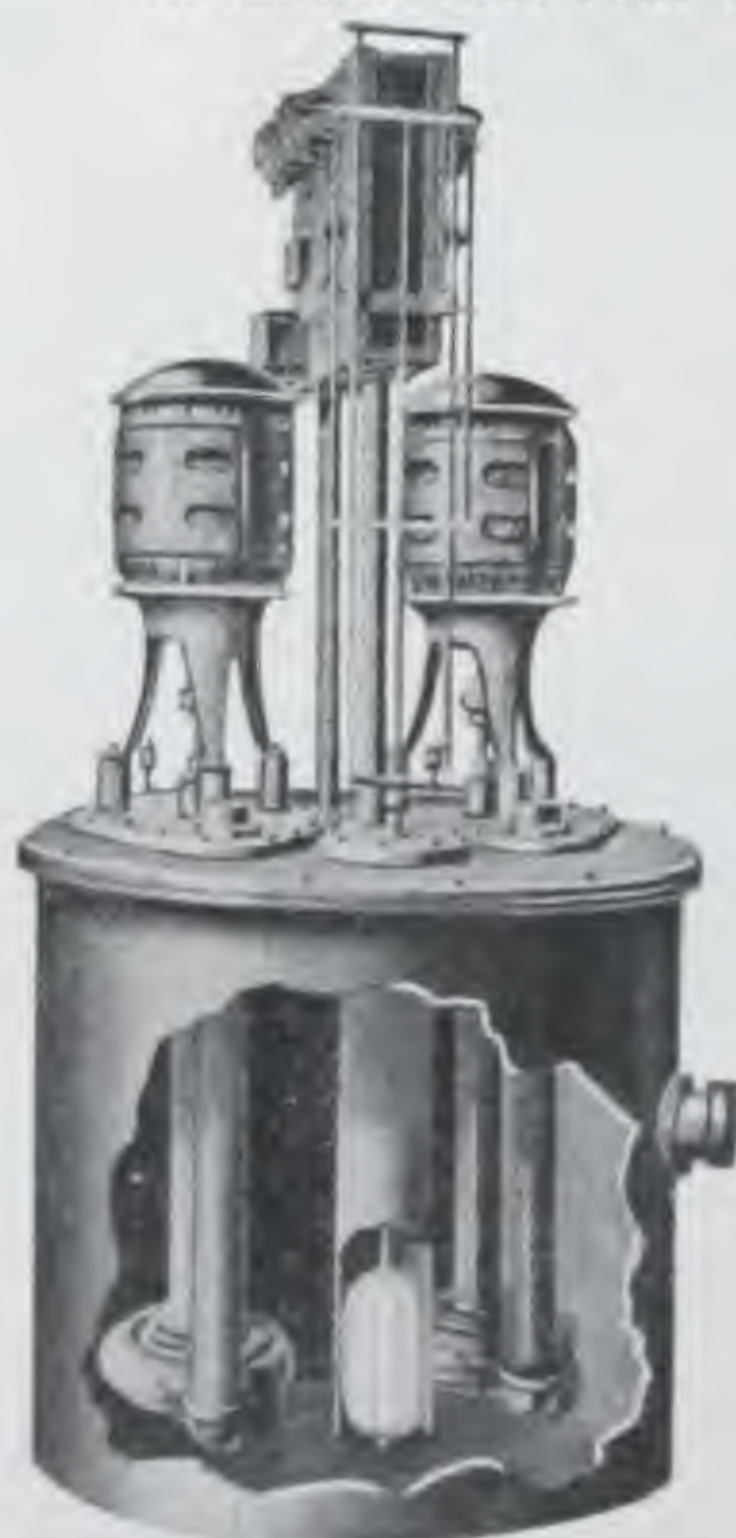
These illustrations represent only a few of our lines. We are manufacturers of Pumps for any Service, Steam Appliances of every description, Freight Elevators and Dumb Waiters.



AUTOMATIC FEED PUMP AND RECEIVER.



ELECTRIC-DRIVEN.
CENTRIFUGAL PUMP AND RECEIVER.



YEOMANS AUTOMATIC BILGE PUMPS.
DUPLEX.



THE WEBSTER OIL SEPARATOR.
HORIZONTAL.



CONNECT WITH LOW PRESSURE SIDE.
SPECIAL VACUUM-PRESSURE
REGULATING VALVES.

We issue catalogues covering all of our lines and shall be pleased to forward them upon application.

VACUUM HEATING.

We desire to draw the attention of architects to the fact that we are the sole Canadian Manufacturers and Distributors for the WEBSTER VACUUM SYSTEM OF HEATING.

See also our advertisement on Freight Elevators and Dumb Waiters, page 117, and Mason Safety Treads, page 134.

LAURIE & LAMB

211 BOARD OF TRADE BUILDING,
MONTREAL.

STEAM
ENGINES.
DIESEL
ENGINES.

Belliss & Morcom equipment is unexcelled for EFFICIENCY, RELIABILITY, NOISELESS RUNNING. Forced lubrication is used throughout. This ensures a minimum of wear on bearings and moving parts. It also materially lessens the possibility of a shutdown.

AIR
COMPRESSORS.

STEAM AND
EXHAUST
TURBINES.

Belliss & Morcom also manufacture complete Steam Condensing Plants, and Oil Engines for house lighting, etc.

GARBAGE
DESTRUC-
TORS.

Heenan & Froude High Temperature Garbage Destructors, with steam generating plant if required.

DYNAMO-
METERS.

Water Dynamometers for engine and turbine testing.

COOLERS.

Coolers for air, oil and water. Coolers for air cooling of turbines, etc.

WATER
SOFTENERS.

Paterson Water Softeners and Filters for all purposes.

CENTRIFUGAL
PUMPS.

Centrifugal Pumps for all services, more particularly High Efficiency Pumps, and pumps for special requirements, such as acid-resisting or non-rusting qualities.

SEWAGE
DISPOSAL.

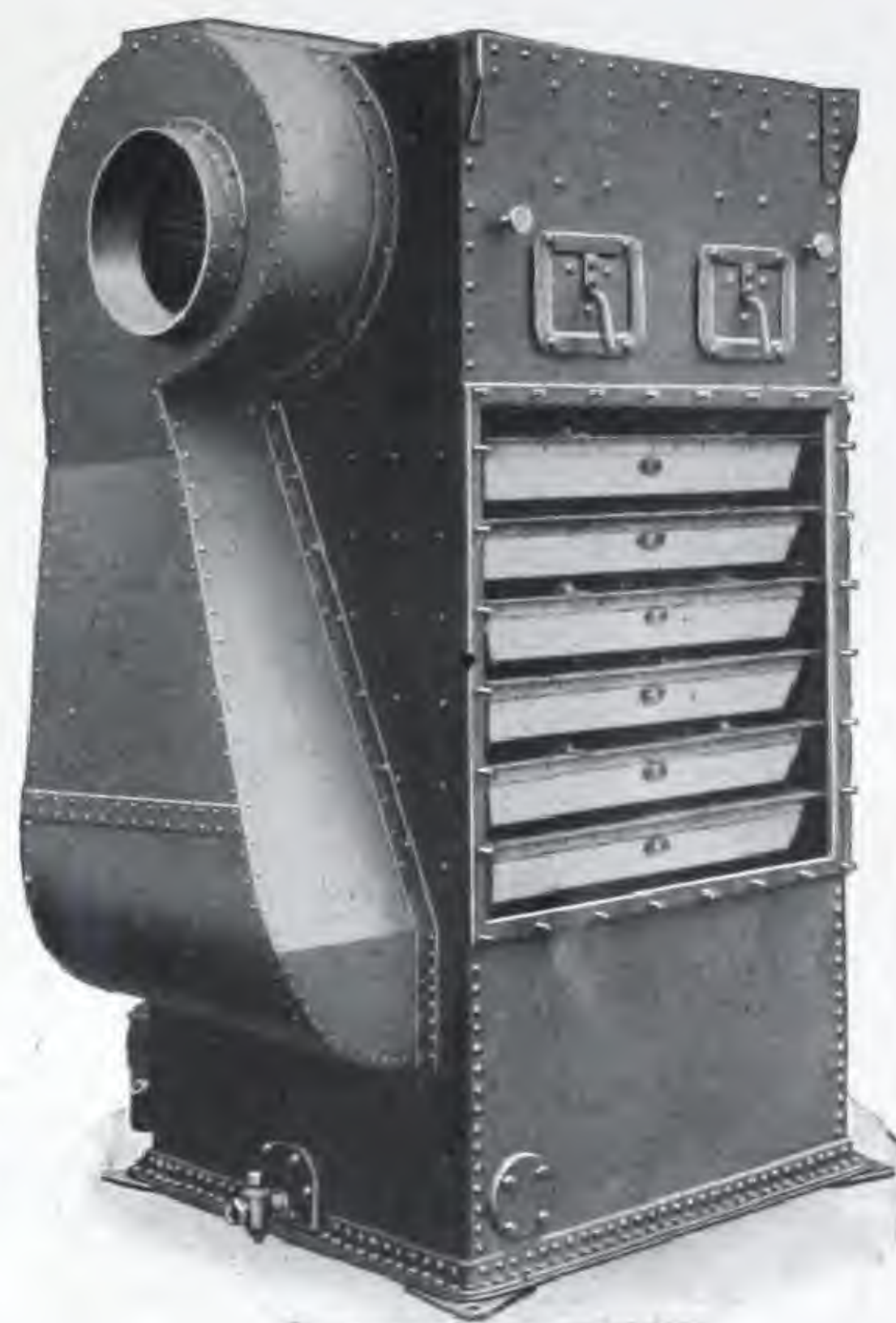
Activated Sludge System of Sewage Disposal, Jones & Attwood Distributors, Ejectors, etc.

GAS
ENGINES.

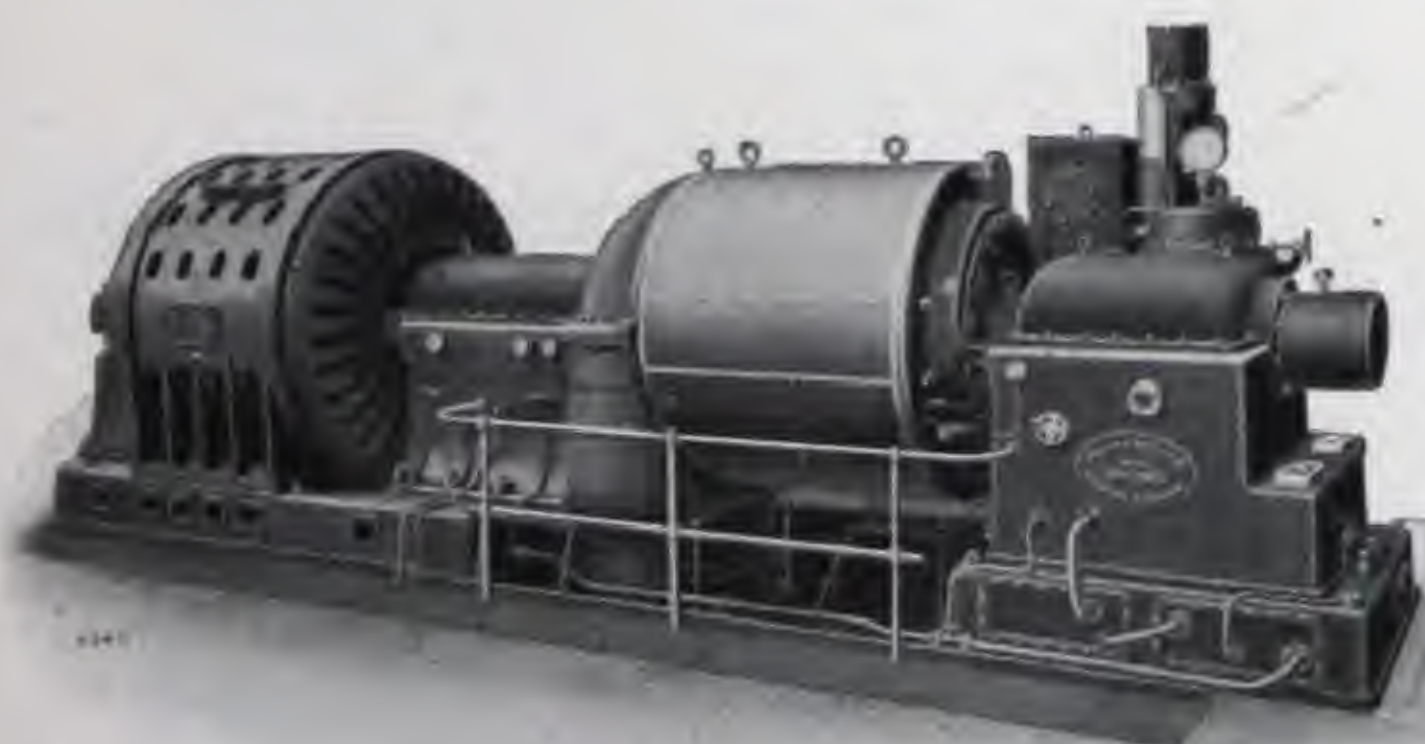
Ruston & Hornsby Gas and Oil Engines. Gas Producers using coal, lignite, wood, waste, etc.

PACKING
AND
JOINTING.

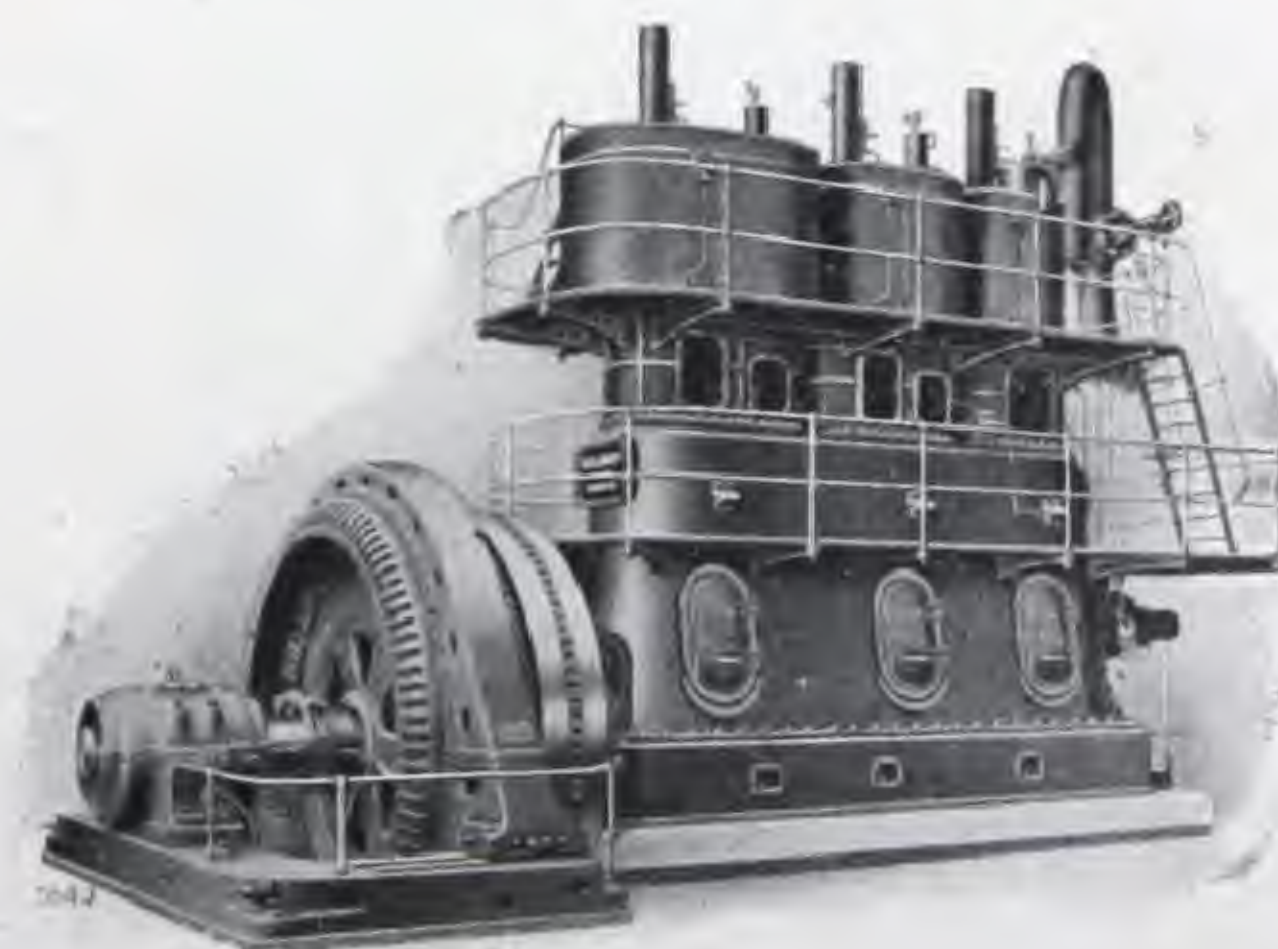
Steam Jointing and Packing for all purposes. Special Semi-metallic Packing for Centrifugal Pump Shafts.
Weldeck Steam Traps.



HEENAN & FROUDE V TYPE COOLER (FOR AIR, WATER, OR OIL), SHOWING SCREENS.



BELLISS LIVE STEAM TURBINE.



BELLISS ENGINE AND GENERATOR.



THE CANADIAN FAIRBANKS-MORSE CO., LIMITED

CANADA'S DEPARTMENTAL HOUSE FOR MECHANICAL GOODS.

HEAD OFFICE: MONTREAL.

HALIFAX. ST. JOHN. QUEBEC. MONTREAL. OTTAWA.
TORONTO. ST. CATHARINES. HAMILTON.



PRODUCTS.

STEAM ENGINES, BOILER FEED PUMPS, FEED WATER HEATERS, OIL SEPARATORS, TRAPS, VALVES, PACKINGS AND STEAM APPLIANCES AND FITTINGS OF ALL KINDS; LATHES, DRILLS AND METAL WORKING MACHINERY OF ALL KINDS; WOOD WORKING MACHINERY, INCLUDING BAND SAWS, LATHES, JOINTERS, ETC.; PIPE CUTTING MACHINERY, HOISTING MACHINERY, WEIGH SCALES, MOTOR SUPPLIES, SMALL TOOLS, ETC.

VALVES.

Fairbanks Valves are widely known and popular among engineers. They are simple in design, contain few parts, and all parts are interchangeable.

Special attention is called to the Fairbanks Renewable Disc, which is the most effective ever produced. It consists of a recessed brass disc into which is spun a specially prepared Bakelite ring. The Disc is held centrally on its seat by guides cast in the body of the valve, and is secured to the end of the spindle without the use of nuts, screws, pins, wires, or anything that is liable to become detached while in use. It is but the work of a minute and requires no skill to unscrew the valve bonnet, slip off the old disc from the end of the spindle, and substitute a new one in its place. They have a raised round seat upon which scale, grit or sediment is not likely to lodge.

These valves are heavily built and well proportioned. The stuffing boxes are packed with Palmetto Twist, which is self-lubricating and has great superiority over any other fibrous packing.

FLANGE FITTINGS.

Fairbanks-Morse Standard and Extra Heavy Flanged Fittings, for pressures of 125 and 250 lbs. respectively, are supplied in all standard sizes from 1 1/4" to 16". All flange fittings, Sweep type, can be furnished in cast iron from stock. Malleable Iron, Semi-Steel, Cast Steel for high pressure and superheat furnished to order only.

STEAM PUMPS.

Fairbanks-Morse line of Steam Pumps includes a wide range of Boiler Feed Pumps, Low Steam Pressure Pumps, Underwriters' Fire Pumps, General Service Pumps, etc., etc. The accompanying cut shows the Fairbanks-Morse Duplex Ram Pattern Pump for discharge pressure not exceeding 175 pounds. In this type of pump the plungers are always in sight, and the stuffing box packing is easily adjusted or replaced, without breaking joints or removing cylinder heads. The element of slippage is reduced to a minimum and the volumetric efficiency increased. These pumps are adapted for handling water at a high temperature or water containing sand or grit. They also offer many advantages for high pressure boiler feed work.

BOILER FITTINGS.

Fairbanks-Morse line of Engine and Boiler Fittings is so extensive that it is impossible to attempt to give any description of same in anything but our regular catalogue.

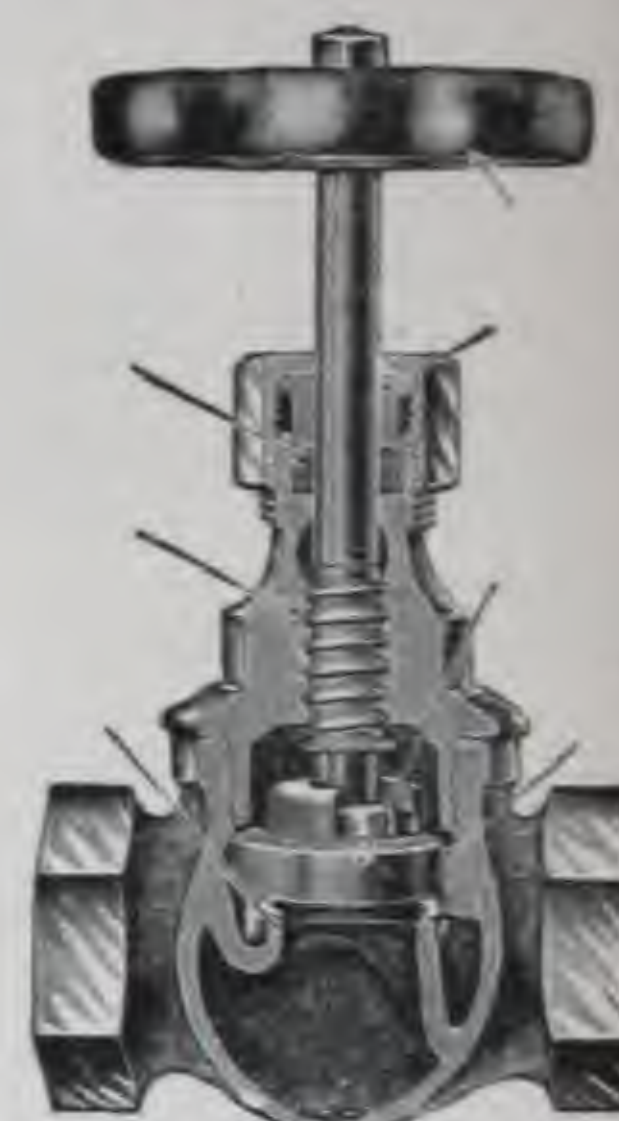
DURABLA PACKING.

Durabla Gaskets will make a tight joint wherever a permanent Gasket is required. Good for Oil, Gas, Water or Steam. Will do the work of double its thickness of rubber.

FOSTER VALVES.

Foster Reducing and Regulating Valves cover a wide range of requirements from Automatic Boiler Stop Valves, Oil Fuel Regulating Valves, Fan Engine and Pump Governors, down to the ordinary Reducing Valves for controlling the flow of steam. High-grade workmanship necessary for valves of this kind is always found in Foster Valves.

Send for complete Foster Valve Catalogue.



RENEWABLE DISC VALVE.



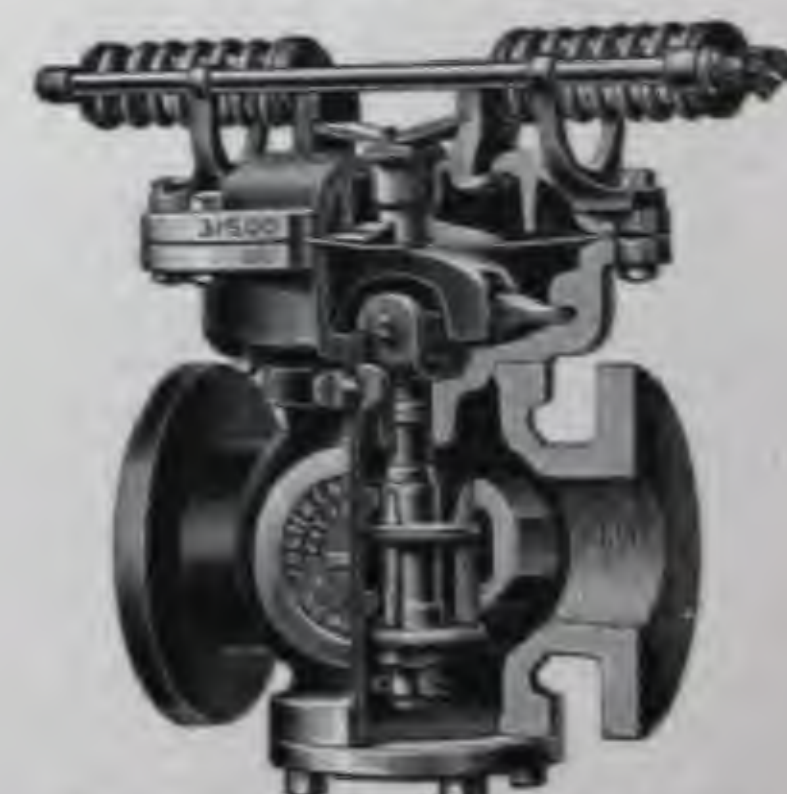
C.I. FLANGE FITTING.



DUPLEX RAM PATTERN PUMP.



DURABLA PACKING.



FOSTER CLASS W REDUCING VALVE.



THE CANADIAN FAIRBANKS-MORSE CO., LIMITED

CANADA'S DEPARTMENTAL HOUSE FOR MECHANICAL GOODS.

HEAD OFFICE: MONTREAL.

WINDSOR. WINNIPEG. REGINA. SASKATOON.
CALGARY. VANCOUVER. VICTORIA.



PRODUCTS.

ELECTRIC MOTORS OF ALL TYPES AND SIZES, MOTOR-GENERATORS, ENGINE-GENERATOR SETS, STORAGE BATTERIES, ELECTRIC AUTOMATIC WATER SUPPLY SYSTEMS, AUTOMATIC ELECTRIC LIGHTING PLANTS, ELECTRIC PORTABLE DRILLS, ELECTRIC BENCH DRILLS, SWITCHES, PRESSURE REGULATORS AND ELECTRICAL FITTINGS OF ALL KINDS. MOTOR-DRIVEN COMPRESSORS, CENTRIFUGAL PUMPS, ETC., ETC.

MOTORS.

Fairbanks-Morse Motors are made in all standard types and sizes. Lack of space prevents a detailed description being given, but the following are a few points of superiority:

1. All Fairbanks-Morse Motors can be supplied either with Ball Bearings or self-oiling sleeve bearings.
2. The bearing sleeves are Phos. Bronze, reamed to size, dust proof, interchangeable, and easily renewable.
3. The Stator Frame permits of perfect ventilation.
4. The End Rings are cast on to the ends of the Rotor Bars, thus forming a perfect electrical and mechanical joint and eliminating all trouble from nuts, washers, solder, etc. As the metal is fused to the bars at a temperature of over 1000 degrees Cent., it will be seen that danger from subsequent heating is entirely eliminated.



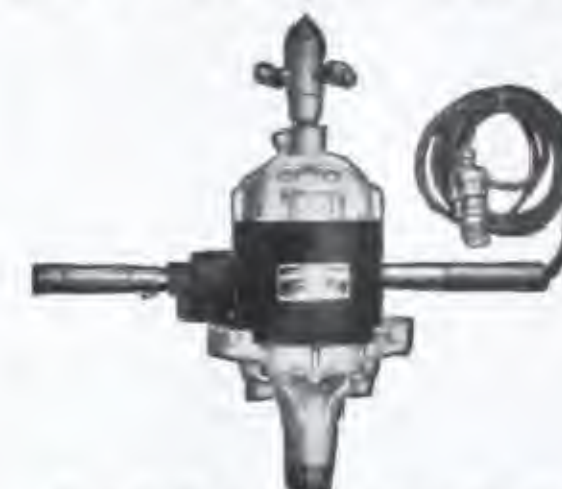
TYPE B. INDUCTION MOTOR.



3" SINGLE STAGE DOUBLE SUCTION CENTRIFUGAL PUMP DIRECT CONNECTED TO MOTOR.

CENTRIFUGAL PUMPS.

Fairbanks-Morse Centrifugal Pumps are designed to stand heavy service, and the line includes all standard types for Water Supply, Irrigation, Fire Underwriters and General Service for manufacturing plants. They can be used with any type of drive, and will give continuous and efficient service with a minimum of expense for attendance and repairs.



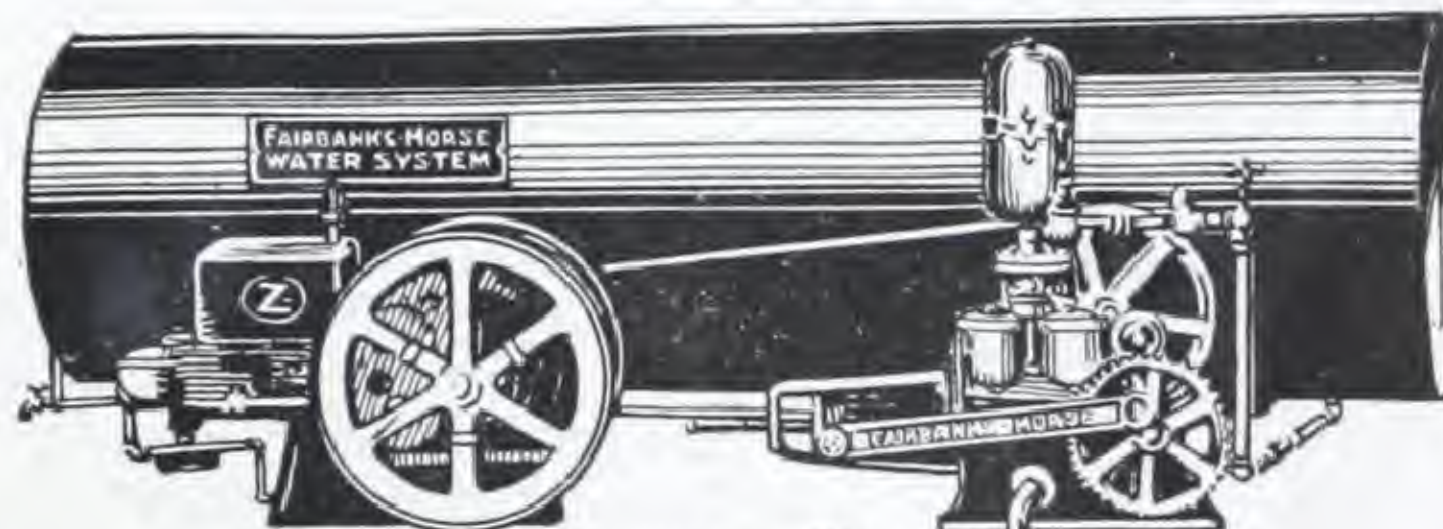
PORTABLE ELECTRIC DRILL.

ELECTRIC DRILLS.

Our line of Portable Electric Drills are designed for work that requires a tool that will stand hard usage, in the shop or on the job. The motor is air cooled and the gears run in grease. These Drills are made in a variety of designs and a wide range of sizes.

PNEUMATIC WATER SYSTEMS.

Fairbanks-Morse Pneumatic Water Service Systems will supply water at high pressure for suburban homes, farms, schools, hospitals, etc. Can be operated by hand, windmill, gas engine or motor. Installations operated by gas engine or motor are furnished with Automatic Pressure Switch for starting and stopping the motor and pump, thus making the system automatic and keeping the pressure even at all times.

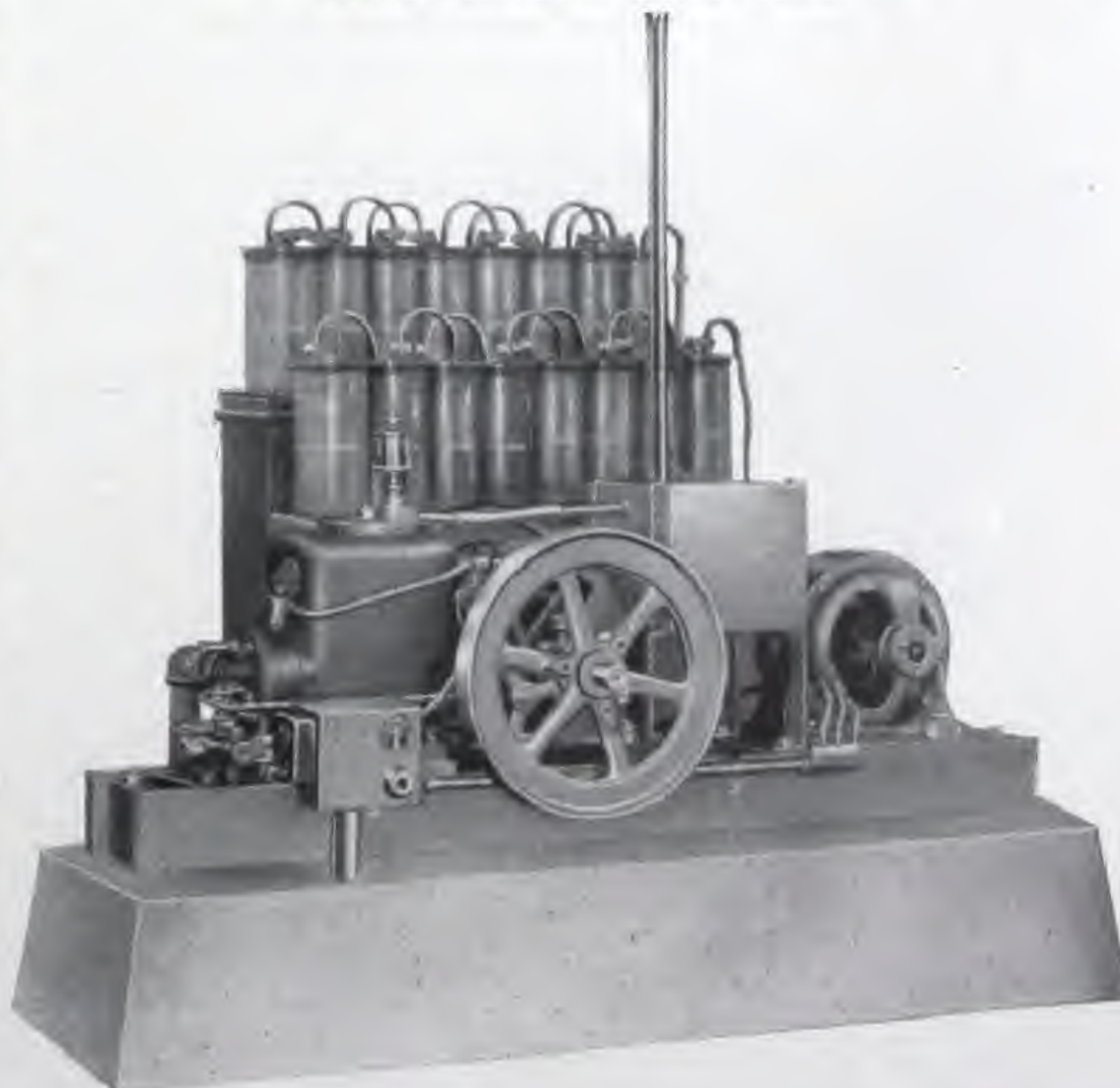


ELECTRIC AUTOMATIC WATER SYSTEM.

TYPE F. PLANTS

Fairbanks-Morse Power and Light Plants are semi-automatic electric lighting plants for country homes, farms, public institutions, etc. They are self-starting with a push button, self-stopping when batteries are full, and self-running. These outfits have been carefully designed to eliminate all need for skilled attention. The dynamo is a multipolar ball bearing type, and as the current generated is of low voltage no unpleasant results follow even if accidental contact is made with uninsulated parts of the machine.

Made in sizes from 40 light, 65, 100 and 200 light capacity and up. The smallest size is self-contained and mounted on skids. All plants are belted and provide an extra power pulley for operation. Small machines thus saving the 50% power loss in small electric generators and motors.



THE ARTHUR S. LEITCH CO. LIMITED

1001 AND 1002 KENT BUILDING, TORONTO, ONT.

REPRESENTING:

TAYLOR STOKER CO., LIMITED, Toronto—Taylor Stokers.
 NASH ENG. CO., Norwalk, Conn.—Return Line Heating Pump & Air Compressor.
 DAYTON-DOWD CO., Quincy, Ill.—Centrifugal Pumping Machinery.
 SIMS CO., Erie, Pa.—Heaters.
 RUMSEY PUMP CO., Seneca Falls, N.Y.—Rotary and Triplex Pumps.
 M. W. KELLOGG CO., New York.—Radial Brick Chimneys.

DEAN BROS., Indianapolis, Ind.—Steam Pumps.
 COPPUS ENG. & EQUIP. CO., Worcester, Mass.—Blowers & BF Pumps.
 NORWALK IRON WORKS CO., Norwalk, Conn.—Air Compressors.
 ROBERTS FILTER MFG. CO., Darby, Pa.—Filters and Water Softeners.
 KEILEY-MUELLER INC., New York.—Steam Specialties.
 BINKS SPRAY EQUIPMENT CO., Chicago.—Spray Ponds.

THE
TAYLOR
STOKER.

The Taylor Stoker is a combustion System which burns all grades of bituminous coal efficiently. Even with low grades of bituminous coal—coal which many furnaces cannot burn at all—the Taylor Stoker will operate boilers at immense over-ratings, and will carry violently fluctuating loads with high efficiency.

The Taylor Stoker does this because the coal is fed and burned on scientific principles, mechanically applied. In short, the Taylor Stoker solves the coal problem in the power plant.

And whether a plant uses high grade or low grade coal, the Taylor Stoker permanently reduces steam production costs by this ability to operate boilers for above rated capacity, not only at peaks but on steady loads.

The Taylor is more than a Stoker—it is a complete system of combustion.

ADVANTAGES.

- (1) IT INCREASES CAPACITY.—Investing in one set of Taylor Stokers is equivalent to enlarging entire plant 50 to 100 per cent.
- (2) IT PRODUCES ECONOMY.—It develops over-all efficiency up to 80 per cent.
- (3) IT DEVELOPS FLEXIBILITY.—Very satisfactory under quick and extreme changes of load.
- (4) SMOKELESS.
- (5) IT BURNS ANYTHING BURNABLE.
- (6) IT CUTS REPAIR COSTS.—The Taylor Stoker is conceded to have the lowest repair cost per ton of coal fired, of any stoker made.
- (7) IT REQUIRES MINIMUM ATTENTION.
- (8) IT CLEANS ITSELF MECHANICALLY.

SPRAY
PONDS.

Spray nozzles and equipment for complete cooling Ponds, special atomizing nozzles for air washing, gas washing, brine spraying, etc. Acid-proof and stoneware nozzles for chemical and allied industries. Whitewashing, painting and spraying machinery, syphons, ejectors, exhausters, vacuum boosters, air blow valves, etc.

ATOMIZING
NOZZLES.

The Spra-Rite Nozzles have widely divergent uses, and the application of scientific principles to their different designs assures successful operation in their various duties.

They are used extensively for cooling water in the Spray ponds of condenser systems, and also for cooling water in connection with Ammonia Refrigeration machines.

Spra-Rite Nozzles are in successful operation in packing and provision plants, using brine Spray system for meat coolers, and are also used for meat washing, deodorizing, etc.

In the industrial chemical field, we have Spra-Rite nozzles used in the manufacture of Sulphuric acid. As this requires an acid resisting material, the body of the nozzle is made of hard lead, and the tip is made of stoneware.

DAYTON-DOWD
CENTRIFUGAL
PUMPS.

TYPE CS SINGLE-STAGE: are of the non-overloading type and so designed that the power consumed under any condition of variation of head will not exceed the power required under normal operation. This feature protects the motor from being seriously overloaded.

Type CS Pumps of the single stage construction are furnished with impellers of the enclosed double suction type.

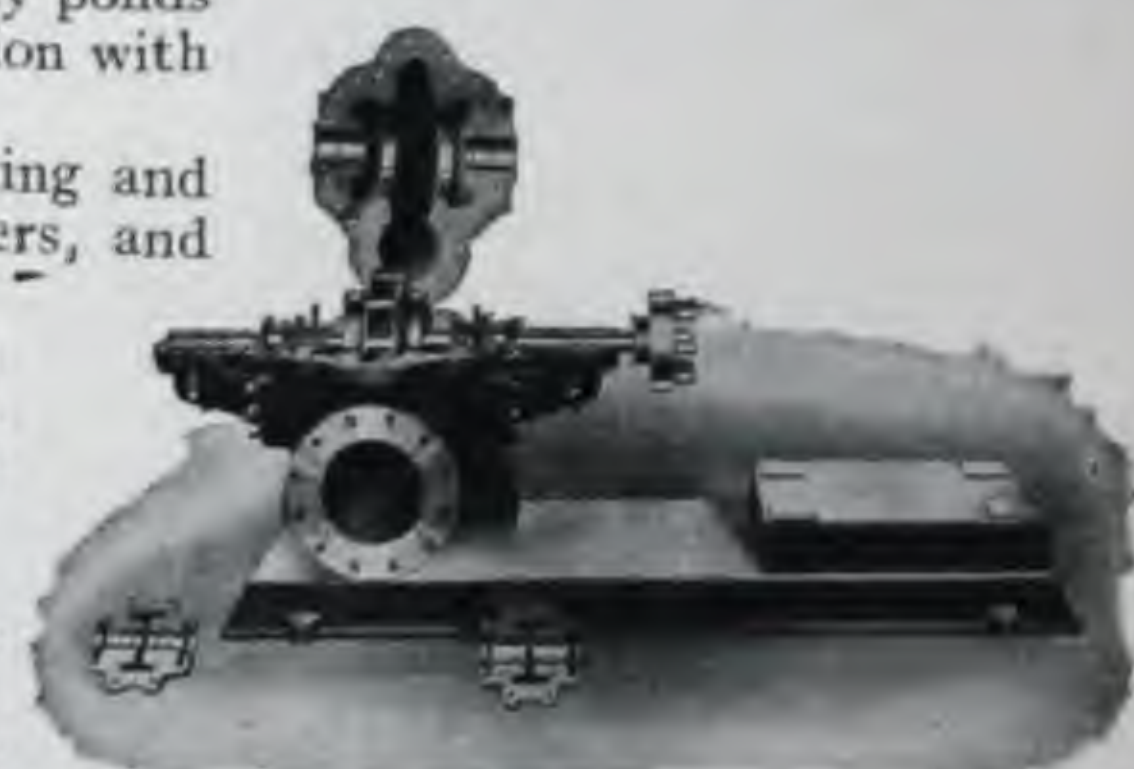
TYPE CSU MULTI-STAGE: For service where the total head is beyond the range of efficient application of our type CS single-stage pumps, the type CSU automatically balanced multi-stage pump is specified, the number of stages being dependent on the head and the speed available to drive the pump. Where the head is greater than can be generated by a four-stage pump it is advisable to install two multi-stage pumps connected in series, in order to avoid the troubles incident to the construction and operation of pumps having a greater number of stages. There is, of course, no theoretical limit to the number of stages in a centrifugal pump, but practical problems of manufacture and operation are interposed, which make it unwise to build pumps above four stages on account of the excessive distance between bearing centres and the correspondingly heavier impeller blades on the shaft. The compact design of CSU pumps, discharge and suction openings being on the same side of the case, permit operations in series with the greatest ease, the piping being in direct line.



TAYLOR STOKER, TYPE AA, WITH POWER DUMP.

5. 5. Feeding Rams.
 6. Distributing Rams.

7. 7. Extension Grate Sections.
 8. 8. Dump Plates.



TYPE CS SINGLE STAGE DOUBLE-SUCTION CENTRIFUGAL PUMP WITH UPPER HALF OF CASING RAISED. NOTE EASY ACCESS TO ALL WORKING PARTS.



TYPE CSU AUTOMATICALLY BALANCED THREE STAGE CENTRIFUGAL PUMP WITH EXTENDED BEDPLATE FOR DIRECT CONNECTION TO MOTIVE POWER.

JENNINGS
TURBINE
PUMPS.

Jennings Return Line Vacuum and Low Pressure Boiler Feed Pumps for return line Heating Systems, Dryer Exhaust Systems in Paper Mills or other Vacuum work where large percentages of liquids have to be handled with gas.

The pump consists of two independent turbine units, an air pump and a water pump combined in one casing, with the impeller of each mounted on the same shaft.

One unit continuously exhausts air and vapours from the heating system, and the other removes the condensation as it accumulates and forces it directly into the boiler or up to the hot-well.

The boiler pressure is against the water only. The air and vapour, representing approximately four-fifths of the volume handled, are delivered to the atmosphere *without back pressure.* The saving in horse power amounts to over 50%.

THE AIR
PUMP.

The air unit of the Jennings Pump is our well known NASH HYTOR TURBINE, a rotor in hydraulic balance, revolves freely, with large clearances, in an elliptical casing filled with water. The water turning with the rotor but following the casing due to centrifugal force, alternately recedes from and is forced back into the rotor. The water, acting as a piston continuously draws the air in through the inlet ports, compresses the air and discharges it through the outlet ports.

THE WATER
PUMP.

The water end of the pump is a centrifugal pump with enclosed impeller, specially designed to give very high efficiency and to *unload* when not handling water.

OPERATION.

Referring to Fig. 1, the heating returns, air and water pass through the Self-cleaning Strainer (14) into the Separating Tank (15). The water falls to the bottom of the Tank (15) and passes into the centrifugal through the pipe (1) driving out the air through the pipe (5). As soon as the centrifugal is full of water it begins to pump and forces the condensation into the boiler through the pipe (2), emptying the tank (15). The centrifugal now stops pumping because it cannot handle air, the check valve (7) preventing a back flow. The power required to drive the centrifugal is closely proportional to the quantity of water handled. It takes no power when it is not pumping.

The air is rapidly exhausted from the system by the air unit, which is connected to the top of the tank (15) by the pipe (3).

COPPUS
TURBO
BLOWER.

For Undergrate Draft and other Industrial uses.

The Coppus consists of a propeller fan driven by a steam turbine, both mounted on the same shaft.

From the steam chamber, which is located at the top of the turbine, the steam enters the nozzles at high pressure and is expanded in the nozzles, where its pressure is changed into velocity energy. Now at low pressure, but flowing at high velocity, the steam is delivered by the nozzles to the point of impact, on the buckets of the turbine wheel, which revolves within the casing.

The fan located at the opposite end of the shaft carrying the turbine wheel draws the air in around the turbine and forces it through the fan casing.

The exhaust steam may be piped off for further use or may be discharged through the fan casing with the air.

ADVANTAGES.

Among the many advantages derived from the use of the Coppus Turbo Blower are:—

(1.) Cheap fuel may be used. (2.) Perfect combustion. (3.) Excess Air cut down. (4.) Constant furnace temperature. (5.) Eliminates smoke.

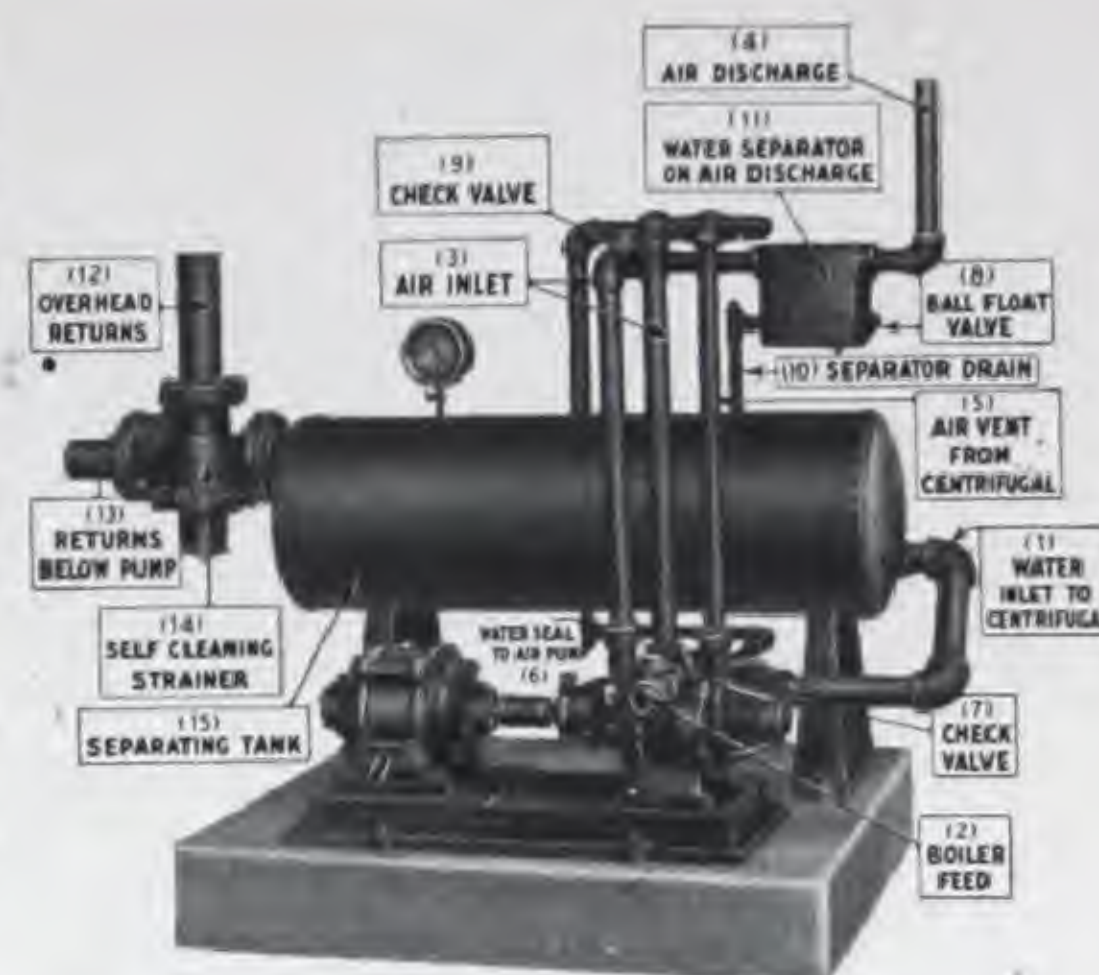
The Coppus has been used with the best results for ventilating dye houses, laundries, kitchens, rendering plants, etc.

COPPUS
CENTRIFUGAL
TURBO-
BOILER FEED
PUMP.

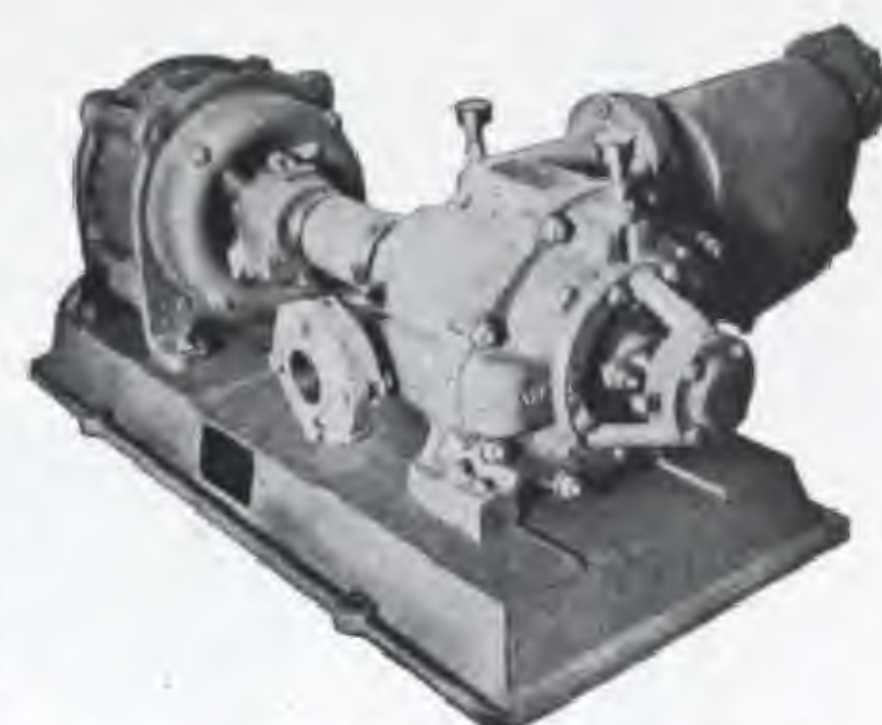
After years of study and experimentation the Coppus Type-C.C.C. Centrifugal Boiler Feed Pump has been developed. It contains the best elements used in modern Turbine and Pump practice, ingeniously combined to make up a single dependable boiler feed pump.

ADVANTAGES

(1) Simplicity of construction. (2) Continuous steady flow of water without pulsation. (3) Great flexibility, constant and easy control of feed capacity. (4) Exhaust steam free from oil. (5) Lower upkeep, less attention required. (6) Longer life, less depreciation. (7) Higher Steam economy. (8) Less floor space required. (9) Especially designed for the particular purpose.



JENNINGS RETURN LINE VACUUM AND LOW PRESSURE BOILER FEED PUMPS.



NASH HYTOR COMPRESSOR WITH DIRECT CONNECTED MOTOR.



COPPUS TURBO BLOWER. TYPE C.



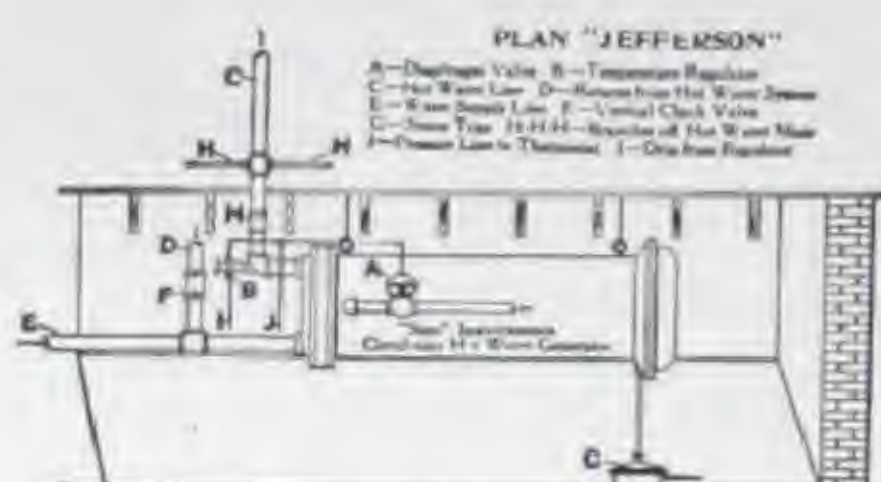
COPPUS CENTRIFUGAL TURBO BOILER FEED PUMP. TYPE CCC.

THE "SIMS" POWER PLANT APPLIANCES.

"SIMS"
APPLIANCES.

CLOSED FEED WATER HEATERS.
OPEN FEED WATER HEATERS.
CLEAN E-Z STORAGE HEATERS.

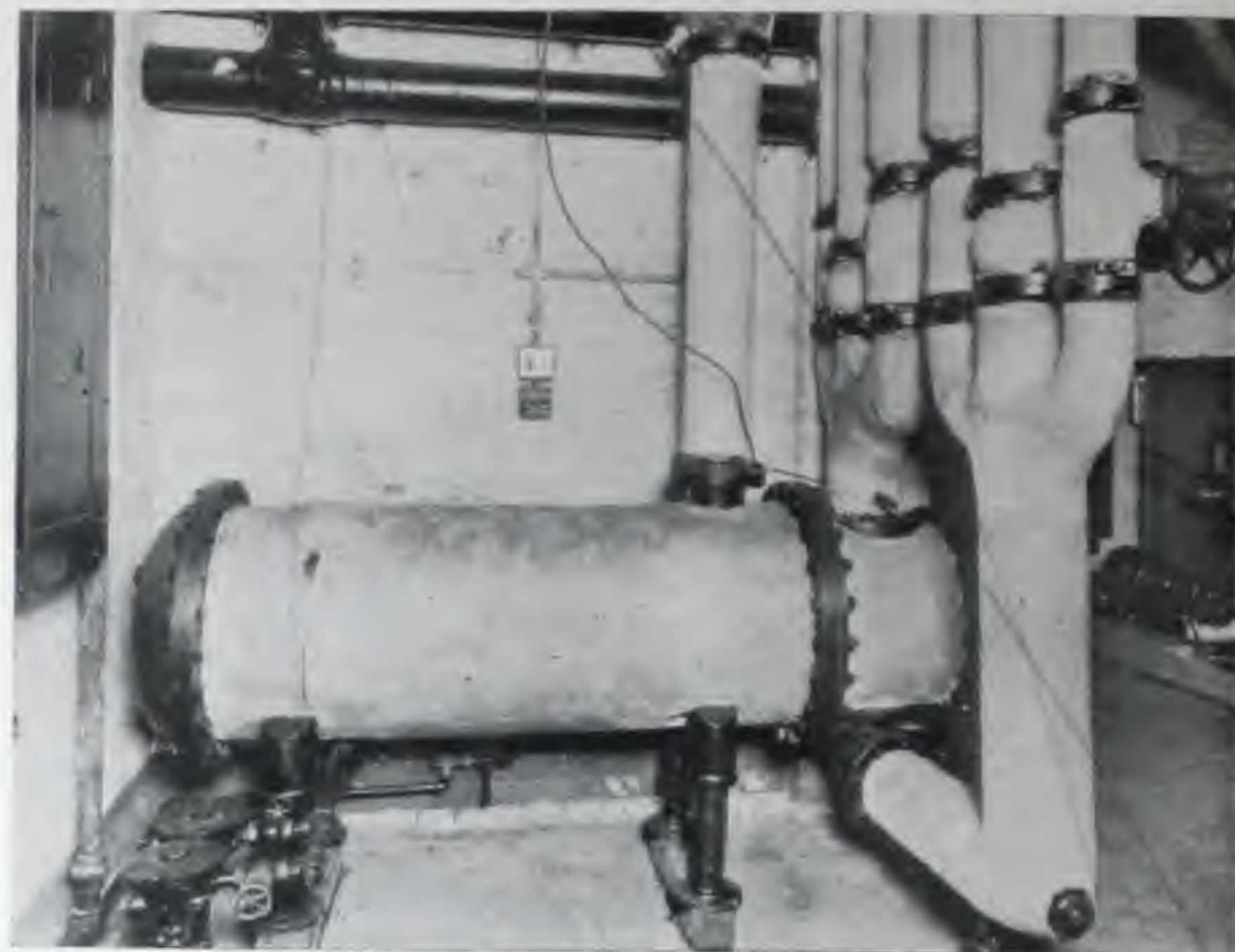
HOT WATER GENERATORS.
HOT WATER CONVERTERS.
OIL EXTRACTORS.



"SIMS" HOT WATER GENERATOR.

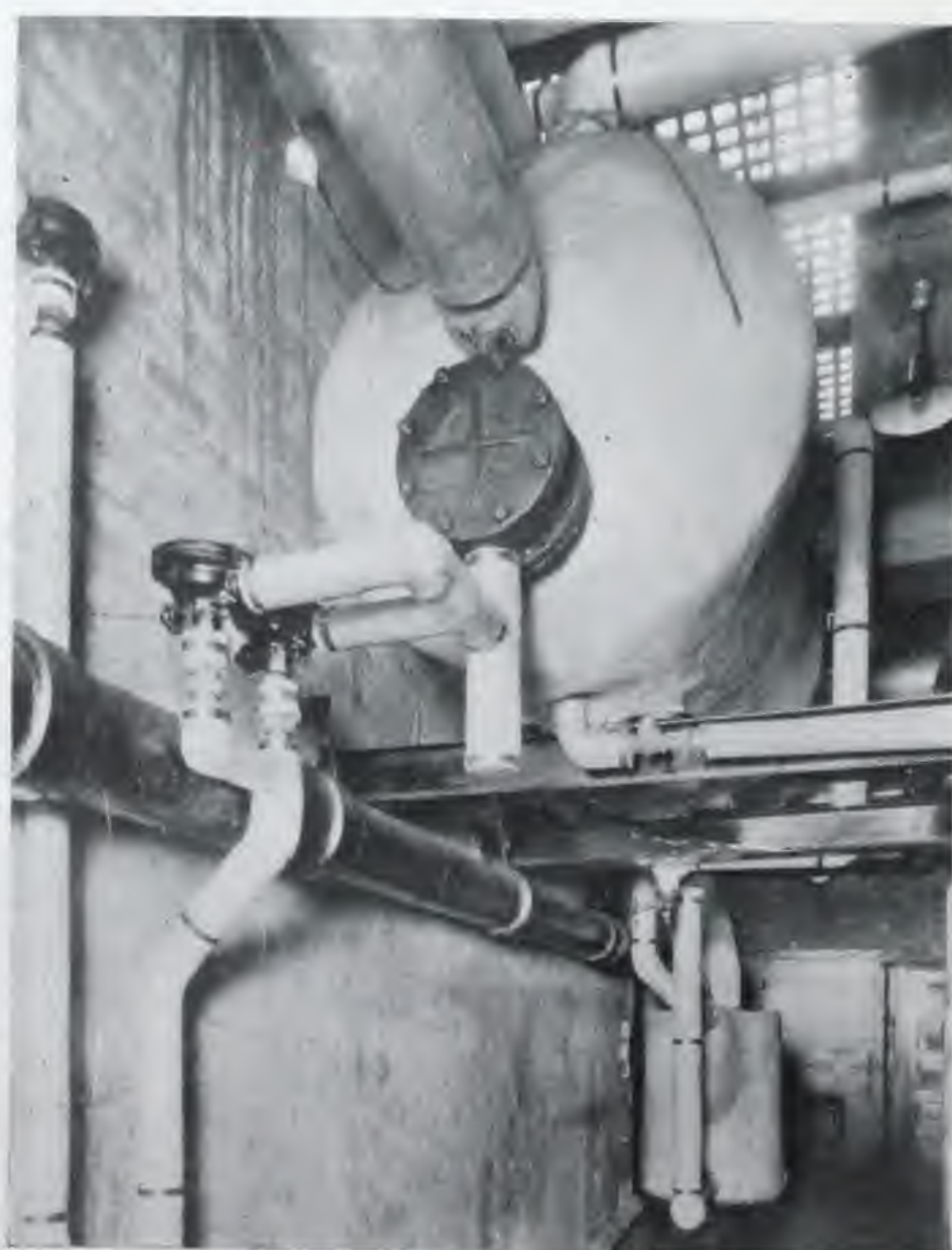


"SIMS" CLEAN E-Z HEATER, BH TYPE.



"SIMS" HOT WATER GENERATOR
Sir John Eaton's Residence.

"SIMS"
WATER
HEATERS,
GENERATORS,
AND
CONVERTERS.



"SIMS" STORAGE HEATER.
Sir John Eaton's Residence.

"SIMS"

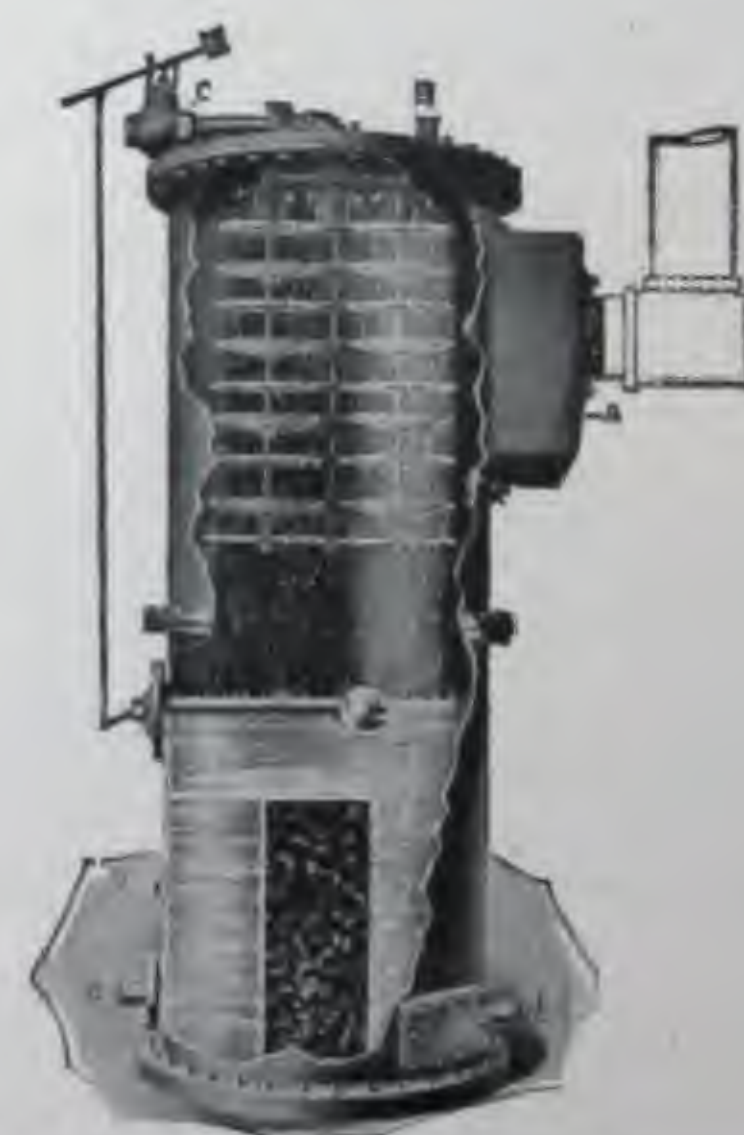
CLOSED FEED WATER HEATERS.
—Heating feed water.

OPEN FEED WATER HEATERS.
—Purifying and heating feed water.

CLEAN E-Z HEATERS.
—Hospitals, hotels, laundries, apartments.

HOT WATER GENERATORS.
—Hot water for domestic service.

HOT WATER CONVERTERS.
—For hot water heating.



"SIMS" OPEN FEED WATER HEATER.

MASON REGULATOR & ENGINEERING CO., LIMITED

HEAD OFFICE AND WORKS:
135 to 153 DAGENAIS ST.,
MONTREAL, QUE.

AGENCIES AT
TORONTO, QUEBEC, WINNIPEG,
HALIFAX, ST. JOHN, VANCOUVER.

PRODUCTS.

MASON PRESSURE REGULATING APPLIANCES FOR STEAM, WATER AND AIR, INCLUDING REDUCING VALVES, STEAM PUMP PRESSURE REGULATORS, STEAM PUMP SPEED GOVERNORS, BALANCED VALVES, HORIZONTAL PRESSURE CONTROLLING DEVICES, HYDRAULIC DAMPER REGULATORS, STEAM VACUUM PUMP REGULATORS, STRAINERS, SIMS STORAGE HEATERS, SIMS OPEN FEED WATER HEATERS, REILLY MULTICOIL FEED WATER HEATERS, EVAPORATORS AND DISTILLERS, MULTISCREEN FEED WATER FILTERS, BUNDY OIL SEPARATORS, STRATTON STEAM SEPARATORS, TURBO BLOWERS, COPPUS CENTRIFUGAL BOILER FEED PUMPS, COPES FEED REGULATORS, STEAM METERS, COMBUSTION APPLIANCES.

SERVICE.

Our Engineering Department know the practical application of our lines to actual conditions, and sell from knowledge, not from catalogues. We furnish results, not merely machinery. Bulletins and full information gladly furnished, upon receipt of particulars of the requirements.

REDUCING VALVES.

Reduce and maintain an even pressure of steam or air regardless of the variation of the initial pressure or of the volume of steam or air required. Automatically reduce boiler pressure for steam heating systems of all types, and all situations where it is desirable to use a lower pressure than that on the boiler.



MASON STANDARD
BRONZE REDUCING VALVE.

PUMP PRESSURE REGULATORS.

Designed for any class of pumping machinery where it is necessary to maintain constant pressure.

GENERAL PRESSURE CONTROL.

We supply pressure controlling devices to meet any condition. Our Damper Regulators are the best on the market. Simple, Solid and Sensitive.

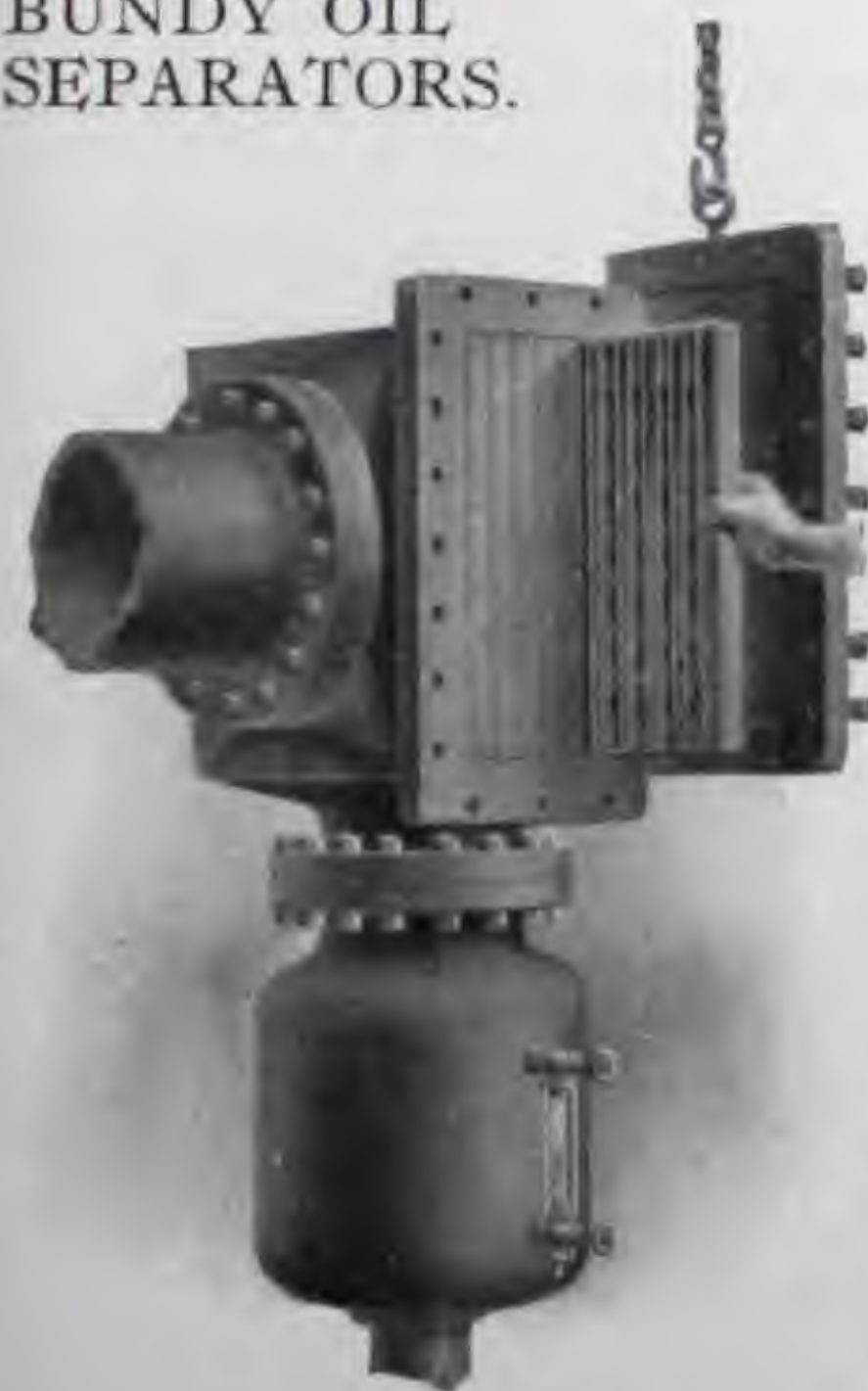


MASON No. 55
PUMP PRESSURE REGULATOR.

STRATTON STEAM SEPARATOR.

We manufacture and offer the Stratton Steam Separator in both horizontal and vertical types. By actual tests the Stratton Steam Separator has been proven the most efficient on the market. It is the only steam specialty that is specifically named in "Kent's Hand-Book."

BUNDY OIL SEPARATORS.



BUNDY OIL SEPARATOR.

The Bundy Oil Separator is the only oil separator which the manufacturers guarantee to continuously remove from exhaust steam every particle of oil or dirt that is held in suspension. It is the only satisfactory oil separator, as it can readily be cleaned and kept clean.

GENERAL.

This Company offers to the discriminating engineer a line of Power Plant equipment which is unequalled in this country. Every article manufactured and sold by us carries not only the usual manufacturer's guarantee covering defects in material for one year, but carries our special guarantee that when an article is sold for a specific purpose and the conditions of operation are known to us, the operating engineer will obtain from that article the service which he expects. We assume full responsibility for the proper operation of all our engineering equipment.



NEW BUNDY RETURN TRAP.



REPRESENTATIVES:
 GEORGE A. YOUNG,
 203 SCOTT BLOCK, WINNIPEG, MAN.
 ROBERT HAMILTON & Co.,
 VANCOUVER, B.C.

GEO. W. COLE, LIMITED

CONDENSATION ENGINEERS.

MANUFACTURERS OF
 HIGH GRADE AUTOMATIC TILTING STEAM TRAPS

MAIN OFFICE AND WORKS: 2002 DUNDAS STREET, W.,
 TORONTO, ONTARIO.



BRANCH OFFICES:
 510 CORISTINE BLDG.,
 MONTREAL, QUE.
 R. W. LOVEGROVE & Co.,
 12 ROCHESTER ROW,
 LONDON, S.W.1, ENGLAND.

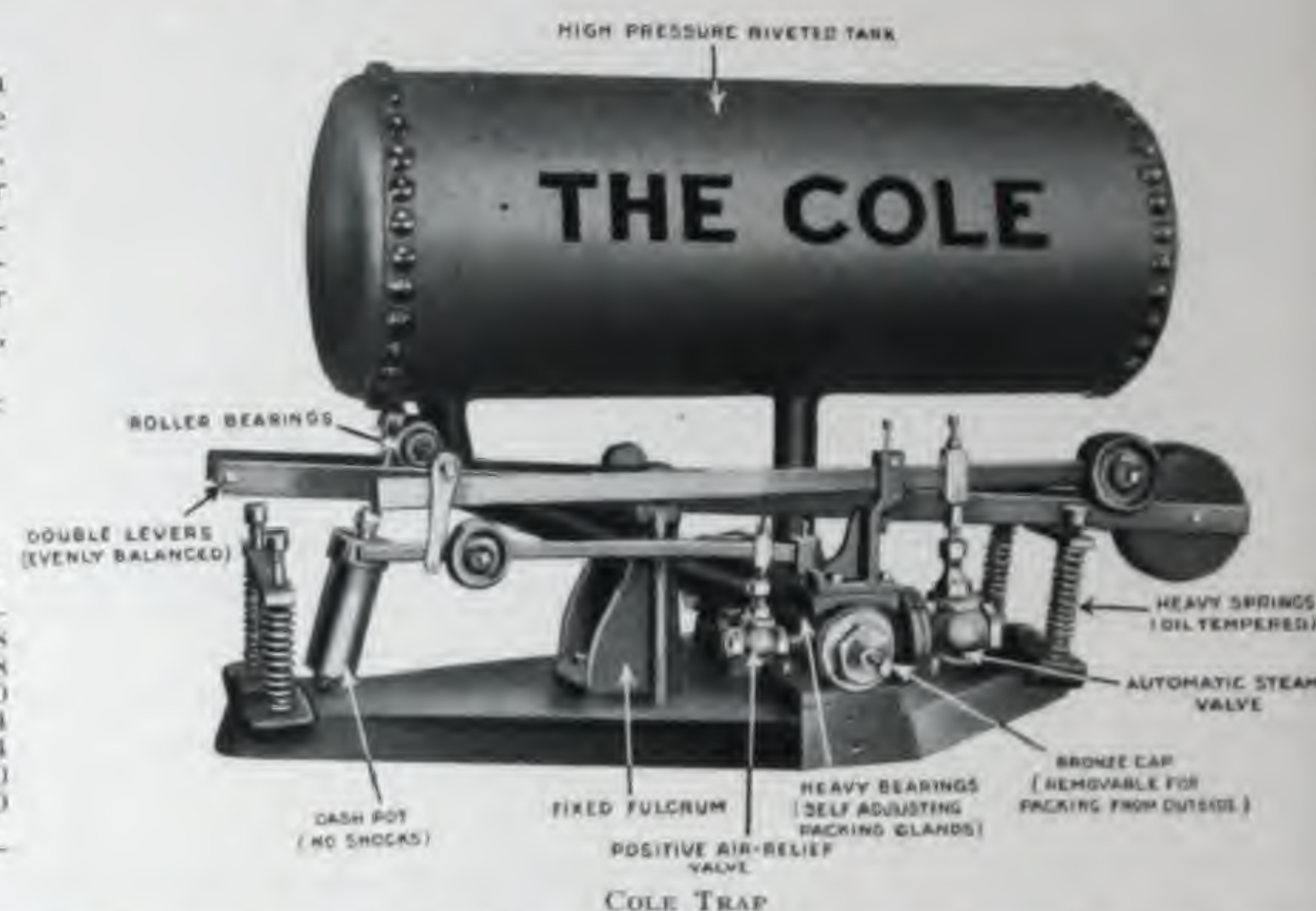
PRODUCTS.

We manufacture a full line of STEAM TRAPS, including "COLE" AUTOMATIC TILTING RETURN TRAPS, "BOILER FEEDERS," "3 VALVE TRAPS," "LIFTING TRAPS," "PUMPING TRAPS," "VACUUM TRAPS," "CONDENSER TRAPS," "NON-RETURN TRAPS," "METERING TRAPS," and "RECEIVER" TANKS. "COLE" CHECK VALVES, "OIL SEPARATORS," "HEATERS" and REDUCING VALVES.

TABLE OF CAPACITIES OF COLE TILTING STEAM TRAP, "RETURN TYPE."

NOTE.—These capacities are based on sixty operations per hour with a pressure equal to ten pounds per square inch at inlet. Horse power based on thirty pounds of water per hour. For Lumber Kilns and Greenhouses divide capacity by two. For Laundries and Brick Dryers divide by three. For Fan Stacks where air is drawn from outside, divide by five.

Trap Number.	Size of Tank in Inches.	Size of Pipe Inches		Capacity of water in lbs. per hour.	Direct Radiation in sq. ft.	Lineal ft. 1" Pipe.	Boiler H.P.
		Steam	Water				
1	6 x 18	3/4	1 1/2	540	1620	4860	18
2	9 x 22	1	1 3/4	1400	4320	13960	48
3	10 x 24	1 1/4	2	2400	7200	21600	80
4	12 x 30	1 1/2	2 1/4	4320	12960	38880	144
5	14 x 36	1 3/4	2 3/4	6720	20160	60480	224
6	16 x 40	2	3	10200	30600	91800	340
7	18 x 48	2 1/2	3 1/2	18000	54000	162000	600



COLE STEAM TRAPS. (OTHER TYPES.)

MERITS OF COLE TRAPS.

Cole Traps are made in different types, and are adaptable to every duty in connection with the trapping of steam and handling of condensation.

The Cole Trap is built of rugged construction, to steam boiler specifications, and meets the requirements of good practice. It is PACKED FROM THE OUTSIDE (therefore easily accessible); has self-adjusting packing glands and has full opening throughout. It is readily adjustable to varying loads.

It operates on a minimum steam consumption per H.P. developed, owing to the design of steam and air valves, which can be set to suit conditions of plant practice. The roller bearings and the method of packing eliminate friction. The weight of the drum and contents is not carried on the packing; machined main bearings carry the load. It is a reliable feed water meter, measuring the volume flowing to the boiler.

THE COLE TRAP HAS BEEN APPROVED BY THE BOILER INSPECTION DEPARTMENTS OF ALL THE PROVINCES.

COLE CHECK VALVES.

This is a three-piece Union Check Valve, combining Valve and Union.

Taken apart easily for regrinding, Valve Section can be used until entirely worn out, thrown away, and renewed at trifling cost; two-thirds of the valve remains in service. Figure out the saving.

The Straight Check is made in sizes from 1/2" to 2".

The Angle Radiator Valve is made in 1/2" and 3/4" sizes.



STRAIGHT WAY VALVE.



ANGLE RADIATOR VALVE.

ENGINEERING SERVICE.

Our experience of Condensation Engineering extends over a period of twenty years. It covers every kind and combination of conditions which arise in steam plants.

We have information at our disposal which deals with Condensation as it occurs in Paper Mills, Wood-working Plants, Greenhouses, Textile Mills, Heating and Drying Plants of every description.

Our Engineering Department is at your service.

GUARANTEE.

We guarantee material and workmanship of all our products one year from date of shipment during which time we will replace any defective parts.

We further guarantee that every installation will work when installed according to our instructions.

THE PERMUTIT COMPANY

WATER RECTIFICATION.

WINNIPEG, MAN., CANADA:
STANLEY BROCK, LIMITED.

MAIN OFFICE:

440 FOURTH AVENUE,
NEW YORK.

HAMILTON, ONT., CANADA:
Main and McNab Streets,
W. J. WESTAWAY Co.

MONTREAL, QUE., CANADA:
400 McGill Bldg.,
W. J. WESTAWAY Co.

PRODUCTS.

WATER SOFTENERS OF ZEOLITE AND LIME-SODA TYPES; HEATER SOFTENERS; IRON, MANGANESE AND SULPHUR REMOVAL APPARATUS; FILTERS FOR REMOVING OIL FROM CONDENSATE; WATER FILTERS AND FILTRATION EQUIPMENT, PRESSURE AND GRAVITY TYPES; GENERAL WATER RECTIFICATION APPARATUS OF EVERY DESCRIPTION.



SOFT WATER FOR THE HOME.

A Permutit Water Softener will give your clients a bountiful supply of sparkling soft water from every faucet in their house, no matter how hard and unsatisfactory the available supply is.

Permutit is a granular material on the order of sand that possesses the remarkable property of abstracting all the hardness from any water that is passed through it. For years this extraordinary power has been utilized industrially in mills, hotels, laundries, hospitals and similar places to render water pure, soft and clean for various exacting purposes. Hundreds of Permutit Water Softeners are in daily use in private houses, where soft water is supplied for drinking, cooking, washing and all domestic purposes. It is vastly superior to rain water, and free from the dangerous contaminations found in cisterns.

REGENERATION.

Permutit material is not consumed by the softening process, but is regenerated periodically and used for an indefinite length of time. When it has softened its designated quantity of water, a solution of common salt in water is run into the tank under pressure from a salt pot. The Salt restores Permutit to its original condition, and after draining off the surplus, it is in exactly the same condition it was at the beginning. The time required is but a few minutes a week, and any child can learn to turn the necessary valves correctly.

SIZE.

A Permutit Water Softener is a metal shell or tank, as shown in illustration, that is connected into the house supply line. It requires 5' 9" headroom and varies from 12 to 24 inches in diameter, according to the hardness of the water and quantity to be softened. There is no internal mechanism to get out of order as the tank contains nothing but the Permutit softening material. Large capacities are obtained by connecting two or more Softeners in parallel, or with commercial size equipment.

CAPACITY.

Softeners are customarily designed with capacities to operate a week to ten days between regenerations. Meters are not included in standard equipment but are furnished on order as most houses have meters. Where no meters are used, the time for regeneration is determined by a soap test that is simple and accurate.

The capacity required for a given house is determined from the number of people in the household, the number of servants and probable number of guests. This information together with an analysis of the water supply, which we make free of charge, is sufficient to make an estimate.

LOCATION.

Softeners may be located in the basement or any other convenient spot, and can be connected into the water supply line by any plumber. They are usually placed directly in the main feed line with a simple by-pass arrangement of valves.

SEWER CONNECTION.

Sewer connection is customarily in the form of an open sump to avoid the backing up of sewer gases, but it is not necessarily confined to that form.

PRESSURE.

Standard designs are constructed to operate under pressures up to 100 lbs. per sq. inch. The normal pressure drop through the Softener does not exceed 5 lbs.

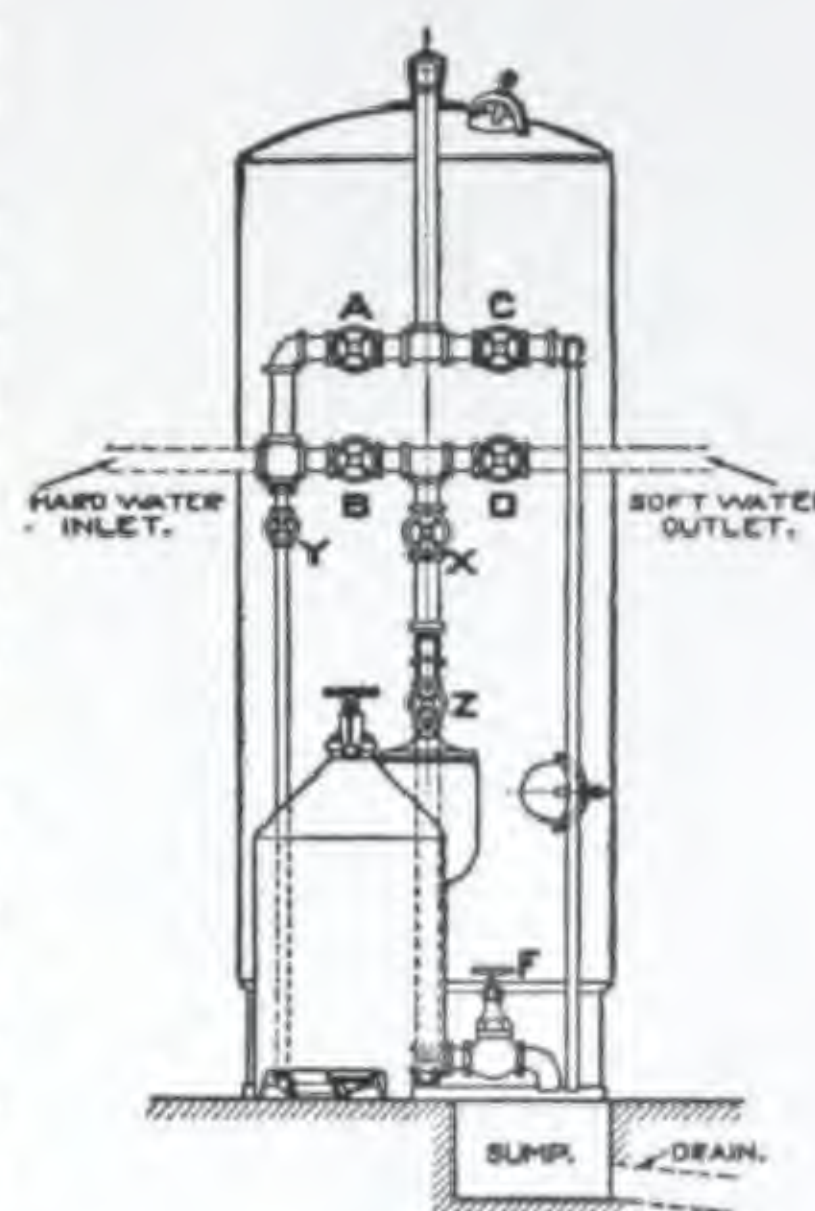
MATERIALS AND WORKMANSHIP.

Softeners of 12" and 18" diameter are made of cast iron, 24" diameter of steel. All valves are of the Crane or Jenkins standard, and workmanship throughout is the highest quality. Our many refinements in design and construction make a Permutit Softener a permanent and dependable fixture that will outlast the plumbing system into which it is connected.

INFORMATION REQUIRED FOR ESTIMATES.

To properly estimate the size, capacity and cost of a Permutit Water Softener for any household, the following information is required: 1. Half-gallon sample of water in clean glass or earthenware. (We make all analyses free of charge.) 2. Number of people living in house. 3. Number of servants. 4. Greatest probable number of guests at one time. 5. Size and location of water storage tank if any. 6. Height of ceiling in basement or other available location for Softener. 7. Nature of water supply: i.e., city, well, river, creek, lake, etc.

If the water supply is that of any good sized city we have analysis in our files, otherwise we need a sample of the water.



ROBERTS FILTER MANUFACTURING COMPANY

QUEBEC AND MARITIME PROVINCES:
ARSENault & PLAMONDON, LTD.,
70 St. James Street, MONTREAL, QUEBEC.

MAIN OFFICE AND WORKS:
DARBY, PA., U.S.A.

ONTARIO—ARTHUR S. LEITCH CO. 1001 Kent Bldg., TORONTO, ONT.

ALBERTA AND SASKATCHEWAN:
THE SMILEY COMPANY,
Tegler Bldg., EDMONTON, ALBERTA.

PRODUCTS.

WATER FILTERS, both pressure and gravity type; FILTRATION PLANTS AND FILTER APPLIANCES for every requirement. Filters for residences, apartment houses, hotels, schools, institutions, hospitals, swimming pools, drinking water systems and industrial plants, capacities from "a gallon an hour to millions a day." Also engineers and contractors for complete municipal water works filtration plants.



ROBERTS STYLE "D" FILTER.

OPERATION.

Water enters filter at top, passing downward through the filter bed, collects in strainer system at bottom and discharges through outlet. Filter bed consists of specially graded pure silica sand, resting on graded silica gravel. In some cases quartz, marble, or refined bone charcoal are employed. Attached to inlet line of filter there may be (and usually is) employed a Roberts automatic coagulant feeder which accurately feeds a slight quantity of alum into the raw water.

In all vertical pressure filters, except styles "H" and "L," the entire operation is governed by the Roberts Single Control Valve.

Cleaning of all Roberts filters is thoroughly and easily accomplished by a reverse flow of water which lifts and "liquefies" the sand bed, scouring it on itself and flushing the removed matter to the sewer. A sight glass on the waste line indicates when the washing is complete.

ROBERTS
STYLE "D" FILTER.

The model household filter. Cast iron construction. Equipped with coagulant feeder, single control valve, sight glass. Also has agitator, operated by hand wheel, which is used during washing to assist in breaking up the filter bed. Made in 12", 16", and 20" sizes.

ROBERTS
STYLE "E" FILTER.

Cast iron construction—in sections. Can readily be taken through small doorways. Equipped with coagulant feeder, single control valve and sight glass. Filling and inspection hole (4") in top; larger sizes also have standard manhole in each shell section. Pleasing appearance; substantial in looks and in fact. Made in ten sizes—12" to 60".

ROBERTS
STYLE "G" FILTER.

Steel construction, top head convex, bottom head concave. Equipment and connections similar to Style "E." Handhole in top, manhole in shell. Made in six sizes—30" to 60".

ROBERTS
STYLE "H" FILTER.

Same as style "G" except single control valve omitted; operation controlled by five gate valves. Made in six sizes—30" to 60".

ROBERTS
STYLE "L" FILTER.

Steel construction, both heads convex. Filtered water collector system consists of central manifold, laterals and strainers; all but the strainers to be embedded in concrete. Equipped with gate valve control, coagulant feeder and waste funnel. Manhole in top and shell. Made in five sizes—66", 72", 78", 84", 96".

DOUBLE
FILTRATION.

Under certain conditions styles "M" and "O" filters are employed. These consist of two cast iron filters connected in tandem. In first cylinder (charged with sand) the water is clarified, then passes through second cylinder (charged with granulated bone charcoal) which reduces or removes dissolved taste, color and odor. Style "M" in 12", 16" and 20" sizes, and style "O" in seven sizes, 24" to 60".

ROBERTS
HOUSEHOLD
FILTERS.
SWIMMING
POOLS.

For individual faucet use. Capacities, 1 gal. to 30 gals. per hour. Over 500,000 in use. Catalogue on request.

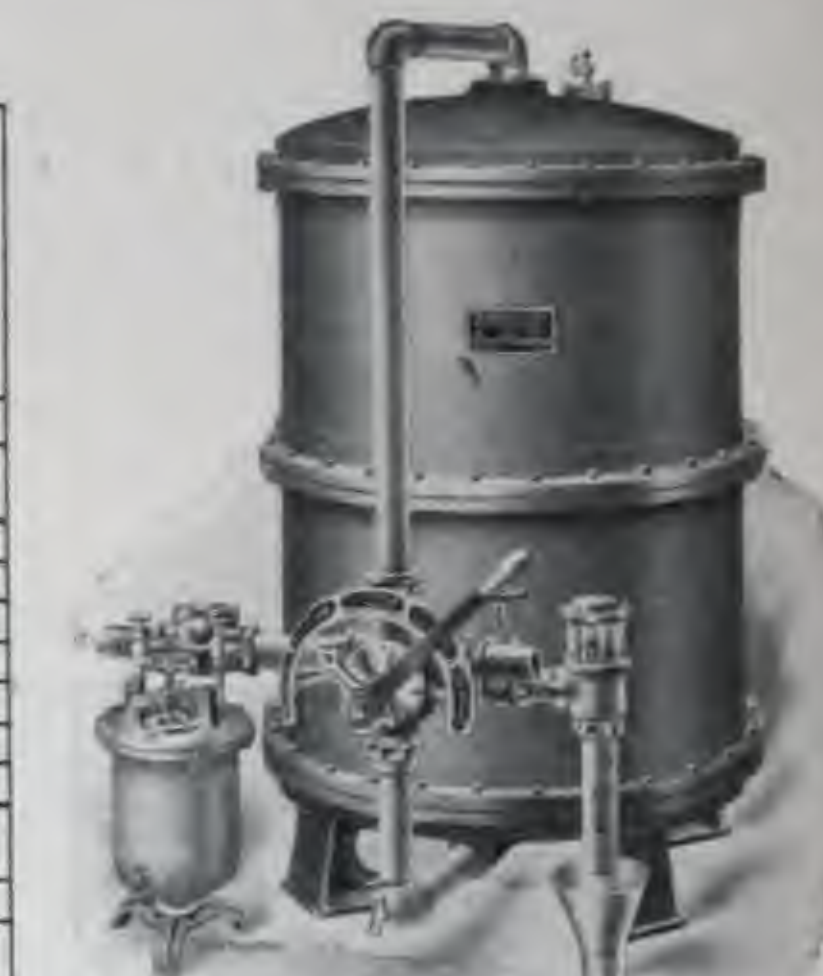
The accepted method of maintaining pools in best sanitary condition at low cost is by "recirculation." Pool contents constantly circulated through heater, filter and sterilizer at rate to give complete turnover every twelve hours; refilling of pool necessary only at three to six months' intervals. Saving in cost of water and fuel quickly repays cost of installation.

LARGE FILTRATION PLANTS.—Horizontal pressure filters, wood tank gravity filters, are employed in connection with large industrial water supplies and municipal water works. Full data sent on request.

VERTICAL PRESSURE FILTERS, DIMENSIONS AND CAPACITIES.

Size (Inside diam.), Inches	Filtering Area, Sq. Ft.	Capacity Gallons per Minute*				Height Over All, Inches	Pipe Connections†		Floor Space, Feet
		Unit Rate 2	Unit Rate 3	Unit Rate 4	Unit Rate 5		Inlet and Outlet, Inches	Waste to Sewer, Inches	
12	.78	1.56	2.34	3.12	3.90	58	1	1½	3 x 2½
16	1.39	2.78	4.17	5.56	6.95	63	1	1½	3 x 3
20	2.19	4.38	6.57	8.76	10.95	64	1	1½	3 x 3
24	3.14	6.28	9.42	12.56	15.70	64	1½	1½	3½ x 3
30	4.91	9.82	14.73	19.64	24.55	74	1½	2	4½ x 3
36	7.07	14.14	21.21	28.28	35.35	76	2	2½	5 x 3½
42	9.62	19.24	28.86	38.48	48.10	78	2	2½	6 x 4
50	13.63	27.26	40.89	54.52	68.15	79	2½	3	6½ x 5
60	19.63	39.26	58.89	78.52	98.15	82	2½	3	7 x 5½
72	28.27	56.54	84.81	113.10	141.40	94	3	4	8½ x 6½
78	33.17	66.34	99.51	132.70	165.90	96	3	4	9 x 7
84	38.48	76.96	115.40	153.90	192.40	98	4	5	10 x 7½
96	50.26	100.50	150.80	201.00	251.30	100	4	5	10½ x 8

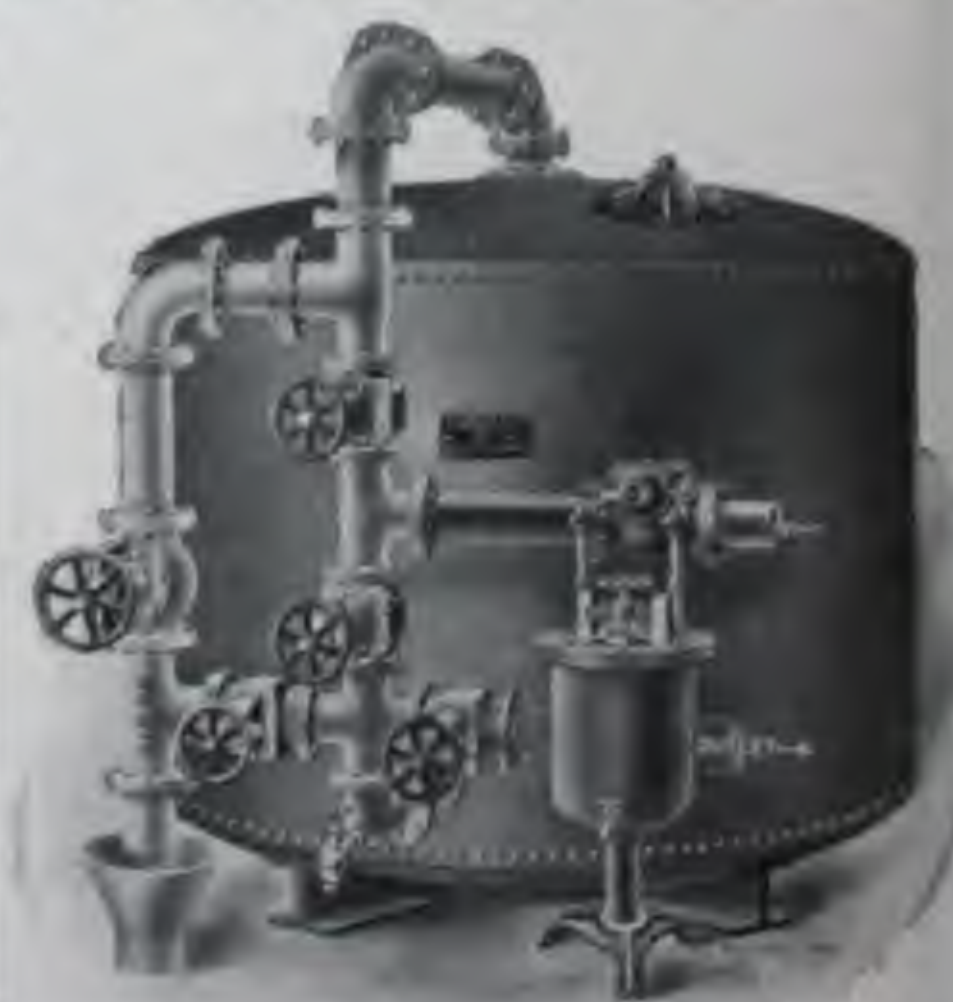
*Special or oversize connections can be furnished.



ROBERTS STYLE "E" FILTER.



ROBERTS STYLE "H" FILTER.



ROBERTS STYLE "L" FILTER.

TAYLOR INSTRUMENT COMPANIES

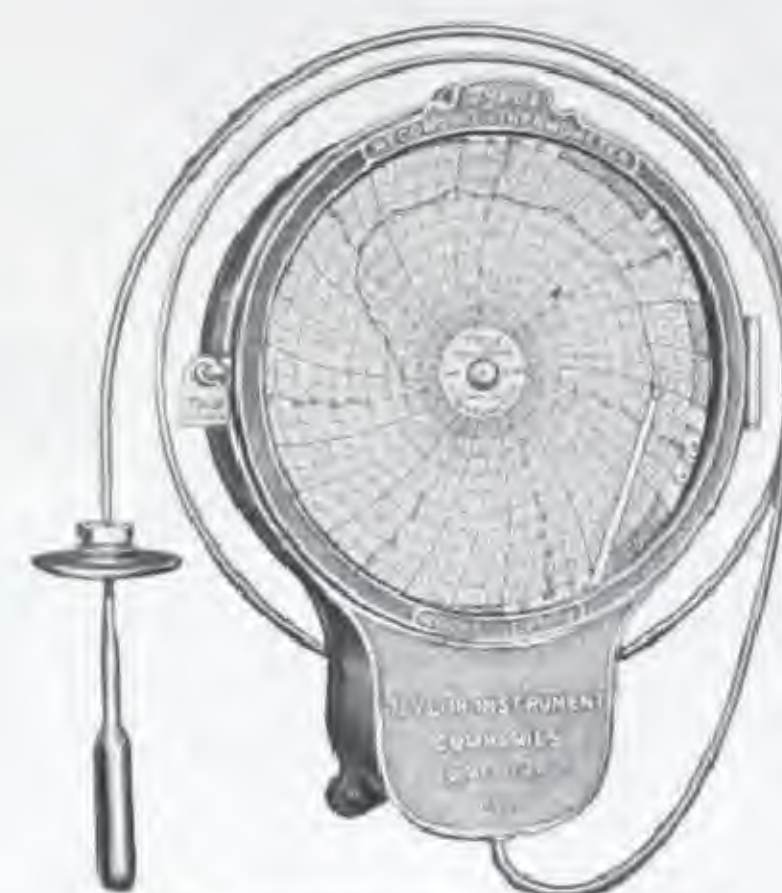
MANUFACTURERS OF
TYCOS PRODUCTS110-112 CHURCH STREET,
TORONTO, CANADA.

PRODUCTS.

THERMOMETERS, PYROMETERS, BAROMETERS, HYDROMETERS,
COMPASSES, AND OTHER SCIENTIFIC APPARATUS FOR INDICATING,
RECORDING AND CONTROLLING ANY TEMPERATURE.TYCOS INDICATING
THERMOMETER FOR STACK
TEMPERATURES.TYCOS PYROMETER
SWITCHBOARD.

TYCOS RECORDING THERMOMETERS.

Give continuous records of temperature. Made in both self-contained and flexible tube form (mercury actuated and vapour tension types) for all industrial applications. Range—40° to 1000° Fahr. Ask for Catalogue Part 8000-9000 and 11000.



TYCOS RECORDING THERMOMETER.

TYCOS SINGLE-DUTY TEMPERATURE
REGULATORS.

Tycos Controls are built for service.
Consult us on your problems.



TYCOS PRESSURE RECORDER.

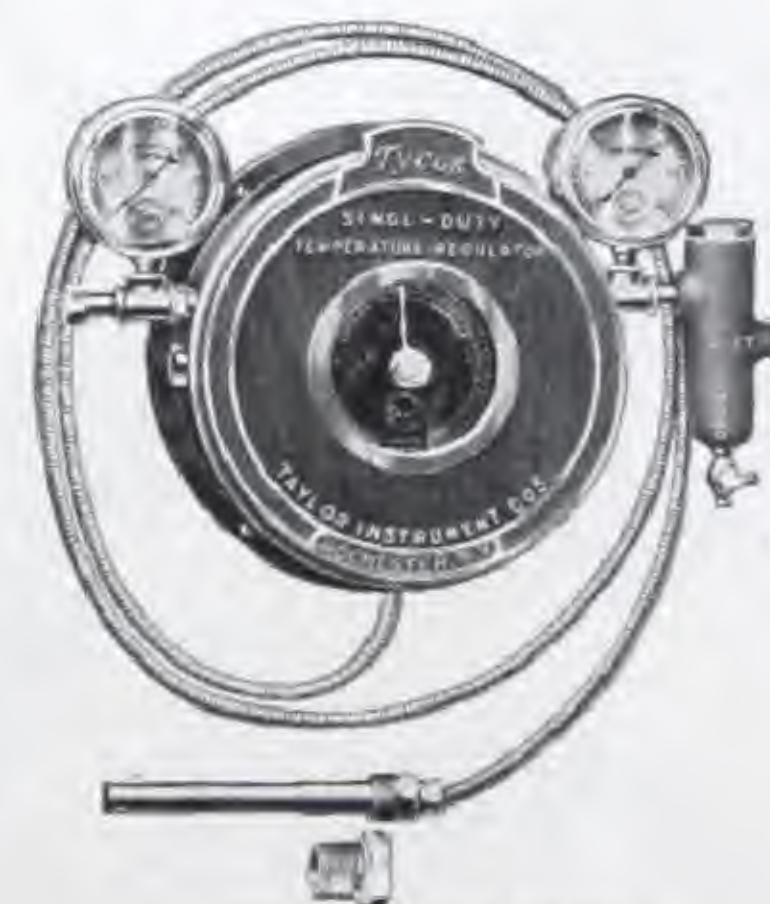
TYCOS PRESSURE RECORDERS.

Tycos Pressure Recorders are built of the same rugged construction as Tycos Recording Thermometers and are designed to handle either high or low pressure, also for draft, vacuum, and combination records.

TYCOS PYROMETER SWITCHBOARDS.

There is a Tycos Pyrometer for any temperature.

Ask for our Catalogues.

TYCOS SINGLE-DUTY
TEMPERATURE REGULATOR.

REPAIRS.

Our Repair Department at Toronto is now fully equipped and we are prepared to look after your repairs to Indicating, Recording and Controlling TEMPERATURE INSTRUMENTS.

JULIAN D'ESTE COMPANY

MANUFACTURERS OF ENGINEERING SPECIALTIES.

26 CANAL STREET, BOSTON, 14, MASS., U.S.A.

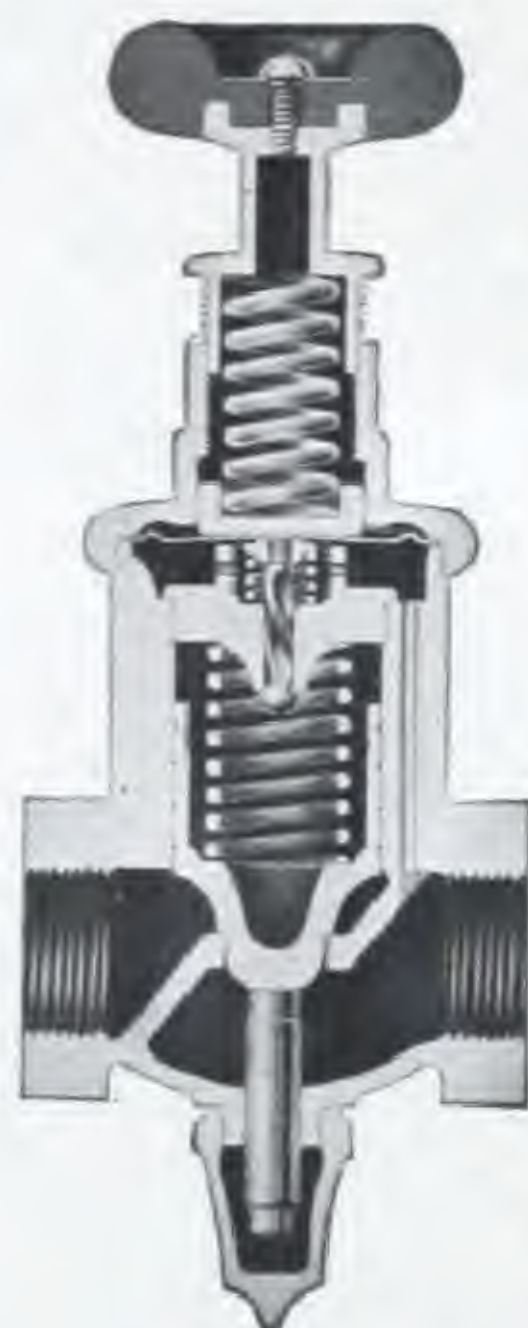
PRODUCTS.

STEAM, AIR, WATER AND PUMP PRESSURE REGULATORS; DAMPER REGULATOR, TEMPERATURE REGULATOR, STEAM TRAPS, STEAM SEPARATOR, STEERING ENGINE REGULATOR, BALANCED VALVES, BALLCOCKS.

In the estimation of the engineering profession generally, they embody the highest standards of theory and practice. For over forty years they have been accorded this distinguished favor, and have never been found lacking. Under all conditions—no matter how exacting—they have stood up satisfactorily to the service required.

IMPROVED
DAMPER
REGULATOR.

The Improved Damper Regulator is simple and trouble proof. It automatically controls the damper on the slightest variations of steam pressure. Steady boiler pressures maintained. Unusual demands are met with a surprising readiness. They assure the most economical burning of coal under either forced, induced or natural draft.

CURTIS
STEAM
PRESSURE
REGULATOR.

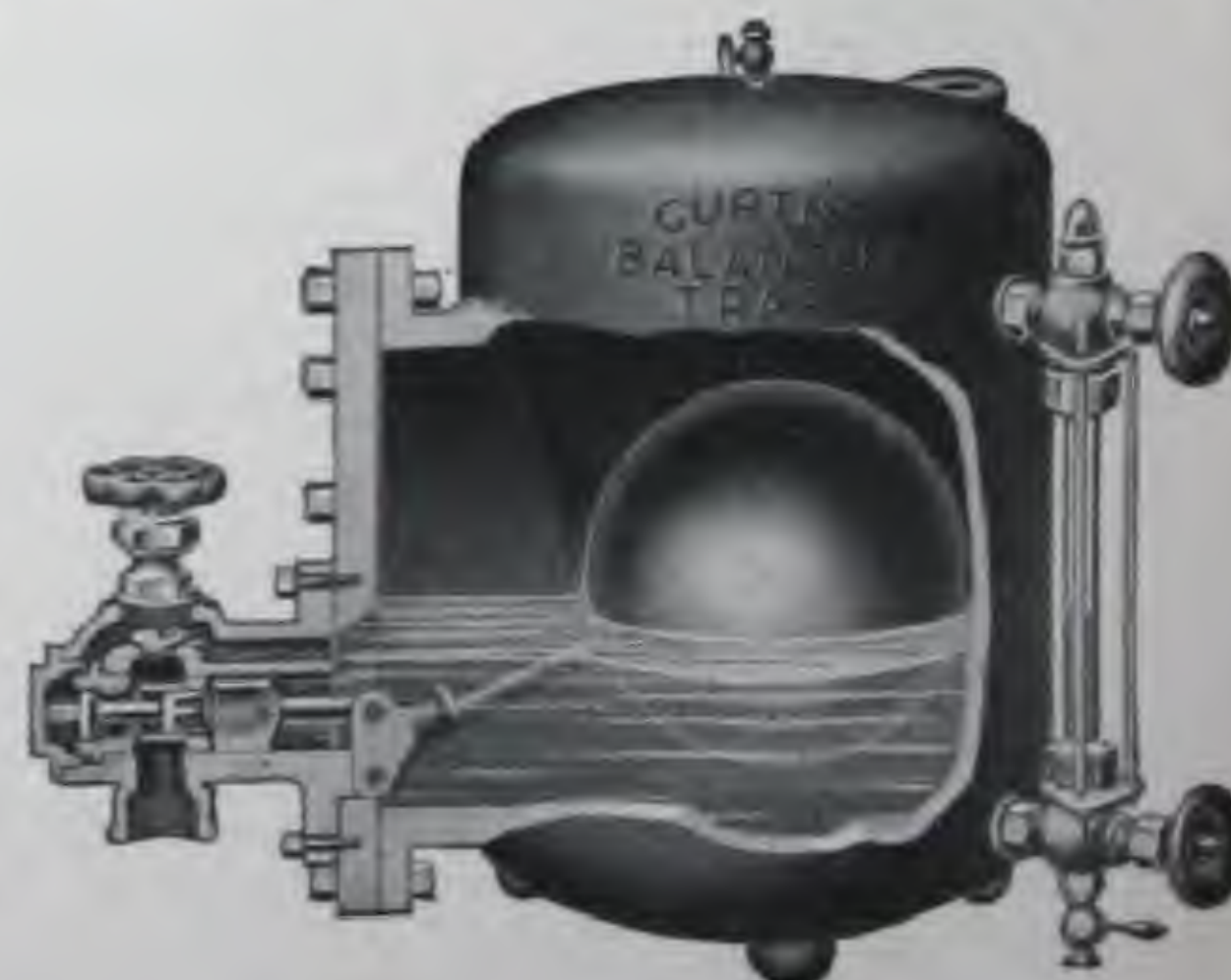
The Curtis Steam Pressure Regulator is designed to reduce any varying high pressure to any constant lower pressure which may be desired from one to within several pounds of the initial pressure. It is extensively used in power plant work, in connection with exhaust steam, also in dye houses, textile and paper mills and rubber works.

CURTIS
WATER
PRESSURE
REGULATOR.

The Curtis Water Pressure Regulator maintains the pressure desired regardless of fluctuations in outside pressure. Rust or clogging by sediment an impossibility. Guaranteed to deliver uniformly and permanently water into service pipes at any desired pressure. Used extensively in pulp and paper mills, hotels, public and apartment buildings.

CURTIS
BALANCED
STEAM
TRAP.

The Curtis Balanced Steam Trap is designed to take care of large quantities of steam line returns, delivering at a high temperature into a tank for return to the boiler. This Trap will work against any head or back pressure less than the direct pressure in the Trap.



THE BRISTOL COMPANY

WATERBURY, CONN.,
U.S.A.

A. H. WINTER JOYNER LTD.

BRISTOL'S

REG. U. S. PAT. OFFICE.

62 FRONT STREET WEST,
TORONTO, ONT., CANADA.NEW BIRKS BUILDING,
MONTREAL, QUE., CANADA.

PRODUCTS.

RECORDING GAUGES, THERMOMETERS, PYROMETERS, PSYCHROMETERS, ELECTRICAL INSTRUMENTS, TACHOMETERS, ELECTRICAL AND MECHANICAL OPERATION INSTRUMENTS, TEMPERATURE CONTROLLERS, LIQUID LEVEL RECORDERS, LONG DISTANCE ELECTRICAL TRANSMITTING RECORDING SYSTEM, COUNTERS AND RADII AVERAGING INSTRUMENTS.

RECORDING PRESSURE
AND VACUUM GAUGES.

A permanent record of operating conditions in connection with steam, gas, air and liquids. Charts furnished to read in pounds, ounces, inches, feet, metric or any other desired units from full vacuum to 12,000 pounds per square inch. Complete information in catalogue AZ 1005.

LIQUID LEVEL
RECORDERS.

For automatically recording depths of water or other liquids in tanks, water towers, reservoirs, etc. Can be located where most convenient at a higher or lower level than the liquid to be measured. Not affected by low temperatures. See bulletin AZ 278.

LONG DISTANCE
ELECTRICAL
TRANSMITTING
AND RECORDING
SYSTEM.

For measuring and recording at remote points, pressure, liquid level, temperature and motion. A distance of five miles or more is perfectly practical. This system is not complicated in design and is easily understood by anyone who may be made responsible for the maintenance of it. Get bulletin AZ 283.

RECORDING
THERMOMETERS.

For all commercial ranges from 60 degrees below zero to 800 degrees Fahr. Furnished with plain bulbs for use in open spaces not under pressure or with screw bulbs for closed spaces under pressure. Used in connection with feedwater to boilers, superheated steam, milk pasteurizers, dry kilns, etc. Ask for catalogues AZ 1102-1202-1302.

INDICATING
AND RECORDING
ELECTRICAL
PYROMETERS.

High Resistance Model 319 for ranges up to 3000 degrees Fahr., with platinum couples or with base metal couples for ranges below 2000 degrees.

Combination Indicating and Recording Unit of pyrometers furnished when it is necessary to have an indicating instrument at the operator's station and a recording instrument for the superintendent in his office. Ask for bulletin AZ 291.

HIGH TEMPERATURE
CONTROLLER

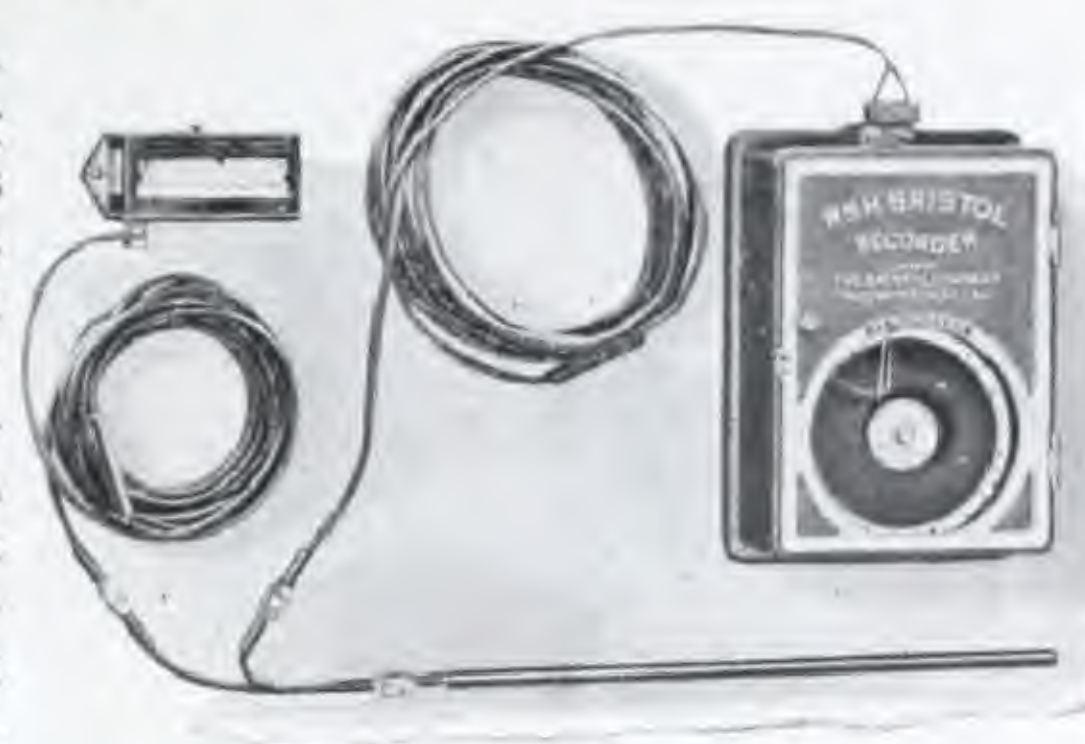
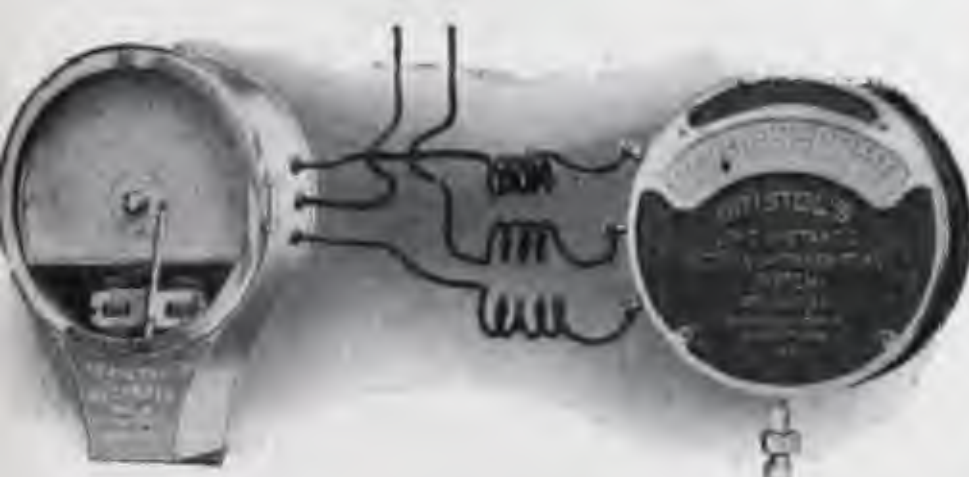
Thermo-Electrical Type supplied with electrical valves or switches to control furnaces heated by gas or electricity and for oil under certain conditions. Operates automatically and is very easily installed. See bulletin AZ 279.

RECORDING WATTMETER
STRIP CHART TYPE.

Portable Model for use on A.C. single or polyphase and on D.C. up to 400 amperes. Convenient and practical for making tests to obtain records of consumption of electrical energy. Ask for catalogue AZ 1500.

OPERATION RECORDER.

Shows time of mechanical movements, machine operations, valve reversals, etc. 20 different operations recorded on the same chart. Easy to install and to maintain in service. Insures a high rate of output continuously in connection with all of your machines. See bulletin AZ 207.



FOXBORO
TRADE MARK
THE FOXBORO CO., INC.

FOXBORO, MASS., U.S.A.

PEACOCK BROTHERS LIMITED,

SALES ENGINEERS.

 179 DELORIMIER AVENUE, MONTREAL.
 TORONTO COBALT VANCOUVER

FOXBORO
TRADE MARK
PRODUCTS.

FOXBORO RECORDING AND INDICATING GAUGES FOR PRESSURE AND VACUUM; RECORDING AND INDICATING THERMOMETERS; AIRPLANE THERMOMETERS; AIR-SPEED INDICATORS; RECORDING PSYCHROMETERS; AUTOMATIC TEMPERATURE CONTROLLER-RECORDERS; INDICATING AND RECORDING LIQUID LEVEL GAUGES; DIFFERENTIAL PRESSURE RECORDERS; FLOW METERS FOR GAS AND LIQUIDS; RADIAL PLANIMETERS FOR FLUE GAS ANALYSIS; INDICATING AND RECORDING PYROMETERS; TACHOMETERS; MECHANICAL AND ELECTRIC TIME RECORDERS; GAUGE BOARDS.

INDICATING AND RECORDING GAUGES.


INDICATING GAUGE.
 Sizes 2 to 24 in. Range, from full vacuum to 20,000 lbs. per sq. in.



INDICATING THERMOMETER.
 From -25° to $+1000^{\circ}$ Fahr., or corresponding degrees Centigrade or Reaumur.

INDICATING—All movements are absolutely non-corrosive and independent of the case. Perfect alignment of working parts insures accuracy.

Ammonia gauges and hydraulic gauges for pressures over 1,000 lbs. have nickel steel screwed tubes. Positively will not set or leak. (Bulletin B.D. 95-2.)

RECORDING—For steam, gas, water, air, oil, ammonia, brine, anything under vacuum or pressure; any range from full vacuum up to 20,000 lbs; any unit of measurement: inches water, ounces, pounds, feet, metric units, etc. New inverted type does away with blotted records and dirty pen arms. All gauges are equipped with patented chart holder; micrometer adjustment pen arm; automatic release pen lifter. All cases round-form and dust-tight. Also 2-pen recording gauges furnished to record 2 separate pressures on one chart. (Bulletin B.D. 98-1.)



RECORDING GAUGE.
 Sizes 8, 10 and 12 in. Any finish desired.

INDICATING AND RECORDING THERMOMETERS.

INDICATING—Designed to eliminate excessive breakage. An instrument easy to read and of the long distance type as well as stem type.

No mercury—the same principle applies as in the recording thermometer. (Bulletin B.D. 104-1.)

RECORDING—Depend upon expansion of liquids, gas and the vapor tension of volatile liquids for their action. Impossible to deteriorate with age.

No mercury used—effect of atmospheric conditions is thus eliminated. Connecting tube can be 300 ft. long and accurate results guaranteed.

The actuating movement is our improved helical tube movement. No multiplying devices are used.

Charts either even scale or increasing scale as desired. Bulbs made to suit any kind of application. Special lead and acid resisting bulbs are made for the chemical industry.

Also 2-pen and 3-pen recording thermometers, to record on one chart 2 or 3 separate temperatures, can be supplied. (Bulletin B.D. 104-1.)



RECORDING THERMOMETER.
 Sizes 8, 10 and 12 in. From -60° to $+1000^{\circ}$ Fahr., or corresponding ranges in Centigrade or Reaumur.

AUTOMATIC TEMPERATURE RECORDER-CONTROLLER.

A new design in which the functions of two instruments have been combined and so co-ordinated that perfect synchronization is obtained. The use of only one bulb to actuate both the recorder and the controller elements gives an accurate record of the controller operation. Valves designed to operate on either pressure or vacuum. An improved form of rubber diaphragm motor is employed, which is so designed that, even under severe conditions, no undue stresses are set up in the diaphragm itself. (Bulletin B.D. 127 is all about this new instrument.)

LIQUID LEVEL GAUGES.

Both indicating and recording types.

Primarily designed for recording varying levels of rivers, reservoirs, canals, forebays, tail races, etc.; but have been widely adopted for sewer work, weir measurements, and specific gravity recorders. Paper mills use them to record the height of stuff in Jordan stuff chests, etc.

They are not affected by ice formation; can be used on liquids other than water; guaranteed for accuracy and will be sent on trial. (Complete list in Bulletin No. B.D. 82-1.)



AUTOMATIC TEMPERATURE RECORDER-CONTROLLER.
 Will operate valves from $\frac{1}{4}$ to 12 in., and on temperatures from -25° to $+1000^{\circ}$ Fahr. Set lever with crossarm at required temperature, and this temperature will be maintained automatically until setting is changed.



LIQUID LEVEL GAUGE.

FOXBORO
TRADE MARK

G. & J. WEIR (CANADA) LIMITED

ENGINEERS AND FOUNDERS.

Head Office and Works:
179 DELORIMIER AVE.
MONTREAL

CANADIAN BRANCH OF
G. & J. WEIR LTD. CATHCART: GLASGOW

SALES ENGINEERS.

PEACOCK BROTHERS, LIMITED
MONTREAL.

Foundry:
VILLE LA SALLE, P.Q.

OFFICES IN:
TORONTO COBALT
VANCOUVER

FEED MAKE UP FOR POWER STATIONS.

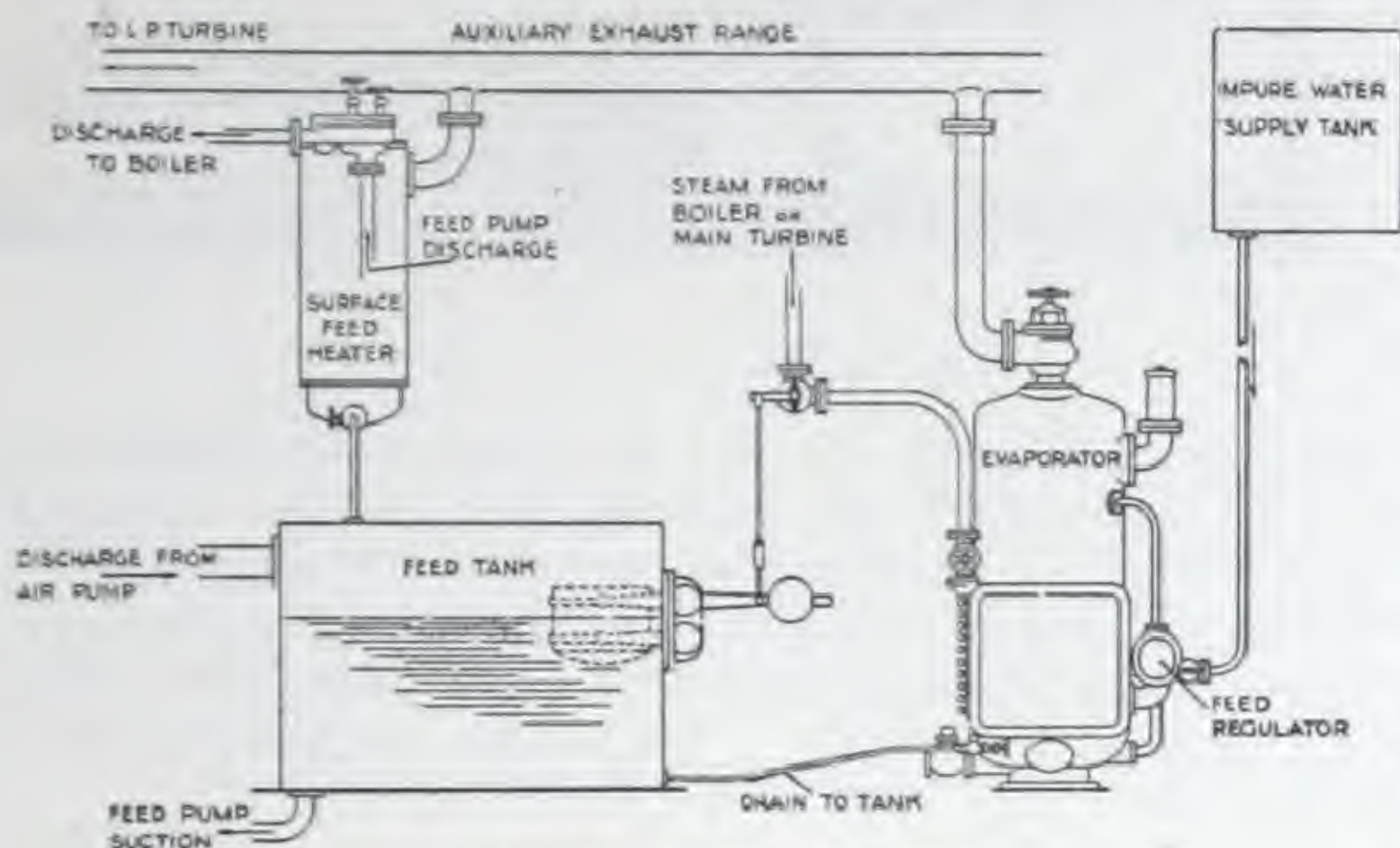
DESCRIPTION.

A noteworthy feature of recent Power Station practice is the increasing attention paid to the maintenance of the purity of the working fluid.

The increasing refinement of the mechanical equipment brought about by the demand for greater economy has given prominence to the innumerable detail losses and troubles caused by impurities in the feed circuit.

No portion of the system escapes the evil effects of impure feed, but boiler tubes, turbine blading, governor valves, and steam valves in general, are the principal seats of trouble. The high-efficiency watertube boiler is particularly susceptible, and in naval practice an accepted criterion of engine-room efficiency in commission is the purity of the feed water.

For many years the established practice in naval vessels of using only distilled water as feed make-up has been amply justified by results, and is finding increasing favour in merchant vessels and in land power stations. The use of evaporators is not confined to installations where the water supply is particularly impure, as even the best of natural waters contains sufficient impurity to have harmful results owing to its cumulative effect.



TYPICAL INSTALLATION.

It would at first appear that the cost of using distilled water for this purpose would be very high, but closer analysis shows that this is not the case.

The trend of modern design has been towards a decrease in the amount of working fluid in a steam generating circuit as compared with the horsepower evolved. In most modern installations the working fluid goes through a complete cycle at least twice per hour, and in some a very much higher rate of circulation is maintained.

For the equivalent horsepower, also, there are now fewer glands and less loss of steam than formerly. A certain amount of flywheel or thermal storage effect can be obtained by suitable evaporator connections which add to the efficiency of the system.

Naturally, the best method of applying the evaporator varies with the nature of the main installation, but the scheme shown diagrammatically is generally most suitable.

Boiler steam, or steam from the main turbine at about 100 lbs. pressure, is taken to the evaporator coils through a valve which is controlled by a float in the feed tank. The vapour from the evaporator passes into the auxiliary exhaust range, which contains the exhaust from all steam-driven auxiliary machinery. This exhaust range is connected to a feed heater and also to the low-pressure turbine, at a stage which has about 15 lbs. pressure under full load conditions. The drain from the coils is led to the feed tank.

This scheme gives an automatic-working plant of high economy. So long as the feed can condense all the auxiliary exhaust, no thermal loss whatever is incurred except that of the sensible heat in the evaporator-concentrate, which is inconsiderable, as with ordinary waters its quantity is small in proportion to the feed make-up.

When there is too much exhaust steam to be absorbed by the feed, it is automatically used in the low-pressure stages of the main turbine, where a large proportion of its work value is recovered.

WEIR AUXILIARY MACHINERY SPECIALTIES.

FEED PUMPS, AIR PUMPS, OIL PUMPS, SERVICE PUMPS, TURBO FEED PUMPS, TANDEM COMPOUND AND TWIN COMPOUND FEED PUMPS, WEIR HYDRAULIC PRESSURE PUMPS, FEED WATER HEATERS, EVAPORATORS, EVAPORATING AND DISTILLING PLANTS, THE WEIR SYSTEM OF FEED HEATING AND BOILER FEEDING FOR LOCOMOTIVES.



WEIR
DIRECT ACTING BOILER
FEED PUMP.



WEIR
TURBO FEED PUMP.

ESTIMATES, CATALOGUES, ETC. ON REQUEST.

WEIR
AUXILIARY
MACHINERY
SPECIALTIES.

NORTHERN EQUIPMENT COMPANY

MAIN OFFICE AND WORKS: 107 W. 11TH STREET, ERIE, PA.

BRANCH WORKS: HAMILTON, ONT.; MANCHESTER, ENGLAND; PARIS, FRANCE; COLOGNE, GERMANY.

SALES REPRESENTATIVES IN ALL INDUSTRIAL CENTRES

CANADIAN REPRESENTATIVES:

ALLEN GENERAL SUPPLIES, LTD., Toronto, Ont.

H. N. BROWN, P.O. 620, New Glasgow,
Nova Scotia.W. W. HICKS & Co., 567 Banning St., Winnipeg, Man.
MASON REGULATOR & ENG. CO., LTD., 123 Dagenais St.,
Montreal, Quebec.

Write CHAS. C. MOORE & Co., Engrs., 618 Mutual Life Bldg., Seattle, Wash., if you reside in British Columbia.

PRODUCTS.

COPES SYSTEM OF FEED WATER CONTROL, FEED WATER REGULATORS, PUMP GOVERNORS.



COPES BOILER FEED REGULATOR

METHOD.

The regulator feeds continuously as long as there is a load on the boiler. On heavy loads it automatically drops the water level so as to increase the steaming capacity. On light loads it automatically raises the water level, and saves the furnace heat which would otherwise be wasted. On steady loads, it maintains a constant water level.

The Governor maintains a fixed excess in the feed line above boiler pressure. As the pressure varies, the feed pressure varies correspondingly. The same Governor, with a change in connections, will give a fixed constant pressure.

CONSTRUCTION.

A glance at the illustrations shows the simplicity of construction. The regulator—a straight tube, a straight lever, a heavy iron base, and a very rugged balanced valve that is practically frictionless. The Governor—a cylinder and piston, a frame, and a balanced valve. No springs, seats, diaphragms, displacement bodies, needle or pilot valves, or other delicate mechanism. Simple. Direct. Positive. Practically no repairs. Many have been operating daily for 20 years.

DESIGN.

Each Copes Regulator is now designed to suit the specific conditions governing the boiler, so as to insure the most economical feeding. The design is based on a study of the local conditions, feed line size, steam pressure, water pressure, etc. Provision is made for easy adjustment in case conditions change. Smooth feeding during light loads as well as heavy loads is insured by a high valve lift.

RESULTS.

Gives higher overload capacity. Removes unreliable human element from water control.

Eliminates danger while new employees are being "broken in."

Saves fuel—3% to 8%.

Even distribution of load between boilers.

Smooth rate of feed; more legible steam and water meter charts.

Smaller feed lines and valves.

More even load on feed pump.

Dry steam since the water level cannot exceed a predetermined level and because the level is a minimum for greatest loads.

Higher superheat because the water is not carried over into superheater tubes.

WHERE USED.

In 98% of the American plants where power is generated for sale at a profit. Copes Regulators and Governors reduce costs and hence increase profits in those plants.)

By most of the leaders in practically every line of industry—in every part of America—in many foreign countries, out-of-doors at Duluth where the minimum temperature is 40° below zero—out-of-doors in India where the maximum temperature is 114° F.—in Mexico, Japan and China where the cheapest grades of labor are used—in the model plants of America and England where the highest grades of labor are employed—on 40 H.P. boilers—on 5,000 H.P. boilers—in Lancashire, Heine, Stirling, B. & W., Erie City, Rust, Wickes, Cahill, Manning, Union, Franklin, Bienenhausen, Keeler, Edgemoor, and practically every known type of boiler—on steady loads—on widely fluctuating loads. Briefly, Copes Regulators are used wherever boilers are used to generate steam for power purposes.

CATALOGS.

Ask for complete catalog, specifications, quotation, charts, test data, etc. Give us your boiler conditions in detail.

SEE PAGE 260 OF 1920 BOOK.



COPES PUMP GOVERNOR.

BUILDERS IRON FOUNDRY

"BUILDERS OF THE VENTURI."

MAIN OFFICE: PROVIDENCE, R.I.

CANADIAN REPRESENTATIVES:

ALLEN GENERAL SUPPLIES, LIMITED, TORONTO, ONT.

GENERAL SUPPLY CO. OF CANADA, LIMITED, OTTAWA, MONTREAL, WINNIPEG, VANCOUVER.



PRODUCTS.

Manufactured by the Venturi Department: VENTURI METERS for cold water, hot water, gases, steam, etc.; VENTURI RATE of FLOW CONTROLLERS; VENTURI CHEMICAL FEED REGULATORS; LOSS OF HEAD GAUGES; WATER LEVEL RECORDERS for filtration plants.

VENTURI
METER
TUBE.

A Venturi Meter Tube is placed in a pipe line in the same manner as ordinary pipe. From the inlet to the throat the interior diameter gradually decreases and then gradually increases again to the full diameter at the outlet. The unobstructed passageway thus formed permits high differential pressure between inlet and throat with minimum friction loss. Annular pressure chambers are provided at inlet and throat. The throat is lined with bronze. Connection to the Indicating, Recording or Registering Instrument is simply made by two small pipes from the inlet and throat chambers.



VENTURI METER TUBE.

TYPE M
REGISTER—
INDICATOR—
RECORDER.

This machine has the advantage of unusual ruggedness and extreme accuracy.

The Type M furnishes three distinct kinds of information: it indicates momentary rate of flow through the Meter Tube; permanently records this rate upon a large circular chart; gives the total quantity on a circular counter dial. Each Register is graduated for the particular Meter Tube with which it is to be used.

For cold and hot water and other liquids, high pressure gases, steam, etc. Universally employed for main water supply lines, boiler feed, hot water heating systems, and many other important kinds of service.

TYPE M
INDICATOR—
RECORDER.

The lower dial is 10 in. in diameter and indicates the rate of flow (pounds per hour, gallons per minute, etc.) through the Venturi Meter Tube. The upper dial records this rate continuously on a large circular chart. The interior mechanism is simply and positively actuated through large cast iron floats, resting on mercury columns, and rack and spur gearing.

The total quantity may be obtained by tracing the charts with a special planimeter manufactured by BUILDERS IRON FOUNDRY.

The Type M Indicator—Recorder may be used for the same kinds of service as the Type M Register and is also frequently employed for temporary installations at various points where it is desired to study the consumption or output through certain main pipe lines, or the efficiency of operation of important plant units.

TYPE M REGISTER—
INDICATOR—RECORDER.

BULLETINS.

Bulletins describing the Venturi for hot and cold water, sewage, brine, chemical solutions, oil, gas, air or steam sent on request.

INSTALLATIONS.

Thousands of Venturi Meters varying in size from $\frac{1}{2}$ in. to $17\frac{1}{2}$ ft. in diameter are in use on all kinds of service throughout the world. The following are a few local installations:—

MUNICIPAL
INSTALLATIONS.

Over 100 Municipal pumping plants in Ontario as well as the principal cities throughout Canada.

BOILER FEED.

Goodyear Tire, Canadian Kodak, International Harvester, Beaver Wood Fibre, Imperial Oil (5 plants), St. Lawrence Sugar Refining Co., etc.

STEAM METERS.

Toronto General Hospital, Imperial Oil (5 plants) and others.

GAS METERS.

United Gas & Fuel Company, Southern Canada Power-Steel Co. of Canada, Dominion Iron & Steel Co., Imperial Oil Co., etc.

TYPE M
INDICATOR—RECORDER.

DOMINION FLOW METER COMPANY, LIMITED



HEAD OFFICE:
145 WEST WELLINGTON STREET,
TORONTO, ONT.

Phone Adelaide 6500
" " 6501

REPRESENTATIVES:

EASTERN CANADA:

The Mason Regulator and Engineering Co. Limited,
185 Dagenais Street, Montreal.

MANITOBA & SASKATCHEWAN:

W. W. Hicks & Company,
Winnipeg.

BRITISH COLUMBIA:

Taylor Engineering Co. Limited,
Vancouver.

PRODUCTS.

Flow Meters for Steam, Gas, Air and Water.
CO₂ Recorders.
Stratton Air Flow Indicating Meters.

"Econometer" for Automobiles.
Gasoline Flow Meter.

FLOW
METERS.

Type A.—Indicating, Integrating, Graphic
Recording.

Type A. Detached.—Indicating Detached,
Integrating, Graphic Recording.

Type B.—Graphic Recording.

Type C.—Indicating.

Type D.—Integrating.

Type E.—Graphic Recording, Integrating.

Type F.—Indicating, Integrating.

Type G.—Graphic Recording, Indicating.

Type G. Detached.—Indicating Detached,
Graphic Recording.

CO₂
RECORDER

The DOMINION is the ONLY electrically operated Flow Meter, consequently the only Flow Meter in which the reading instruments may be located at long distances from the point of measurement.

The meter body may be located at points so inaccessible that readings could not be obtained were it not for the fact that the instrument board may be situated where it is a convenient reminder of what is going on throughout the plant.

THE REPUBLIC FLOW METERS CO. OF CANADA,
LIMITED, wish to notify their customers that in future the
Company will be known as the

DOMINION FLOW METER CO., LIMITED.

The organization has been augmented, retaining the original personnel, to carry on the ever-increasing business, and we trust this change will continue to merit our customers' confidence.

The design of equipment is in no way changed and the service will be of the same high standard in the future as it has been in the past.

NOTE.



NATIONAL CONDUIT COMPANY, LIMITED

FORMERLY

ORPEN CONDUIT CO., LTD.

HEAD OFFICE AND WORKS: QUEEN AND DUFFERIN STREETS,
TORONTO, ONT.

PRODUCT AND SERVICE.

We are sole manufacturers of "XCELADUCT" GALVANIZED and "ORPENITE" ENAMELLED RIGID STEEL CONDUIT for interior construction.

We carry a large and well-assorted stock of both "Xceladuct" and "Orpenite" Conduits at Toronto, and can at all times make prompt shipments of large orders.

"Xceladuct"



"Xceladuct"

DESCRIPTION "XCELADUCT" CONDUIT.

Is a high-grade Mild Steel Tube made absolutely rust-proof by the finish given the raw pipe before electro-galvanizing. It bends easily. Sharp, clean-cut, zinc-coated threads save the labour of re-threading and render bonding wires or ground clamps unnecessary.

"XCELADUCT" zinc coating is a uniform and continuous deposit of pure zinc. There is no possibility of an alloy since the zinc is deposited directly on the Mild Steel Tubing—and its full value as a rust-preventive is secured.

"XCELADUCT" bonds with concrete. Its surface is absolutely clean, so that concrete wets it thoroughly and bonds with it without allowing the formation of pockets, in which corrosive elements might accumulate.

"XCELADUCT" enamelled interior is entirely free from blisters, burrs or any obstructions. Its smooth, glossy surface allows rapid fishing without injuring the insulation of the wires.

DESCRIPTION "ORPENITE" CONDUIT.

The same grade of pipe is used in the manufacture of "ORPENITE" Conduits as in "XCELADUCT," which after being cleaned by the same method, is coated both inside and outside with flexible black enamels, which have been selected with the utmost care as to finish, lustre, elasticity and durability, being acid-resisting, and are not affected by any dampness in walls or contact with lime, mortar or cement. The wires are constantly free from every disturbing influence on the insulation.

APPROVAL OF

UNDERWRITERS. Each tube is ten feet long, "threads" on both ends, with coupling, and bears Underwriters' Inspection Label and label bearing our name.

"Orpenite"



"Orpenite"

PRICE LIST.

"XCELADUCT" GALVANIZED AND "ORPENITE" ENAMELLED CONDUIT COUPLINGS AND ELBOWS.

CONDUIT.							COUPLINGS.			ELBOWS.			
Size.	Price per Foot.	DIAMETERS.		Thick-ness.	Weight per Foot.	Threads per Inch.	Size.	Price Each.	Wt. per 100 in lbs.	Price Each.	Wt. per 100 in lbs.	Radius. Inches.	Offset. Inches.
		External.	Internal.										
1/2	\$0.08	.540	.364	.088	.425	18	1/2	\$0.05	6.0	\$0.19	42	4.250	7.500
3/4	.08	.675	.493	.091	.568	18	3/4	.06	9.5	.19	53	4.250	7.500
1	.08	.840	.622	.109	.852	14	1	.07	11.6	.19	75	4.250	7.375
1 1/4	.11	1.050	.824	.113	1.134	14	1 1/4	.10	20.9	.25	120	5.375	8.375
1 1/2	.17	1.315	1.049	.133	1.684	11 1/2	1 1/2	.13	34.3	.37	200	5.750	9.500
2	.23	1.660	1.380	.140	2.281	11 1/2	2	.17	53.5	.45	300	7.250	10.875
2 1/2	.27	1.900	1.610	.145	2.731	11 1/2	2 1/2	.21	74.3	.60	427	8.250	12.625
3	.37	2.375	2.067	.154	3.678	11 1/2	3	.28	120.8	1.10	700	9.500	15.250
3 1/2	.58	2.875	2.469	.203	5.819	8	3 1/2	.40	172.0	1.80	1300	10.500	17.375
4	.76	3.500	3.068	.216	7.616	8	4	.60	249.8	4.80	1700	13.000	19.500
4 1/2	.92	4.000	3.548	.226	9.202	8	4 1/2	.80	424.1	10.60	2300	15.000	21.250
5	1.09	4.500	4.026	.237	10.889	8	5	1.00	474.1	12.25	2700	16.000	22.500
5 1/2	1.27	5.000	4.506	.247	12.642	8	5 1/2	1.50	550.0	18.55	3100	18.000	24.375
6	1.48	5.563	5.047	.258	14.810	8	6	1.65	700.0	25.75	5500	24.000	32.000
6 1/2	1.92	6.625	6.065	.280	19.185	8	6 1/2	2.40	750.0	32.00	9000	30.000	39.750

Conduits in 10-foot lengths threaded on both ends with one coupling.
Conduit pipe is known and spoken of by its nominal inside diameter.

CONDUITS COMPANY LIMITED

TORONTO, ONTARIO.

HEAD OFFICE AND WORKS:
33 LABATT AVENUE.



PRODUCTS.

"GALVADUCT" AND "LORICATED" IRON ARMoured CONDUITS FOR INTERIOR CONSTRUCTION. Manufactured by us under Patents.

GENERAL.

The Conduit System is the only absolutely safe method of wiring. It eliminates all risk of fire through defective wiring, lessens insurance risks, protects the wiring from all possible damage and makes it possible to easily and quickly re-wire, without tearing up flooring, cutting into plaster, etc., etc.



GALVADUCT.

"GALVADUCT"
CONDUIT.

"Galvaduct" Conduit is manufactured from best quality mild steel welded tubing of gas-pipe thickness of wall. All tubes are thoroughly cleaned of silicates, scale and burrs, the ends carefully reamed to facilitate the fishing of wires, and then electro-galvanized on the outside and coated on the inside with a superior and flexible enamel, which gives absolute protection from rust or the action of acids and alkalis contained in plaster and cement.

We call particular attention to the fact that the threads of "Galvaduct" Conduit, being clean and free from any insulating substances, electrical conductivity is secured at each joint; it is therefore positive that, when properly grounded at any point, the metal of the entire conduit system is "permanently and effectually grounded" as required by the Rules and Requirements of the National Board of Fire Underwriters. With enamelled threads, this grounding is entirely problematical.



LORICATED.

"LORICATED"
CONDUIT.

"Loricated" Conduit is manufactured with the same care and from the same quality of material as used in "Galvaduct" Conduit, but, in place of being electro-galvanized, all tubes are coated outside and inside with a superior flexible and moisture-proof enamel, which renders it impervious to the action of acids and other chemicals. "Loricated" Conduits are coated and "baked" three times, which results in a finish which will not "crack" or "scale" even when bent in coldest weather, and renders the pipe moisture and acid proof.

APPROVAL OF
UNDER-
WRITERS.

"Galvaduct" and "Loricated" Conduits are made in standard lengths of ten feet, threaded on both ends with one coupling to each length, and each tube bears our name and the Underwriters' Inspection Label.

Our Conduits are included in the list of conduits examined under the standard requirements of the National Board of Fire Underwriters and by the Underwriters' National Electric Association, after exhaustive tests by the Underwriters' Laboratories and have their approval.

STOCK
CARRIED.

We are at all times in a position to make prompt shipment of large orders, as we always carry an extensive stock of all sizes of Conduits, Couplings and Elbows, both in Toronto and Montreal.

REMARKS.

Electrical Conduits for interior construction have developed through various types of wood moulding, paper tube, thin sheet metal encasing paper, wood or composition and heavy iron or steel tubing lined, until they reached their highest state of perfection in "Galvaduct" and "Loricated" Conduits as manufactured in Canada solely by Conduits Company Limited, under Canadian and United States Letters Patent.



WIREMOLD.

"Wiremold" is designed to meet the demand for a superior surface wiring material. It is made in two wire size only— $\frac{3}{4}$ " wide and $\frac{1}{2}$ " thick over all, and is furnished in ten-foot lengths. The base and capping is permanently assembled at the factory, hence conductors cannot be laid into it as in similar materials, but must be fished in all cases. "Wiremold" Base is galvanized and its capping finished with special high-grade enamel of a neutral tint, particularly selected to blend with colourings of average walls and ceilings.



FIG. 2.



FIG. 3.



FIG. 4.

INSTALLATION.

To put up "Wiremold," just shove a coupling into the grooves of the capping, and screw it to the wall with a No. 8 flat head wood screw as indicated in Fig. 2 above. Start the grooves in the next length over the edges of the coupling as in Fig. 3. And close up as in Fig. 4. Certainly nothing could be more simple. And the beautiful part of this simplicity is that it applies to all fittings.

We make a very simple clip to support "Wiremold" in the middle of the length. You will find it listed in our pocket catalogue.

No. 515.
PLAIN TEENo. 584.
ELBOW CONDUIT COUPLING.No. 511.
FLAT ELBOW.No. 532.
OUTLET BOX.No. 550.
PUSH SWITCH BOX
AND COVER.

FITTINGS.

"Wiremold" Fittings are specially designed and are made to suit every requirement. Write for special catalogue, prices, etc.

CANADIAN TRIANGLE CONDUIT COMPANY, LIMITED

OFFICE AND WORKS:
21 Prescott St.,
TORONTO.

GENERAL SALES AGENTS:
CONDUITS COMPANY, LIMITED,
33 Labatt Ave.,
TORONTO.



PRODUCTS.

- "TRICABLE" (Flexible Steel Armored Conductor).
- "TRISTEEL" (Flexible Steel Conduit).
- "TRIDUCT" (Flexible Non-Metallic Conduit).
- "TRIHOSE" (Flexible Metallic Gas Hose).
- "TRITUBE" (Flexible Metallic Automobile Tubing).
- "TRICORD" (Hard Service Portable Cord).

We have a competent staff who are always pleased to consider and advise on any points that may come up in the use of our products. If the occasion presents itself, we hope you will take advantage of this service.

"TRICABLE."

Flexible Armored Conductor. A well-insulated electric conductor, single or twin, protected by a spirally wound, interlocking steel strip, so designed that it will not open when bent, is extremely flexible, is practically impervious to nails. Its use in buildings of mill construction type gives a high degree of protection, and a neat and thorough mechanical job. For outside extension work, such as electric signs, or any underground work, we manufacture "TRICABLE" Armored Conductors, with a lead sheath over the conductors, and our flexible steel covering over all.

"TRISTEEL."

Flexible Steel Conduit. Is manufactured on the same patented machinery and under the same process as "TRICABLE." We manufacture "TRISTEEL" Flexible Conduit in sizes up to and including 1½ in., and carry a complete stock. For motor installations "TRISTEEL" is particularly adaptable. It allows the finished conduit to be bent around projections on a close angle as small as a 2 in. radius.

"TRIDUCT."

Single Wall, Non-Collapsible, Non-Metallic Flexible Conduit. "TRIDUCT" is of knitted construction consisting of circumferential loops of rib-like form running parallel with the race way, thus insuring easy insertion of a maximum sized wire. The construction of "TRIDUCT" assures you of an undamageable product and is a thorough and complete departure from the usual practices under which Loom has been heretofore manufactured.

All Triangle products are manufactured and labelled under the supervision of the Underwriters' Association.

Where you have use for materials which are manufactured by the Canadian Triangle Conduit Company, Limited, if you will specify our trade name and insist upon your order being filled as specified, you will be assured of

QUALITY, SERVICE AND ECONOMY.



THE ABOVE SHOWS A COIL OF 1½" "TRISTEEL" FLEXIBLE STEEL CONDUIT.

ECONOMY FUSE & MFG. CO. OF CANADA, LIMITED

UNITY BLDG., MONTREAL, CANADA.

MANUFACTURERS OF

ECONOMY RENEWABLE CARTRIDGE AND RENEWABLE PLUG FUSES.

"DROP OUT" RENEWAL LINKS.
NON-RENEWABLE PLUG FUSES.

"ARKLESS" NON-RENEWABLE INDICATING FUSES.
S & C HIGH POTENTIAL FUSES.

COMPLETE STOCKS CARRIED BY ALL LEADING JOBBERS.

ECONOMY FUSES are made in three general types (ferrule, plug and knife blade), with a full line of capacity ranges for all commercial voltages. This was the first line of fuses approved in all capacities by the Underwriters' Laboratories, Inc., established and maintained by the National Board of Fire Underwriters, employing an inexpensive bare link for restoring a blown fuse to its original efficiency.

The fusible elements are of the "Drop Out" Renewal Link type, accurately rated and of definite design. Every part of an Economy Fuse is built on the "safety first" principle, which means that the design is right from an electrical standpoint, and that material entering into the construction of the completed fuse is the best that money can buy.

IMPROVED ECONOMY RENEWABLE FUSE—Study the renewable link feature. See the two narrow bridges of metal holding the "Drop Out" features in place. In operations on short circuits, these two bridges fuse. The entire fuse metal does not volatilize, only the two narrow bridges. This very greatly decreases the danger factor due to the tremendous pressure generated when an entire strip of fusible metal is instantly converted into gases. No powdered filler to deteriorate or solidify. Only the fuse metal is destroyed; the fuse itself is ready for years of service. See the new winged washer which makes it simple and easy for any one to replace the "Drop Out" renewal link in a few minutes.

ECONOMY FUSE SAVINGS—There is 80% of fuse maintenance cost saved yearly, as compared to the cost of securing adequate protection by the use of non-renewable "one-time" fuses.

ECONOMY FUSE USERS—Users include industrial plants, large corporations, light and power companies, arms and munition plants, powder mills, mining and smelting companies, department and large stores, publishing companies, flour mills, food product plants, hotels, theatres, public buildings, steamships, wireless stations, ashore and afloat, and various departments of the United States Government.

WHY ECONOMY APPROVED RENEWABLE FUSES ARE USED—Because Economy Fuses cut yearly fuse costs 80% and furnish proper protection under all conditions of service. Unlike "one-time" fuses, which are discarded after operation, Economy Fuses are used over and over again to obtain complete protection against the fire and accident hazards of overloads, short circuits, and the effects of lightning discharges on electrical circuits.



SECTIONAL VIEW—KNIFE BLADE TYPE.



FERRULE TYPE. FUSE AND "DROP OUT" RENEWAL LINK.

"DROP OUT" RENEWAL LINK—It is the heart of an Economy Fuse. It instantly restores a blown Economy Fuse to its original efficiency at the absolute minimum of cost. A stock of "Drop Out" Links, always on hand, represents a small investment.



PLUG TYPE FUSE.



SECTIONAL VIEW.



"DROP-OUT" RENEWAL LINK.

SAFETY—The use of Economy Fuses in establishments where the fire hazard is great (powder factories, arms and munition plants, chemical works, flour mills, submarines, battleships, etc.) and where "safety first" is the highest consideration (department stores, hospitals, schools, hotels, theatres, institutions, ships, railway cars, etc.) is the proof of their safety in use.

"ARKLESS" NON-RENEWABLE INDICATING FUSES—We are also sole manufacturers of "Arkless," the non-renewable fuse with the "100% guaranteed indicator." For use on circuits not subject to frequent overloads.

SAMPLES—Any capacities sent on request, provided they are to be used for comparison and tests.

Sole manufacturers in Canada of the famous "S & C" High Potential Fuses for use on lines of over 2,500 volts.

S & C HIGH POTENTIAL FUSES—FOR LINES OVER 2,500.



"S & C" EXTRA HIGH POTENTIAL FUSES.

Are rapid and positive in operation.
Clear the circuit and limit the rush of current to a minimum.
Do not endanger nearby apparatus.
Effect a big saving in investment.
Facilitate the location of trouble and blown fuses.

PREST-O-LITE CO. OF CANADA, LIMITED

MANUFACTURERS OF DISSOLVED ACETYLENE.

HEAD OFFICE AND FACTORY:

PREST-O-LITE BUILDING,
TORONTO, ONT.

PLANTS AT

TORONTO, ONT.; MERRITTON, ONT.;
SHAWINIGAN FALLS, P.Q.; ST. BONIFACE, MAN.

BRANCHES AT

MONTREAL, TORONTO, WINNIPEG.

PRODUCTS.

PREST-O-LITE DISSOLVED ACETYLENE for lighting, oxy-acetylene welding and cutting, and all commercial purposes.

APPARATUS and SUPPLIES for welding, cutting, brazing, heating and lighting.

DEEP DRAWN SEAMLESS STEEL SHELLS and CYLINDERS. PRESSED, SPUN and DRAWN STEEL SHAPES.

PREST-O-LITE ELECTRIC STORAGE BATTERIES for every make and model of pleasure car or commercial truck. Also Batteries for Light and Power Plants.

PREST-O-LITE ACETYLENE SERVICE.

As the world's largest makers of dissolved acetylene, with a network of factory branches, charging plants and service stations literally covering the country, PREST-O-LITE COMPANY OF CANADA, LIMITED, insures prompt, universal, perpetual acetylene service for all purposes and in any quantity.

PREST-O-LITE acetylene cylinders are supplied in various sizes shown in table. Each cylinder is fitted with valves and safety plugs and pneumatically tested. Full compliance is made with all regulations.

SIZES, CAPACITIES AND WEIGHTS OF PREST-O-LITE CYLINDERS.

PREST-O-LITE STYLE.	LENGTH, INS.	DIAMETER, INS.	CAPACITY, CU. FT.	AVERAGE WEIGHT, LBS.
MC	13½	4	10	8.9
E	16	6	30	26.8
B	20	6	40	32.4
A	22	7¼	70	44.5
WC	33	8	100	85.
WK	38	12	300	220.

Styles WC and WK, for welding and cutting, are furnished, under special agreement, direct to user through factory branches and service stations. Styles MC, A, B and E may be obtained at PREST-O-LITE exchange agencies, which are located in all principal towns and cities.

ADVANTAGES OF PREST-O-LITE ACETYLENE.

PREST-O-LITE acetylene service furnishes the purest form of dissolved acetylene (ready-made carbide gas) in portable cylinders of convenient size—used as conveniently as cylinders of oxygen. Saves large initial outlay and depreciation. When acetylene is needed there is no delay in generating gas; simply turn on the PREST-O-LITE at the cylinder valve and use it.

ABSOLUTE SAFETY.—A PREST-O-LITE will go through a fire without exploding, because safety plugs in both ends of cylinder will melt, allowing the gas to escape and burn harmlessly at the opening. In winter there is nothing to freeze.

SOME OF THE MANY USES FOR PREST-O-LITE GAS.

LIGHTING SYSTEMS.—For automobiles, motorcycles, motor boats and yachts, trucks, buggies, fire apparatus, tractors, aeroplanes, searchlights, camps, tent meetings, isolated railway stations, country homes, churches, schools, railroad locomotives, railroad signals, buoys, beacons, lightships, contractor's work, etc. Use either style A, B, E or MC PREST-O-LITE gas tanks.

FLARE LIGHTING.—For fire departments, construction work, dredges, railroad wrecks, ice harvesting, lawn parties, military encampments, etc. Use styles WC and WK PREST-O-LITE cylinders.

WELDING AND CUTTING.—For manufacturing metal products of all kinds; for constructing high pressure gas, oil, steam and water pipe lines; for iron and steel constructive and destructive work; for repairing and reclaiming broken or worn metal parts, castings, tools, etc. Use styles WC and WK PREST-O-LITE cylinders.

HEATING PURPOSES.—For soldering, brazing, lead burning, paint burning, Bunsen burners, dental work, jewellers, laboratory work, branding irons, and hundreds of others.

OXY-ACETYLENE WELDING AND CUTTING.

This process is the one distinctly successful method of fusion welding. The oxy-acetylene flame quickly unites two pieces of metal, making them one homogeneous piece. Oxy-acetylene welding largely eliminates the use of rivets, bolts and threaded joints in the construction of thousands of metal products; corrects mistakes in design; remedies defects in castings, and reclaims damaged or worn equipment.

With a special blowpipe, oxy-acetylene cutting can be done along any line—circle, curve, bevel or other line—and leave a sharp, clean cut.

The PREST-O-LITE process of oxy-acetylene welding and cutting is used by thousands of factories, foundries, railroads, mines, iron and steel mills, sheet metal works, repair shops, garages, etc., effecting large savings in time, labour and material.

Expert advice by the PREST-O-LITE engineering department on any oxy-acetylene welding or cutting problem is always a part of PREST-O-LITE service. Valuable suggestions, such as improved methods of handling different welding or cutting operations, are offered to customers. At important centres staffs of skilled men are maintained. These experts are at the disposal of users of PREST-O-LITE acetylene, and are ready at all times to give practical advice and assistance on welding or cutting problems.

PREST-O-LITE WELDING APPARATUS.

This high-grade, portable welding equipment provides the necessary apparatus for handling the widest range of light or heavy welding in manufacturing construction and repair work. Uses PREST-O-LITE dissolved acetylene, in styles WC and WK cylinders; and compressed oxygen, in cylinders.

Welding apparatus consists of an equal pressure blowpipe using 7 interchangeable welding tips for different classes of work, automatic regulators and gauges for acetylene and oxygen cylinders and the necessary sundries.

Light steel truck for carrying acetylene and oxygen cylinders, also special apparatus for metal cutting, furnished at extra cost.

BOOKLETS, BULLETINS, ETC.

Each of the pieces of apparatus has scores of profitable uses, described in special booklets. Write for full details on any contemplated use.

PREST-O-LITE Welding Instruction Book is written in simple language and enables any workman who understands metals to learn welding quickly and easily.

If interested in oxy-acetylene welding and cutting, our series of Special Bulletins showing many applications of this process in various industries will be mailed if you ask. Address, Dept. C-123.



WELDING OUTFIT
ON PORTABLE TRUCK.

THE LANCASHIRE DYNAMO & MOTOR CO.

OF CANADA, LIMITED

45 NIAGARA ST., TORONTO

BRANCH OFFICE: 602 NEW BIRKS BLDG., MONTREAL.

PRODUCTS

ALTERNATING AND DIRECT CURRENT MOTORS AND GENERATORS; LANCASHIRE BALL BEARING INDUCTION MOTORS; TURBO ALTERNATORS AND SYNCHRONOUS MOTORS; MOTOR-GENERATOR SETS AUTOMATIC REVERSIBLE BOOSTERS; LANCASHIRE PATENT ELECTRIC DRIVE FOR PLANERS

LANCASHIRE BALL BEARING" INDUCTION MOTORS.—"Lancashire" Induction Motors, representing the highest standard of British manufacture.

Covering a wide range of outputs, the motors are built to limit gauges in a large number of standard sizes, and absolute reliance may be placed upon the interchangeability of spare parts with the originals.

In their manufacture the fact has not been overlooked that Motors are often installed in inaccessible positions where they must operate for long periods with very little attention, and every possible care is taken in connection with workmanship and the selection of materials to ensure that the motors will withstand the misuse to which they are so often subjected without breakdown.

"Lancashire" Induction Motors are characterised by a rigidity of construction and a careful attention to detail that render them very attractive to those who require serviceable motors

TYPE OF MOTOR (S.C.R. OR W.R.) —THE SQUIRREL CAGE MOTOR has neither slip rings nor brushgear, and there are no rotating parts that require insulation. This type of motor is therefore the simplest electrical machine that can be used, and should always be installed where it is suitable in preference to the more complicated and more expensive wound rotor motor. The WOUND ROTOR motor is, however, necessary for such duties as crane driving, and in some other cases where a certain amount of speed control is required.

Large numbers of "Lancashire" Squirrel Cage Motors have been supplied recently in sizes up to 200 B.H.P.

Our experience in the application of motors to all kinds of machinery enables us to offer valuable service to prospective users.

REPAIRS.

At Toronto we have one of the finest equipped repair shops in the Province, where we can repair, rewind, or rebuild *all* types of electrical apparatus.



STANDARD "LANCASHIRE"
PROTECTED TYPE, SQUIRREL CAGE
ROTOR MOTOR.



STANDARD "LANCASHIRE"
PROTECTED TYPE, WOUND ROTOR MOTOR.



STANDARD STATOR OF "LANCASHIRE"
INDUCTION MOTOR.



STANDARD "LANCASHIRE"
TOTALLY ENCLOSED MOTOR WITH
WOUND ROTOR.



STANDARD "LANCASHIRE"
PIPE VENTILATED OR FORCED DRAUGHT
MOTOR.



STANDARD SQUIRREL CAGE ROTOR OF
"LANCASHIRE" S.C.R. MOTOR.

R. A. LISTER & CO. (CANADA), LIMITED

58-60 STEWART STREET,

TORONTO, ONT.,

BRANCHES—122 ST. ANTOINE ST., MONTREAL WALL ST., WINNIPEG, MAN. EDMONTON, ALTA.

WORKS—DURSLEY, ENGLAND.

LISTER-BRUSTON AUTOMATIC ELECTRIC LIGHTING PLANTS.

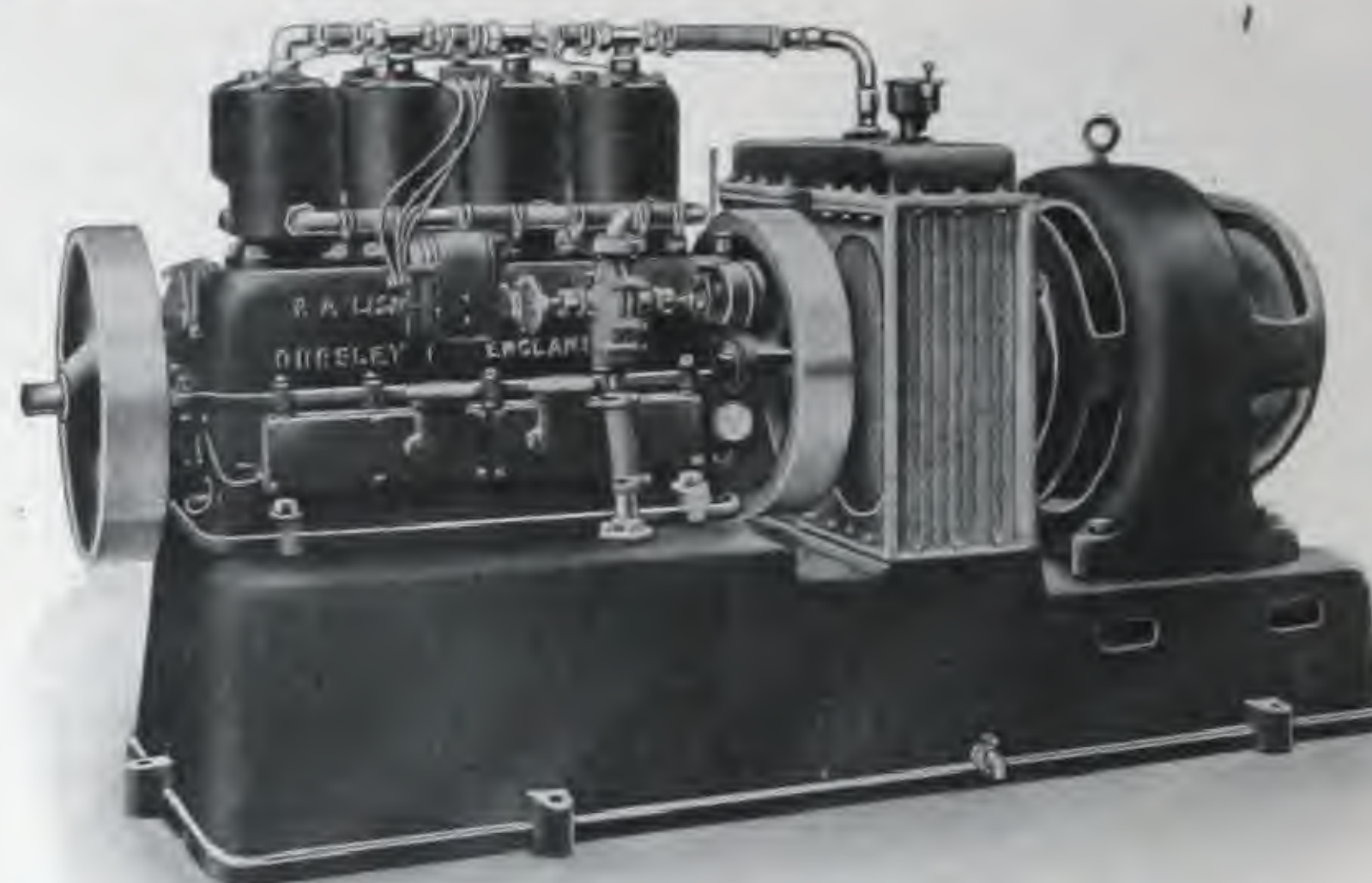
Self-starting; Self-stopping.

PRODUCTS.

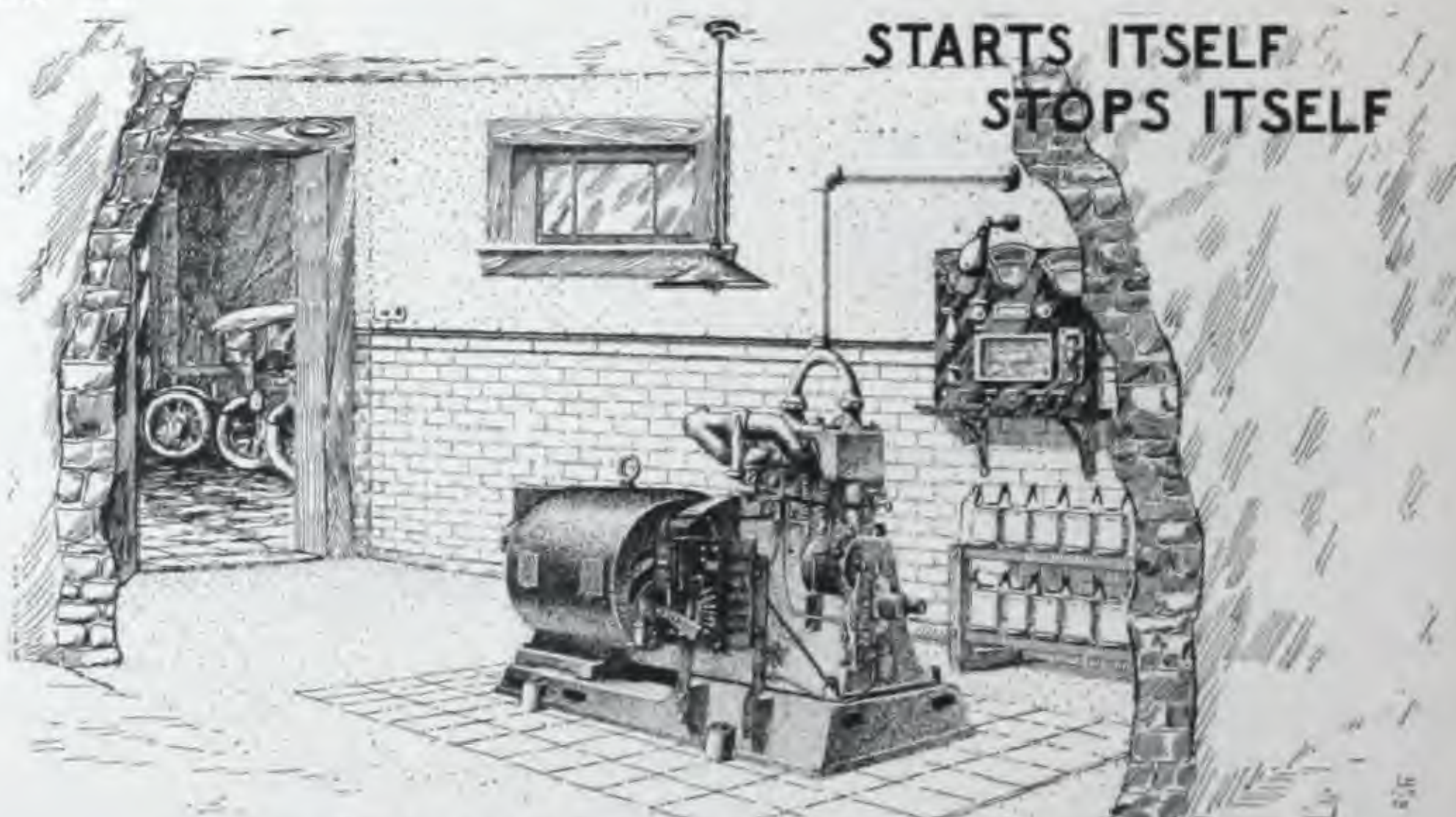
DIRECT-RUNNING AUTOMATIC OR STORAGE BATTERY SETS—Run on Gasoline, Natural or Town Gas. IDEAL POWER AND LIGHT PLANTS for Country Houses, Hotels, Summer Homes, Churches, Moving Picture Theatres and Small Towns.

"LISTER-BRUSTON" AUTOMATIC PLANT.

The "LISTER-BRUSTON" Automatic plant is made in fifteen sizes, direct coupled and belt driven, varying in capacity from 40 to 2,000 lamps. This plant is the simplest, most economical and efficient means of providing electric light. It gives a twenty-four hour service of light. Practically the only attention required is to keep the gasoline and lubricating oil tanks supplied and keep the plant in a reasonably clean condition. If only a few lights are in use the current is supplied by a storage battery, but on more lights being switched on the engine starts automatically and supplies the current direct from the dynamo, thereby insuring that the engine is never running except when necessitated by the number of lights in use. This system has been installed in all parts of the world.



DIRECT-COUPLED PLANT.



THE LISTER-BRUSTON PLANT INSTALLED IN THE BASEMENT

LISTER GASOLINE ENGINE.

This engine is a high-grade English-built product. It is fitted with throttle governor; pump-fed lubrication; high-tension magneto ignition. Cylinders and pistons accurately ground. No exposed gearing. Interchangeable bearings.

It is particularly adapted for Engineers and Contractors.

USERS.

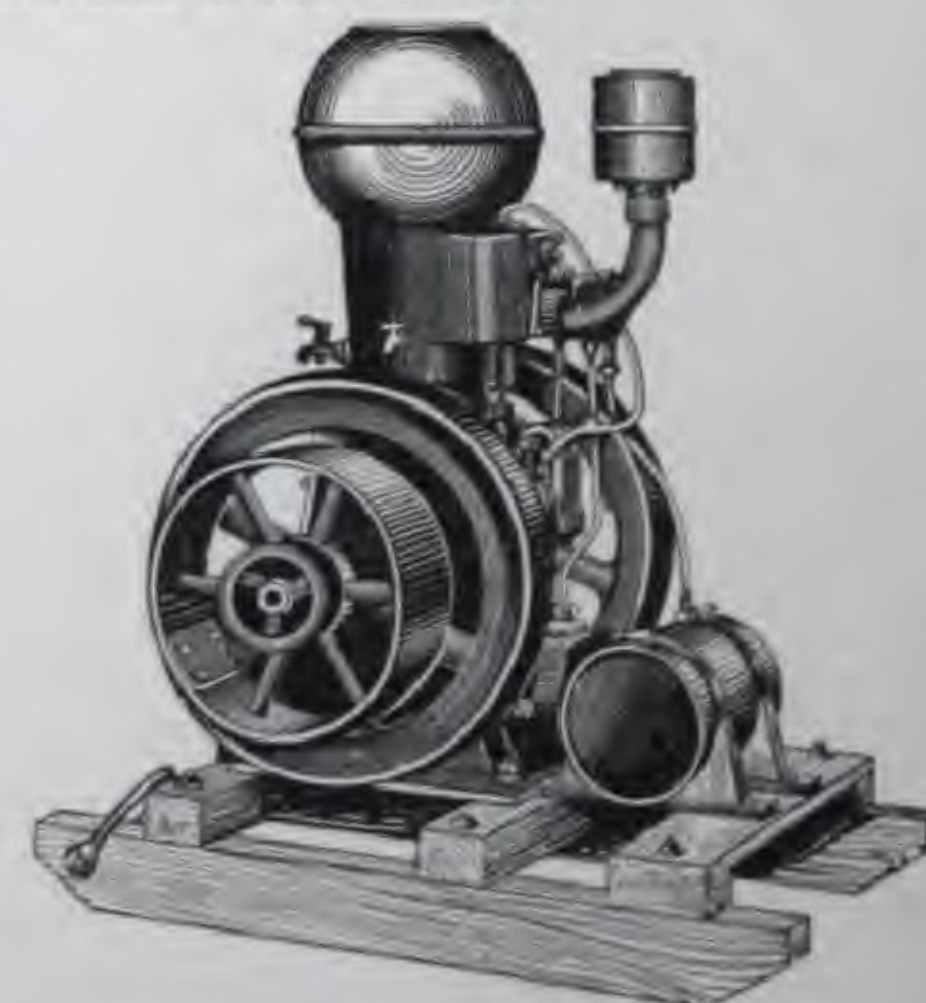
Canadian Government.

Various Provincial Governments.

British Admiralty.

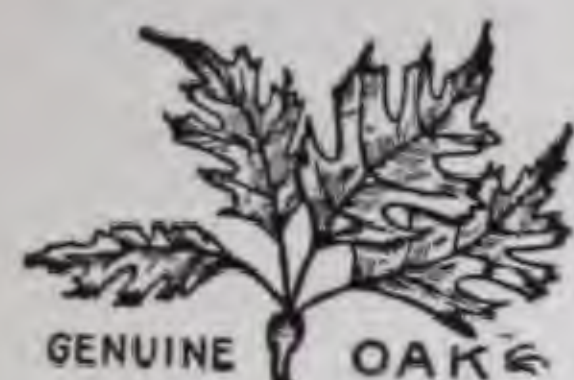
British War Office.

Also many well-known people throughout Canada.



BRITISH-BUILT.
SOLD ALL OVER THE WORLD.

D. K. McLAREN, LIMITED
 MANUFACTURERS "GENUINE OAK" LEATHER BELTING.



HEAD OFFICE AND FACTORY:

351 ST. JAMES ST., MONTREAL.

BRANCHES: ST. JOHN, N.B.; TORONTO, ONT.; VANCOUVER, B.C.



MADE IN CANADA



FROM BRITISH STOCK

**LEATHER
 BELTING.**

OUR CLAIMS are more solid leather to the foot than any other belt made. Because—The most vigorous system of inspection and classification of hides and leather has been our reputation for years. No Shoulders, Necks or Bellies to use, all hides being Close Trimmed. Special Belts for Special Conditions. Extra C quality stocked at all our Branches. Waterproof Belts made to order.



In placing this Brand of Belting before the public we do so with full confidence, it being manufactured solely for us by a firm with a well known reputation, backed by our own trade mark every 10 feet.

**STEEL SPLIT
 PULLEYS.**

In presenting the above make we do so as sole agents. The Hub is strong and substantial, cast iron, easily bored true, tightened by four hub bolts. The rim is formed from one solid sheet of steel double thickness without rivets on face.



STEEL SPLIT PULLEY.

**WOOD SPLIT
 PULLEYS.**

In submitting the D. K. pulley we have no hesitancy in proclaiming it the best on the market, built in sections nailed and glued. The spokes are white oak, built into the rim, the width of the arm being in proportion to the width of face.



WOOD SPLIT PULLEY.

**BELTING
 ACCESSORIES.**

We carry the Largest Assortment of any firm in the Dominion, viz.:—Alligator Lacing, Bristol, Clipper, Crescent, Blake Studs, Jewell, Jackson, Talcott, Smith, Wire, Raw Hide, Chrome, Oil Tanned Lacing, cut or in sides.

SUPPLIES:

COTTON MILL:
 Card Clothing.
 Card Combs.
 Card Hammers.

WOOLEN MILL:
 Wire Goods of all descriptions.
 Pickers, Heddles.
 Picker Sticks.

CATALOGUE AND PRICES FURNISHED ON APPLICATION.

MATHEWS GRAVITY CARRIER COMPANY, LIMITED

OFFICE AND FACTORY:
PORT HOPE, ONT.

SALES OFFICES: MONTREAL. HALIFAX. TORONTO. VANCOUVER.

MANUFACTURERS OF

PRODUCTS.

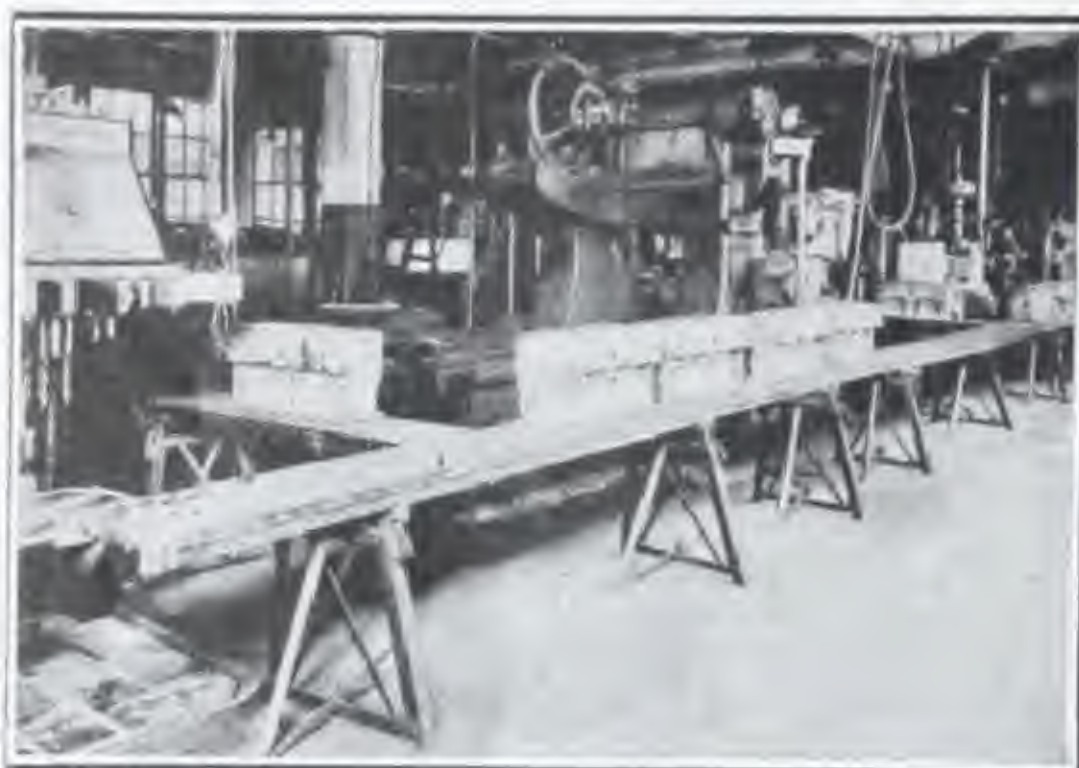
GRAVITY CARRIERS.
AUTOMATIC ELEVATORS.
POWER PALLET CONVEYORS.
LIGHT BELT CONVEYORS.

ROLLER SPIRALS.
SHEET METAL SPIRALS.
SPIRAL FIRE ESCAPES.
STRAIGHT CHUTES.

We are the original manufacturers of GRAVITY CONVEYORS and are specialists in this kind of equipment. Sixteen years of experience enables us to give to all our prospective customers, good sound advice on conveying problems.

ILLUS-
TRATIONS.

All illustrations below are taken from actual installations.



GRAVITY CONVEYOR HANDLING HEAVY CASTINGS.



GRAVITY ROLLER SPIRAL



GRAVITY BRICK CONVEYOR.



AUTOMATIC INCLINE ELEVATOR.



GRAVITY WHEEL CONVEYOR.



GRAVITY CONVEYOR HANDLING CEMENT.



GRAVITY SPIRAL CHUTE



GRAVITY CARRIER AND CHUTES.

THE LOUDEN MACHINERY COMPANY

OF CANADA, LIMITED.

ESTABLISHED 1867.

OVERHEAD CARRYING SYSTEMS

FOR

FACTORIES, GARAGES, FOUNDRIES, MACHINE SHOPS, WAREHOUSES.

THE LOUDEN SYSTEM

HAS A WIDE RANGE OF USAGE.

BRANCHES AT:

VANCOUVER, B.C.

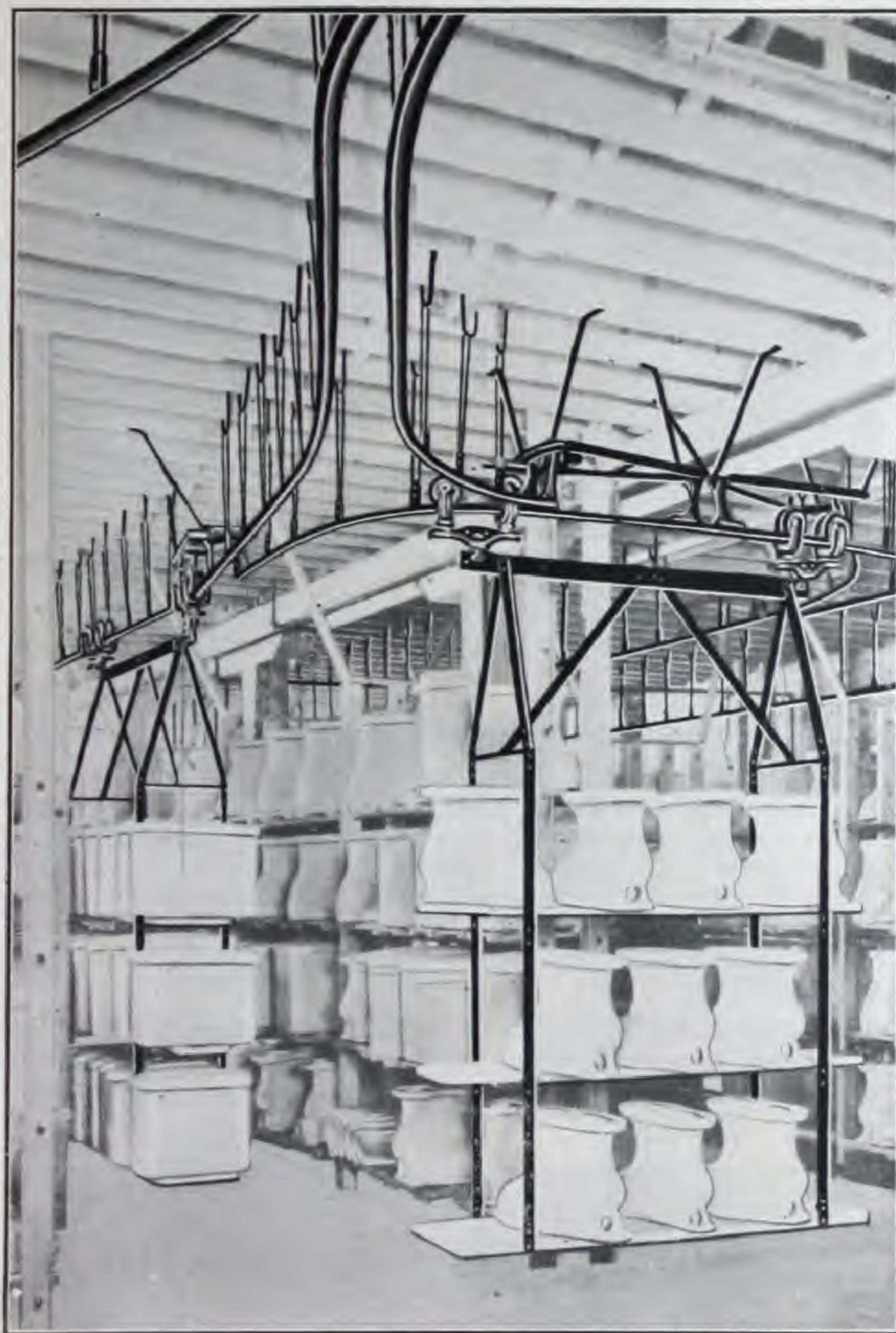
WINNIPEG, MAN.

QUEBEC, QUE.

ST. JOHN, N.B.

HEAD OFFICE AND
FACTORY:

GUELPH, ONT.



LOUDEN SYSTEM. One of the greatest industrial problems of to-day is to reduce the cost of production in order to be able to sell the products of the factory at lower prices.

One way to reduce production costs is by speeding up production. Louden Overhead Carrying Systems speed up production in several ways.

They prevent congestion of aisles and delays in transporting material and parts as is the case when trucks are used.

They handle a stream of material and goods of various sizes, from one pound to a ton, and do it with clock-like regularity.

The material and parts proceed from operation to operation, from floor to floor, from building to building, saving loading and unloading of trucks and costly re-handling of material.

Only one-third the number of men are required to handle the speedy Louden System as are necessary with trucks.

Do not confuse the Louden System with the heavy I-Beam Equipments which have their place where very heavy loads have to be carried.

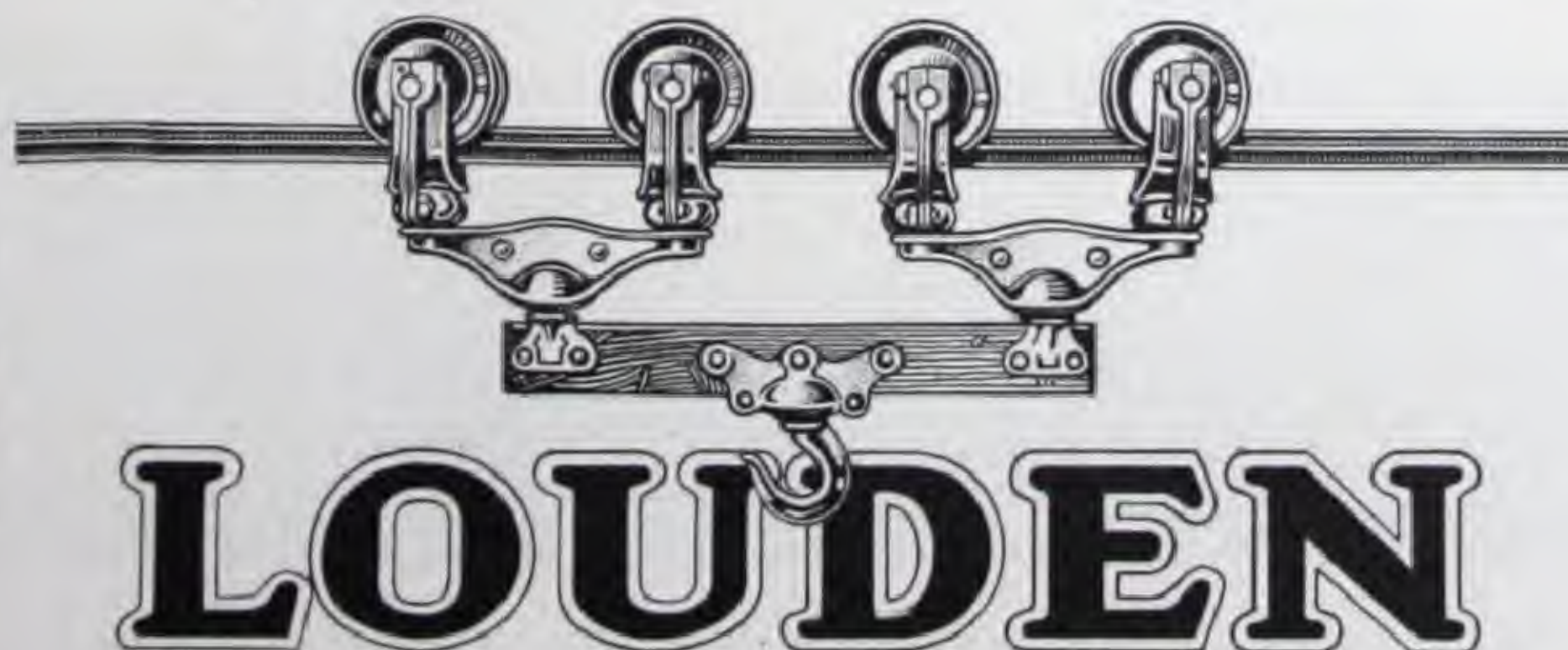
The Louden Overhead Carrying System is lighter, speedier, more adaptable and more economical. *No steam or electrical power* is required to move the Louden Carriers.

The tracks, switches, etc., are built on the ceiling, but the materials are generally carried breast high where they are most easily and quickly handled.

A complete catalog describing Louden Overhead Carrying Systems in detail and showing illustrations of various installations will be mailed upon request.

A practical, competent Engineering Staff will be glad to consult with manufacturers or others interested in reducing cost of production by means of speeding up transportation.

Articles such as the above can be transported between the different operations with the greatest ease, speed and economy. They can be much more quickly inspected, checked or stamped, and the danger of breakage is minimized.



Louden Patented Overhead double headed Steel Track is doubly reinforced and strongest built. No holes weaken it, it being spliced by clamps and hung by clamps.

ROBINS CONVEYING BELT CO.

MANUFACTURERS OF ROBINS CONVEYING MACHINERY.

PARK ROW BUILDING, NEW YORK, U.S.A.

CHICAGO, ILL.: OLD COLONY BLDG.
BOSTON, MASS. 70 KILBY, ST.
PITTSBURGH, PA.: UNION ARCADE BLDG.

TORONTO, ONT.: GUTTA PERCHA & RUBBER, LTD.
SAN FRANCISCO, CAL.: THE GRIFFIN CO.
BIRMINGHAM, ALA.: C. B. DAVIS ENG. CO.



General view of the plant of the Abitibi Power and Paper Co., Iroquois Falls, Ontario, where Robins Conveying Machinery is used to handle wood chips and waste.



Loading dock at the limestone quarry of the Dominion Iron & Steel Company, Port au Port, Newfoundland, where Robins Conveying Machinery is used to put limestone into and carry it away from storage, and finally load it into ships.

CONVEYING MACHINERY.

The Robins Conveying Belt Company is prepared to design and install conveying machinery to meet any requirement. The machinery includes belt conveyors, bucket elevators, unloading towers, stocking and reclaiming bridges, coal storage and reclaiming systems, coke cooling wharfs, ore bedding and reclaiming systems, standard and adjustable coal or coke crushers, and the auxiliary equipment such as chutes, feeders, screens of various types, etc.

Robins machinery is handling coal, coke, ashes, ore, limestone, clinker, cement in bulk and in bags, wet concrete, sand, crushed stone, dirt, gypsum, phosphate rock, salt, grain, wood chips and pulp, rubbish, packages of all kinds and many other materials.

Robins machinery parts are fitted for compression grease cup lubrication to protect the bearings from dust and corrosion. Consequently, troubles resulting from these causes are practically eliminated under the most severe operating conditions.

CONVEYOR BELTS.

Robins Conveyor Belts are made in a number of different grades, both of the stepped-ply and straight-ply construction, each grade being designed to give the most economical service under certain operating conditions. If it is believed that none of the standard brands of belt will give satisfactory service because of unusual conditions, a special grade of belt will be designed for the work.

Robins stepped-ply belts have thicker rubber cover in the centre than at the edges, thus giving more protection where the abrasion is greatest. A belt of this construction is flexible laterally, allowing it to conform to the shape of the troughing idlers, and causing it to run true even when empty.

CATALOG.

The Robins "Handbook of Conveyor Practice" will prove of value to engineers who are planning for or designing conveyor installations. It contains a group of useful tables concerning capacities, power requirements, speeds of conveyors and similar matter; dimensions of conveyor parts, together with general data on conveyor practice. We will be glad to send a copy on request.



General view of the plant of the Providence Gas Company, Providence, Rhode Island, built by the Koppers Company. The coal and coke handling machinery as well as the screening equipment was designed and built by the Robins Conveying Belt Company.

CANADIAN SKF COMPANY, LIMITED

83 KING ST., TORONTO.

412 ST. JAMES ST., MONTREAL.

PRODUCTS.

SKF

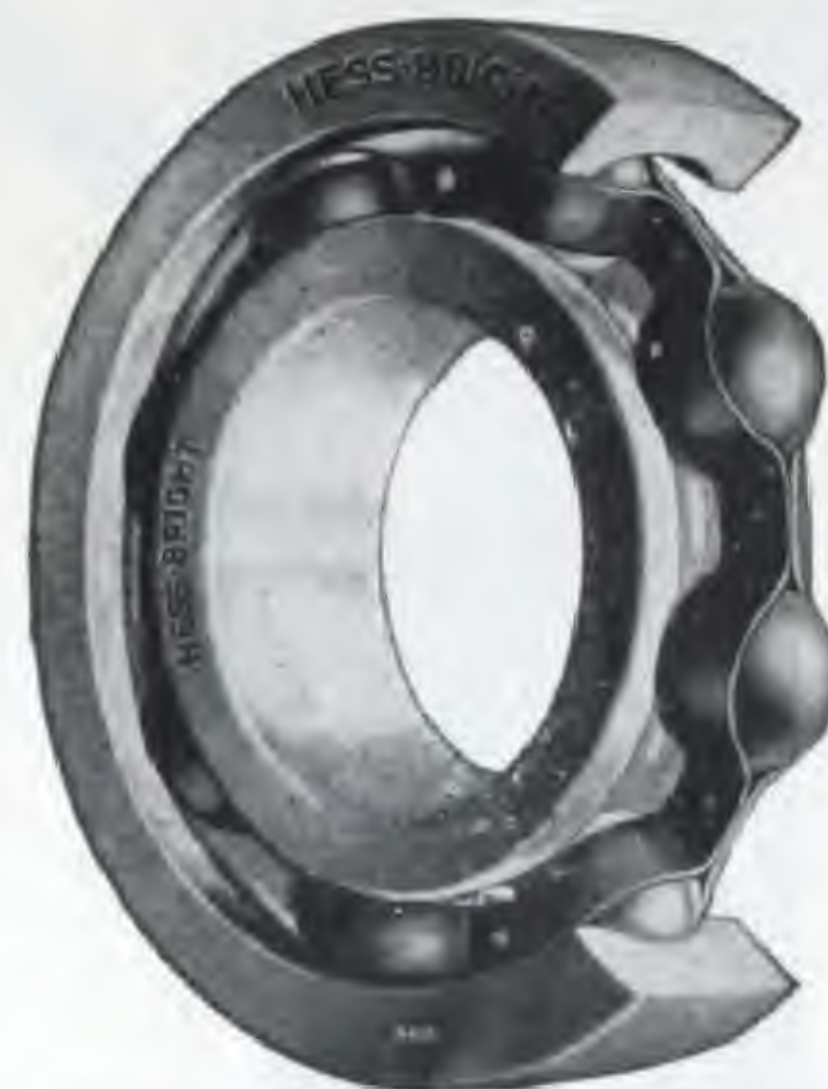
SINGLE ROW DEEP GROOVE BALL BEARINGS, DOUBLE ROW SELF-ALIGNING BALL BEARINGS, THRUST BALL BEARINGS, STEEL BALLS, STEEL SPLIT PULLEYS, CAST IRON BALL BEARING PULLEYS, TRANSMISSION EQUIPMENT.



RIGID TYPE SINGLE ROW BEARING.



DOUBLE ROW SELF-ALIGNING BEARING.



SHOWING CONSTRUCTION OF RIGID BEARING.



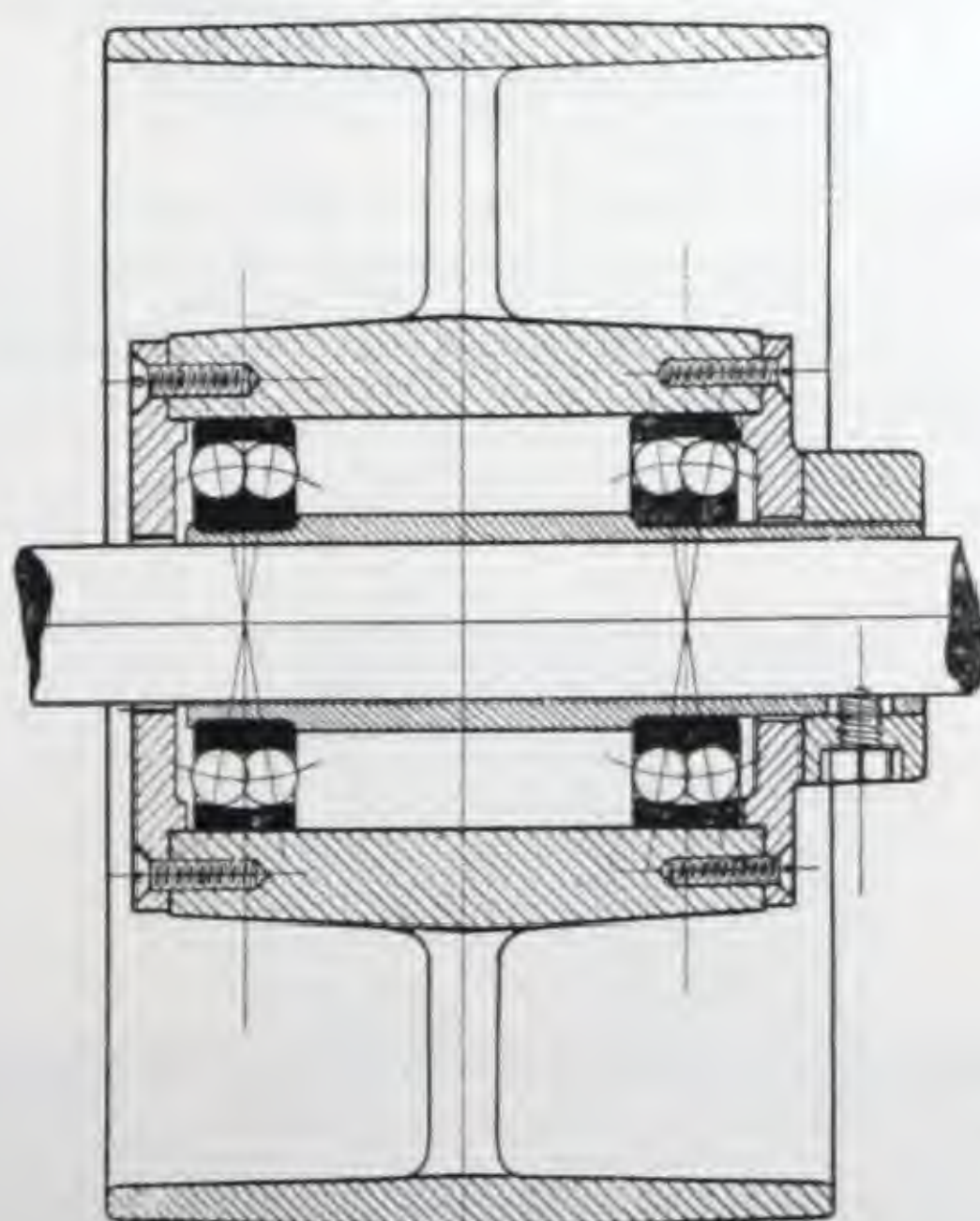
CASING AND BEARING MOUNTED ON SHAFT.



SOLID RIGID PILLOW BLOCK.



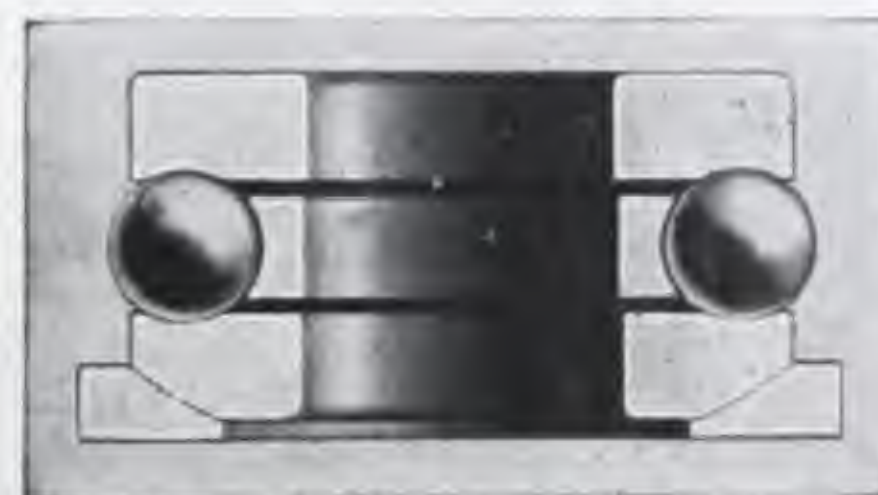
CHROME ALLOY HARDENED STEEL BALLS.



BALL BEARING LOOSE PULLEY.



BALL BEARING DROP HANGER.



SINGLE THRUST BEARING, SHOWING SELF-ALIGNING SEAT AND WASHER.

SKF
SERVICE

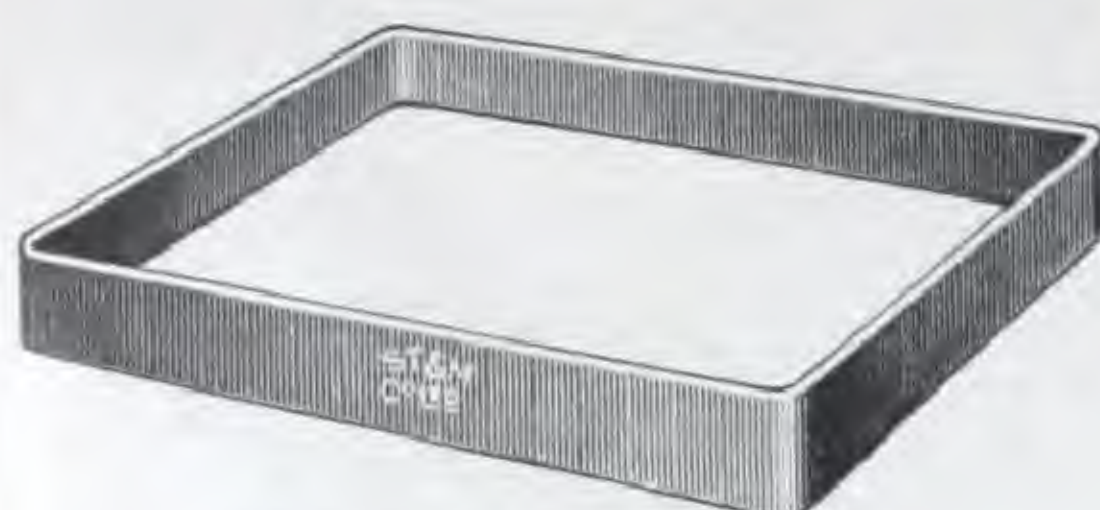
Is a part of every transaction we make. In its breadth of scope and its wealth of practical experience, **SKF** Service can render invaluable assistance when transmission problems arise in your plant.

THE STEEL TROUGH & MACHINE CO., LIMITED

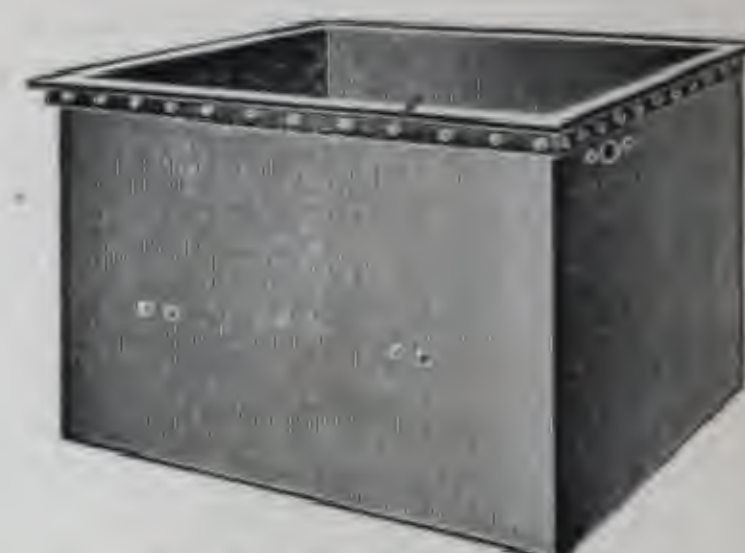
TWEED, ONT., CANADA.



WELDED COPPER STEEL SMOKE STACKS.



SNAP FLASK BANDS.

Sq. $\frac{1}{4}$ " PLATE TANK.

STEEL FACTORY EQUIPMENT

We manufacture practically anything in the way of steel factory equipment in our modern up-to-date plant at Tweed. We are now making many special lines of goods for manufacturers who formerly imported them.

Let us know your requirements; send blue print or rough drawing, if necessary, and get our prices.

Steel Tanks of any size, round, square, oblong, light or heavy plate, Smoke Stacks, Shop Boxes, Tool Boxes, Shop Barrels, Shelf Boxes, Elevator Buckets, Rubbage Cans, Oil Storage Equipment, etc.

Only the finest material used in all our products. If it's anything in Steel, we can offer you unsurpassed workmanship at attractive prices.

RD. $\frac{1}{4}$ " PLATE TANK.

STEEL SHIPPING BARREL.



AIR PRESSURE TANK.



STEEL SHOP BOXES.



STEEL SHOP STOOL.



STEEL STORAGE TANKS.



OIL WASTE CANS.



McFARLANE-DOUGLAS CO., LIMITED

MANUFACTURERS OF
SHEET METAL BUILDING MATERIALS,
SLATER STREET, OTTAWA, CAN.
MONTREAL OFFICE: 34A DORCHESTER WEST.

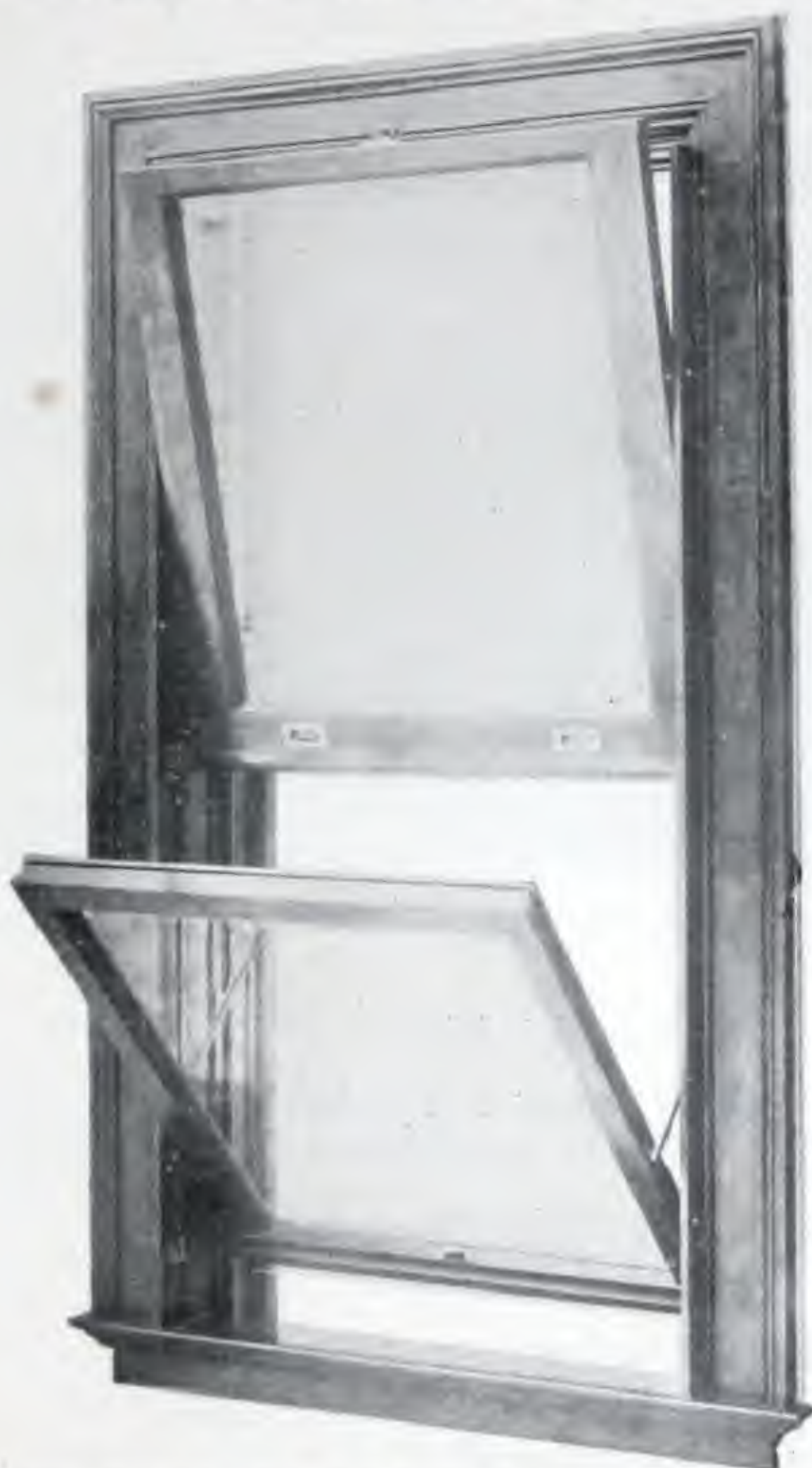
TORONTO AGENT:
JOHN LINDSAY,
43 VICTORIA STREET.

PRODUCTS.

ALL-STEEL DOORS AND INTERIOR TRIM, KALAMEIN DOORS, WINDOWS AND TRIM, FACILE WINDOWS, SOLAR WINDOWS, TIN-CLAD FIRE DOORS, FIREPROOF WINDOWS, SKYLIGHTS, VENTILATORS, COPPER CORNICES, GALVANIZED IRON CORNICES, ZINC ORNAMENTS, PLASTER BEAD, "CROWN" METAL SHINGLES, "CROWN" METAL SIDINGS, "CROWN" METAL CEILINGS, CORRUGATED IRON, EAVE TROUGH, CONDUCTOR PIPE, ELBOWS, Etc.



KALAMEIN DOORS AND TRIM made to Architect's detail and finished as desired.



THE FACILE DOUBLE-HUNG PIVOTED WINDOW shown above is, without doubt, the highest achievement in Window construction, and is absolutely tight. Installed in new Sun Life Building, Montreal; The Imperial Bank Building, Toronto, and in the new Parliament Buildings, Ottawa.



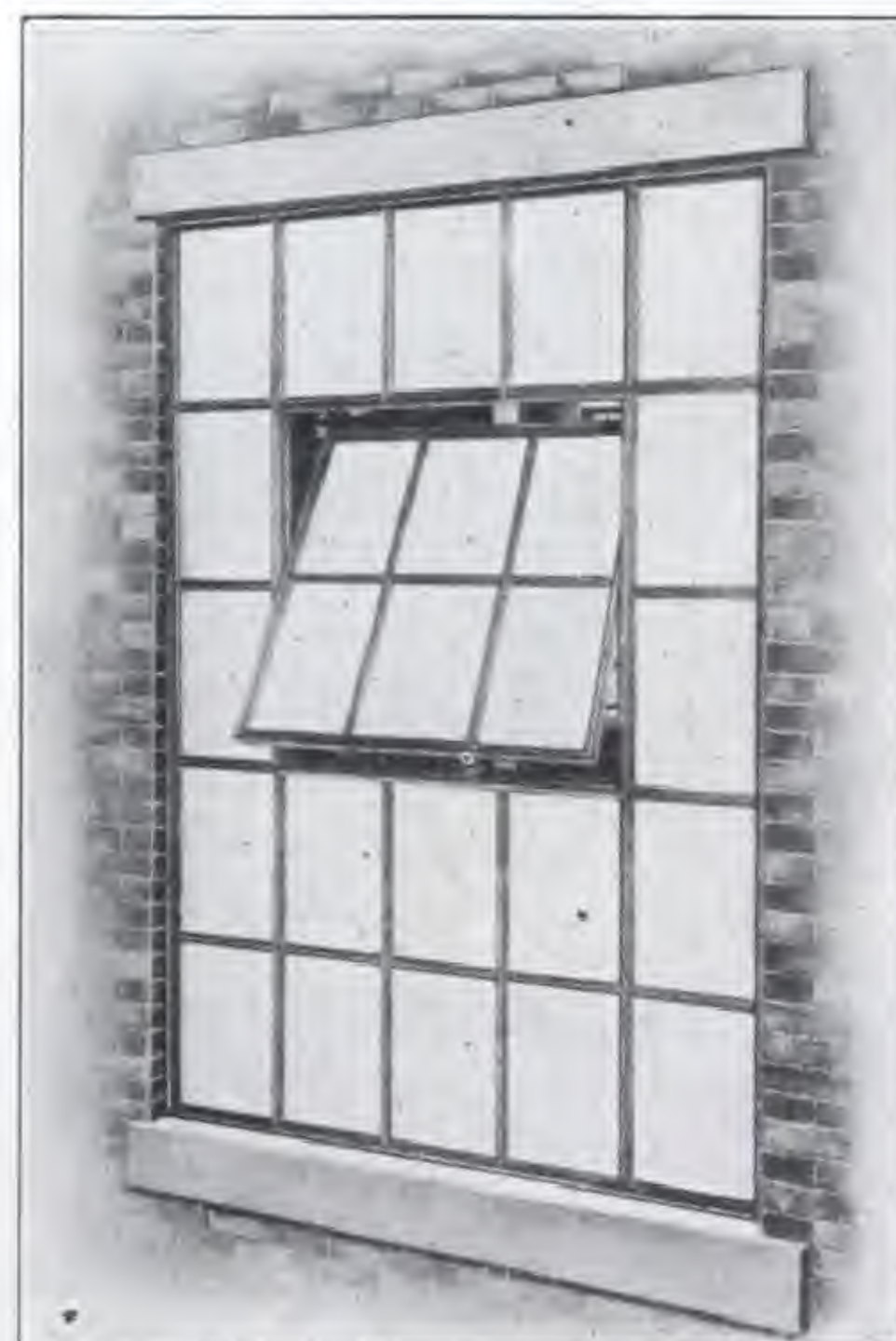
"CROWN" ALL-STEEL DOORS AND TRIM finished to Architect's selection.



"CROWN" HOLLOW METAL FIRE-PROOF WINDOWS are made in different types. They are absolutely weather-proof, non-rattling, and furnish a substantial double-hung window where a box frame fireproof window is required.



"CROWN" TIN-CLAD FIRE DOORS are made in all styles, and carry the Fire Underwriters' Label.



"CROWN" SOLAR WINDOW is the latest Hollow Steel Sash Window approved by the Fire Underwriters' Association. They are an economical installation in buildings such as factories where Fire Protection, Daylight Saving and Ventilation are essential.

THE URGENCY OF FIRE PREVENTION AND CONTROL has never been given the consideration of our leading architects and builders as during the present crisis. Exposure conditions are of great moment. Industrial plants, especially those utilized for the manufacture of essentials, should be protected from adjoining buildings and rendered immune from a neighbouring fire. The exterior should be fireproof, having metal windows with wire glass, and a roof constructed of fireproof materials.

The above illustrations will show you that we make Fireproof Doors and Windows for every contingency.

May we quote on your requirements?



TRUSSED CONCRETE STEEL COMPANY

OF CANADA, LIMITED

WALKERVILLE, ONTARIO

MONTREAL

TORONTO

WINNIPEG

CALGARY

VANCOUVER

TORONTO

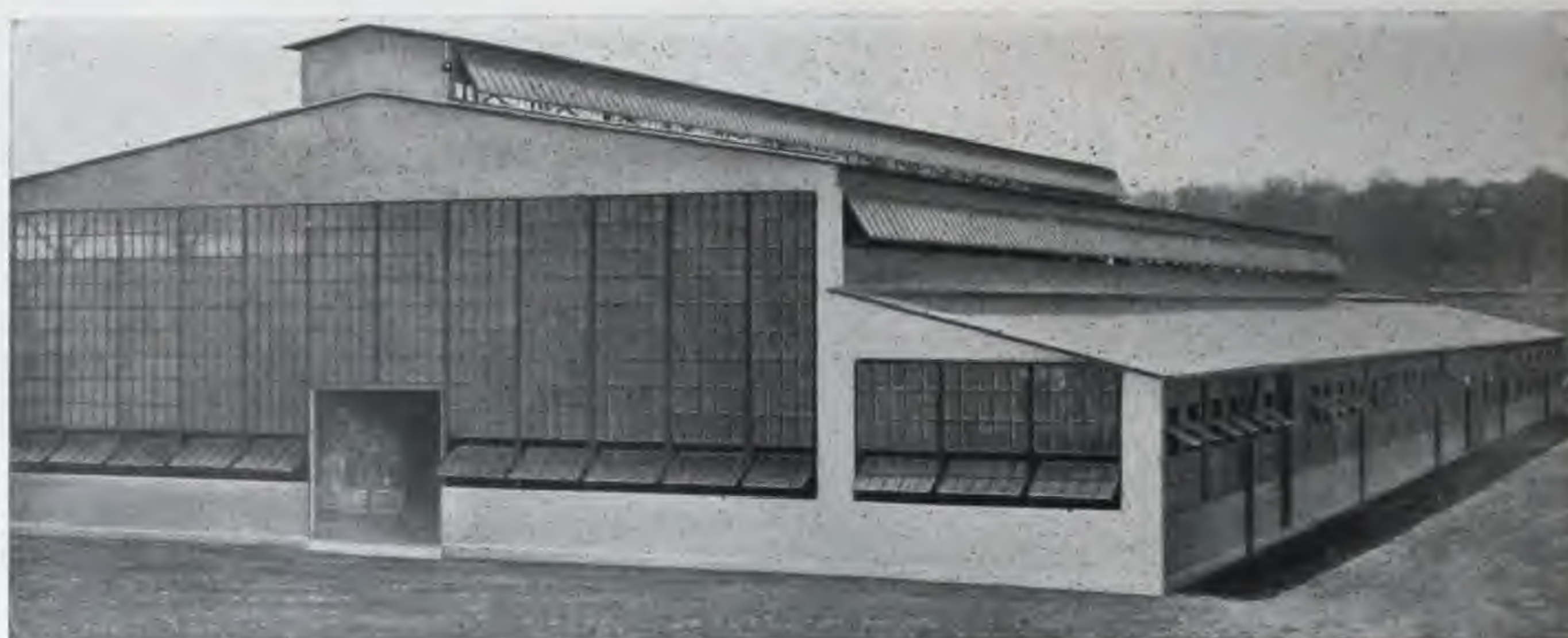
WAREHOUSES AT

WINNIPEG

CALGARY



Truscon BUILDING PRODUCTS For modern permanent construction cover Reinforced Concrete in all its phases; Steel Window Sash of every type; Metal Lath for Plaster and Stucco; Concrete Highway Reinforcement; Waterproofings, etc.



TYPICAL INSTALLATION OF TRUSCON STEEL SASH, USING BOTH SIDE WALL AND MONITOR SASH.

Truscon DAYLIGHT SASH.

TRUSCON DAYLIGHT SASH for Factories, Power Houses, Warehouses, etc.

Truscon Daylight Sash fulfils the modern requirements of all buildings where maximum daylight, proper ventilation and permanency are desired.

This product is made up of specially rolled sections of the best grade of mild steel.

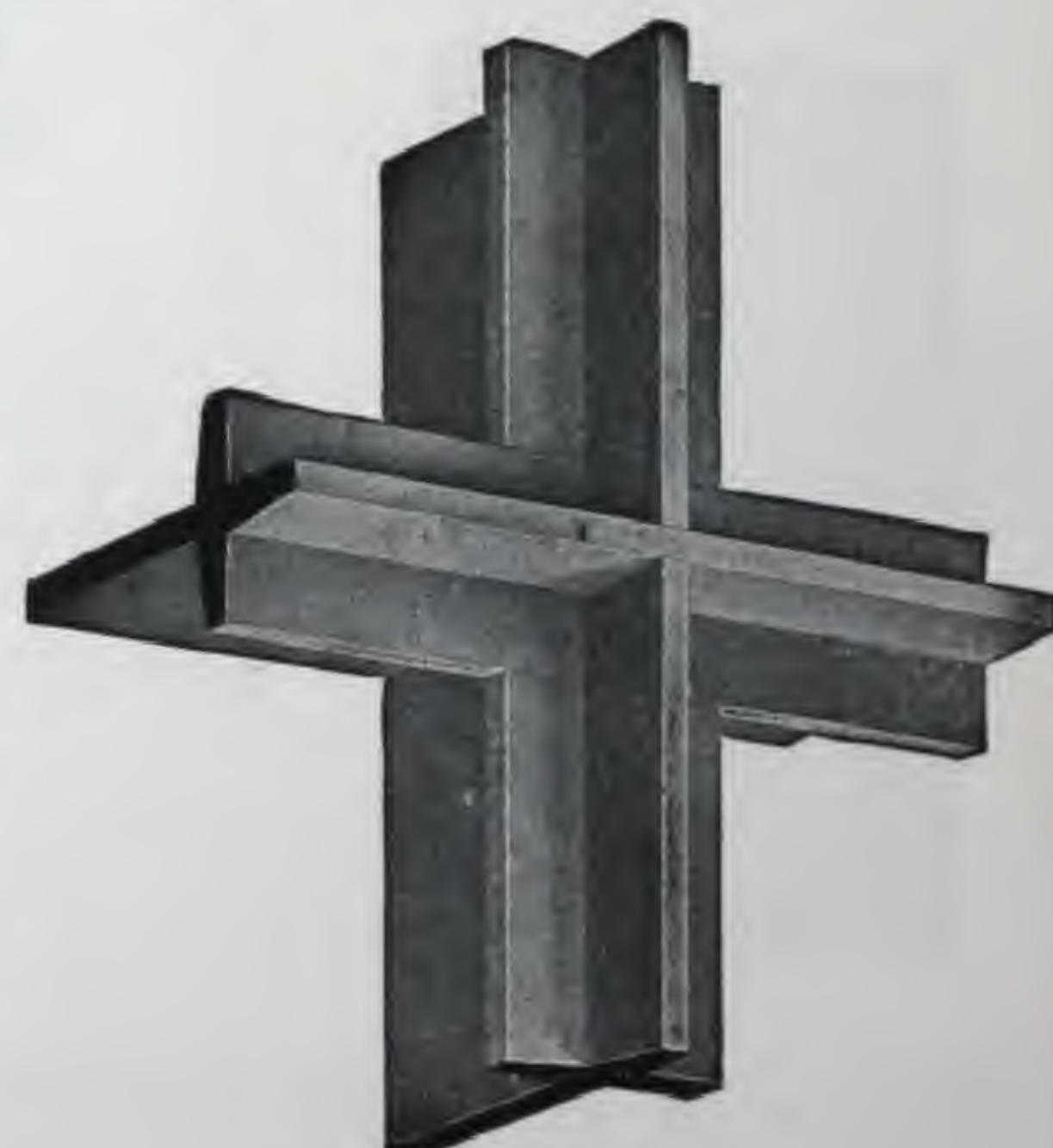
The joints are so constructed that maximum strength is secured throughout the sash, and weather-proofness is assured.

Ventilation of any required type and area can readily be provided. All ventilators are of Two Point Contact, are hinged on Truscon Patent Hinges—which cannot be put out of order.

Spring glazing clips are provided for all Truscon Daylight Sash. The clips are forwarded with other fittings, and adapt themselves to all thicknesses of glass. All types of glass can be used in Truscon Daylight Sash.

Proper glazing can only be secured through the use of a special putty which hardens within itself. The ordinary wood sash putty, which relies on absorption of the oil by the wood muntins, is not satisfactory for glazing steel sash. We recommend the use of Truscon Self-hardening Metal Sash Putty in glazing all steel sash.

Truscon PUTTY.



TRUSCON SASH JOINT.

We also manufacture Steel Sash Partitions, Sliding and Swinging Doors.

See also our advertisements on Reinforced Concrete, Etc., pages 18-19.

ROBERTON-OLSEN, LIMITED

CHERRY STREET,
TORONTO, ONTARIO.

TELEPHONE - ADELAIDE 4093.

PRODUCTS.

KALAMEIN DOORS in Bronze, Copper and Steel; KALAMEIN WINDOWS, double hung, pivoted, hinged, stationary and case-ment types, in Bronze, Copper and Steel.

UNDERWRITERS' STANDARD METAL COVERED FIRE DOORS, panelled and tin clad.

ROBSEN
ALL-STEEL
TOILET
COMPART-
MENT
PARTITIONS.

A combination of design and material which makes it the ultimate in lavatory equipment.

Embodies many exclusive features which place it far in advance of anything yet designed.

All unnecessary joints, projections, etc., eliminated—a big sanitary feature.

Adjustable to varying wall or floor conditions, absolutely simple and quickly erected.

Architects all over Canada are specifying this equipment.

FACILITIES.

Our Factory being of very recent construction is equipped with the most modern machinery necessary for the production of our line of work. Each department is under the supervision of men who are specialists in their particular line of work.

METAL
WEATHER-
STRIP.

We also manufacture the Robertson Patent Lock Metal Weatherstrip. This weatherstrip is made of best quality zinc and will not crack or rust. It is proof against dust, noise and draught; prevents rattling of sash; saves 20% fuel consumption and has many other advantages. We will be glad to quote Architects and others interested.

INSTALLA-
TIONS.THE FOLLOWING ARE SOME OF OUR RECENT
CONTRACTS:

Childs Building, Toronto, Ont.
Saint Clare Separate School, Windsor, Ont.
King Edward Hotel, Toronto, Ont.
Jackson Building, Ottawa, Ont.
Berliner Gram-o-phone Building, Montreal, Que.
Canadian General Electric Building, Toronto, Ont.
Dominion Bank Building, Queen & Bay Sts., Toronto, Ont.
Canadian Bank of Commerce Building, St. John's, Nfld.
Victoria Hospital, Halifax, N.S.
Loew's North Toronto Theatre, Toronto, Ont.
Pantages Theatre, Toronto, Ont.
Allen's Parkdale Theatre, Toronto, Ont.
Loew's Theatre, Windsor, Ont.
Allen's Theatre, Windsor, Ont.
Navy League Building, Halifax, N.S.
Timmins General Hospital, Timmins, Ont.



ROBSEN ALL-STEEL TOILET COMPARTMENT PARTITIONS



TYPICAL KALAMEIN DOOR



TYPICAL TIN-CLAD FIRE DOOR.

CANADIAN METAL WINDOW AND STEEL PRODUCTS, LIMITED

OFFICE AND FACTORY: 160 RIVER STREET, TORONTO.

MONTREAL OFFICE: 169 PEEL STREET.

AGENCIES: R. R. POWER, Metropole Building, Halifax, N.S.; R. N. M. ROBERTSSON, P.O. Box 1053, St. John, N.B.; W. J. BANKS, St. John Street, Quebec, P.Q.; R. Y. KILVERT & Co., 402 Builders Exchange, Winnipeg, Man.; A. L. CHARLEBOIS, Ave. J and 20th Street, Saskatoon, Sask.; GORMAN, CLANCEY & GRINDLEY, Edmonton, Alta.; Calgary, Alta.; Vancouver, B.C.

FIVE ESSENTIALS OF STEEL SASH CONSTRUCTION.

The experience of successful architects and engineers proves that there are five main essentials of steel sash:

1. Sufficient strength at the joint.
2. Strongly attached and well weathered butts.
3. Weathering constructed to effectively resist storms.
4. Fittings that stay on and provide ready and efficient operation.
5. Strong mullions—weather resisting and easy to erect.

How well FENESTRA measures up to each of these requirements is shown below:

THIRTY PER CENT. MORE STRENGTH AT THE JOINT.

The FENESTRA Joint is a patented interlocking of vertical and horizontal bars which permits them to run continuously from head to sill and from jamb to jamb. This interlocking method retains 30% more steel than any other method of joining and gives the sash maximum strength against wind pressure and wind suction.

The machine-cut bars fit together with an absolutely tight and weather-proof union which makes welding unnecessary and reduces to a minimum the opportunity for corrosion.

The graceful outward curve of the vertical nuntin at the inter-locking point increases the beauty of the sash and provides a guard which guides water away from the joint.

RIGIDLY ATTACHED, WEATHER-PROOF BUTTS:

All ventilators are horizontally pivoted 2" above centre, by means of two external, adjustable, solid steel butts.

Each section of the butt has a projecting "ear" which extends beyond the plane of the sash. Through these "ears" the butt bolt is passed, giving a pivot that is external and therefore easily accessible.

A slot in the projecting "ear" of the butt member attached to the sash permits easy adjustment up or down and the ventilator can be lifted from the sash entirely by merely removing the butt bolts.

The construction of the butt members is such that an aperture is left, through which condensation at the upper part of the ventilator follows the weathering down to the sill and escapes outward through the weep holes.

FENESTRA engineers, by designing a butt with a projecting ear, made possible two improvements:

1st—The new design permitted the riveting of each butt member through both weathering and sash bar, thus insuring a sturdy and durable attachment.

2nd—It permitted the use of springy steel channel weathering, which insures tight contact of the ventilator against the sash.

EFFECTIVE VENTILATOR WEATHERING.

In designing steel members that form a contact where no friction occurs, engineers consider straight edges and flat surfaces as the most effective method of weathering.

FENESTRA ventilators are built in strict accordance with this well recognized principle, the various FENESTRA bars used at the head, jambs and sill being so assembled, that as the ventilator closes, two flat surfaces on the ventilator come into actual and positive contact with two flat surfaces on the sash.

This gives two point, flat contact weathering all around the ventilator.

At the butt the weathering members are so constructed that the upper portion completely overlaps the lower portion when the ventilator is closed.

DURABLE AND EASILY OPERATED HARDWARE.

THE FENESTRA CAM LATCH.

THE Z BAR BRACKET.

STRONG, EASILY ERECTED MULLIONS.

Engineers and architects have demanded a self-operating and fool-proof method of locking ventilators in place. This demand has been supplied in the FENESTRA cam latch (Part 467), which is of pleasing design, strong and substantial, and is attached to a solid rolled Z bar bracket which is securely riveted to the bottom rail of the ventilator.

In closing the ventilator—the cam latch rides up over the weathering and falls inside, locking the window.

FENESTRA operating hardware is attached to the ventilator by the Z bar bracket. This is a solid steel section rolled with a fillet in each corner which gives it double thickness at this point and, therefore, greater strength than can be obtained in any other way. The bracket is securely attached to the bottom section of the ventilator by means of three rivets and cannot work loose.

Two or more units of FENESTRA sash may be combined in the same opening by joining them with our T. bar mullion as shown below. Absolute weather resistance is assured because of the wide, flat contact between the mullion and the sash—a lap of 1". Strength is provided in two directions, an adequate guard against bending or distortion. Erection is made easy. Just place the sash side by side—bolt the mullion between. Bolts are accessible—sash easily removed.



Horizontal bar with notch cut for locking wing.



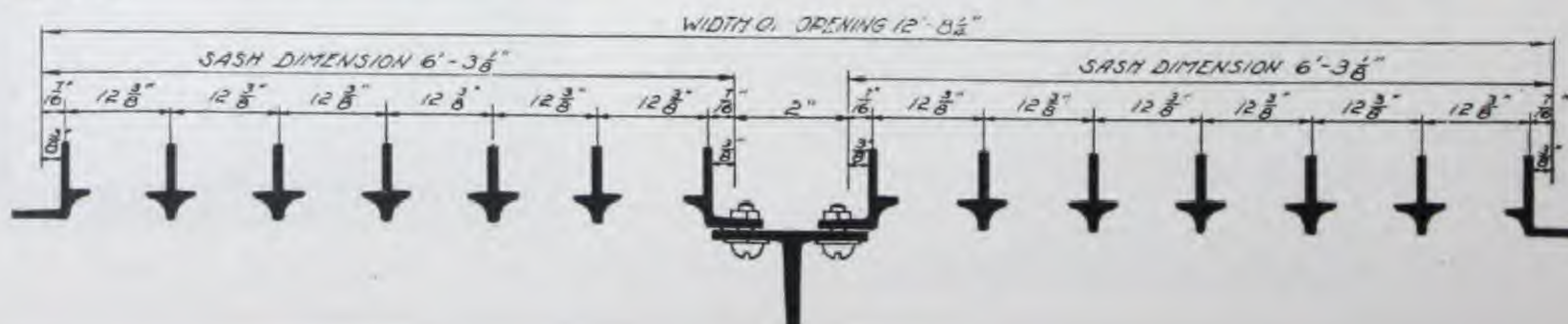
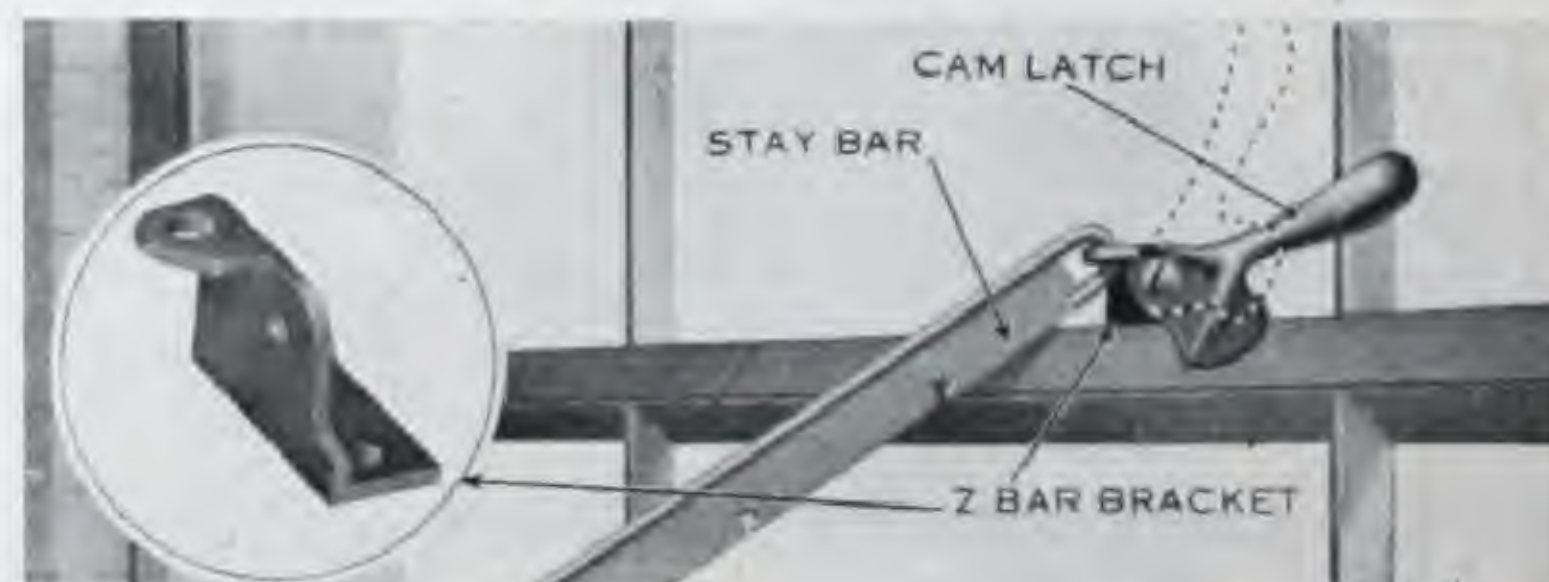
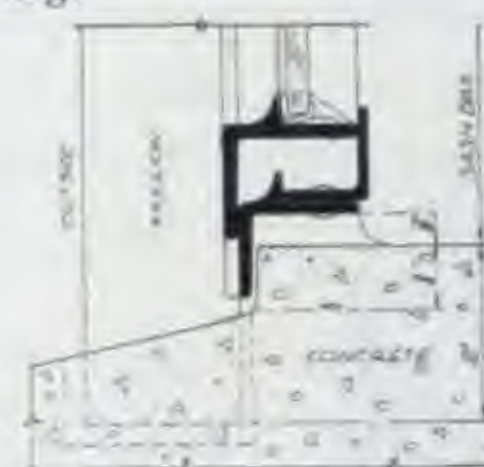
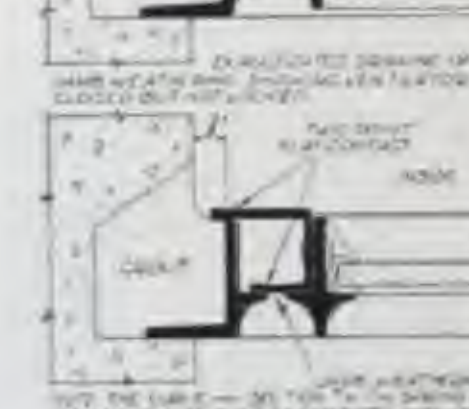
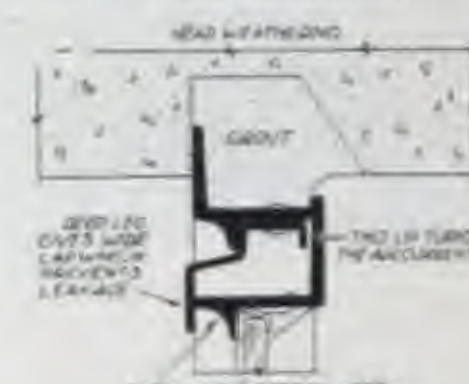
Vertical bar with metal removed.

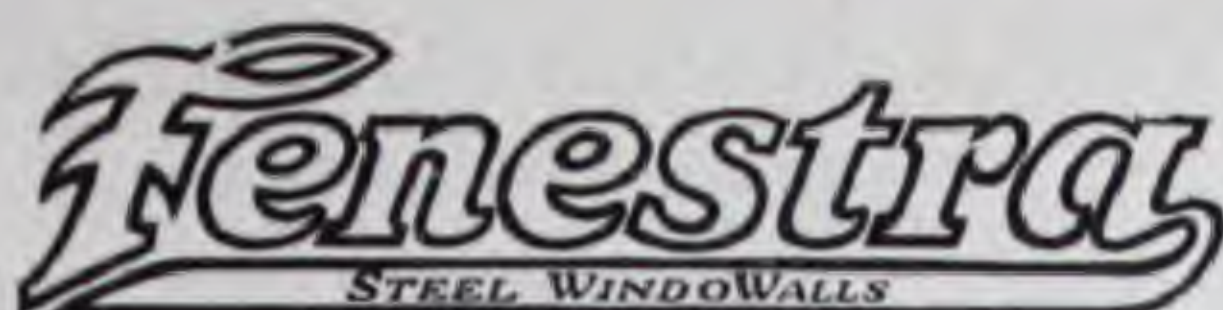


Horizontal bar slipped through vertical bar. Note locking wing ready to fit into notch in horizontal bar.



Completed Fenestra joint with locking wing in place.





DIMENSIONS OF FENESTRA SOLID STEEL WINDOWS.

HEIGHT DIMENSIONS.

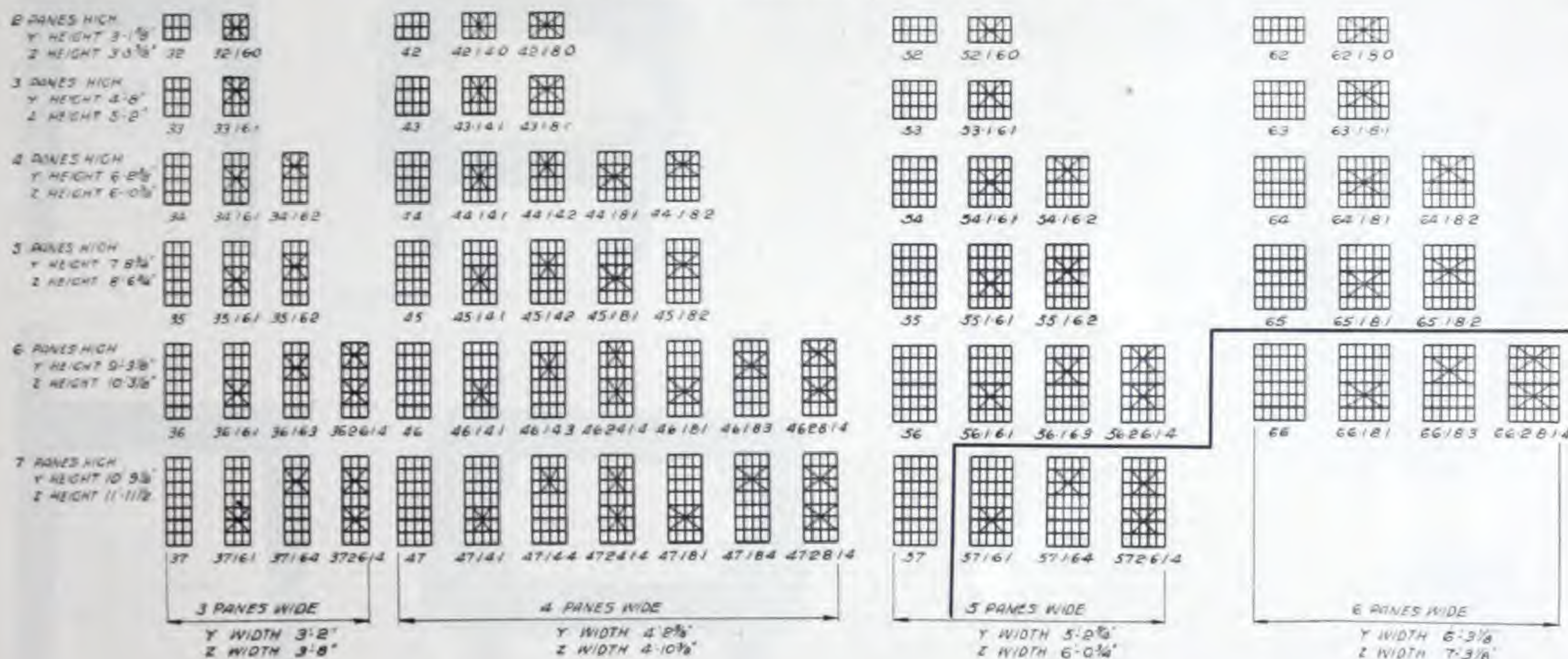
No. of Lights High.	HEIGHT OF EACH LIGHT IN INCHES.			
	X-16	Y-18	Z-20	P-22
1	1-5 1/4	1-7 1/4	1-9 1/4	1-11 1/4
2	2-9 5/8	3-1 5/8	3-5 5/8	3-9 5/8
3	4-2	4-8	5-2	5-8
4	5-6 3/8	6-2 3/8	6-10 3/8	7-6 3/8
5	6-10 3/4	7-8 3/4	8-6 3/4	9-4 3/4
6	8-3 1/8	9-3 1/8	10-3 1/8	11-3 1/8
7	9-7 1/2	10-9 1/2	11-11 1/2	....
8	10-11 7/8	12-3 7/8	13-7 7/8	....
9	12-4 1/4	13-10 1/4	....	....

WIDTH DIMENSIONS.

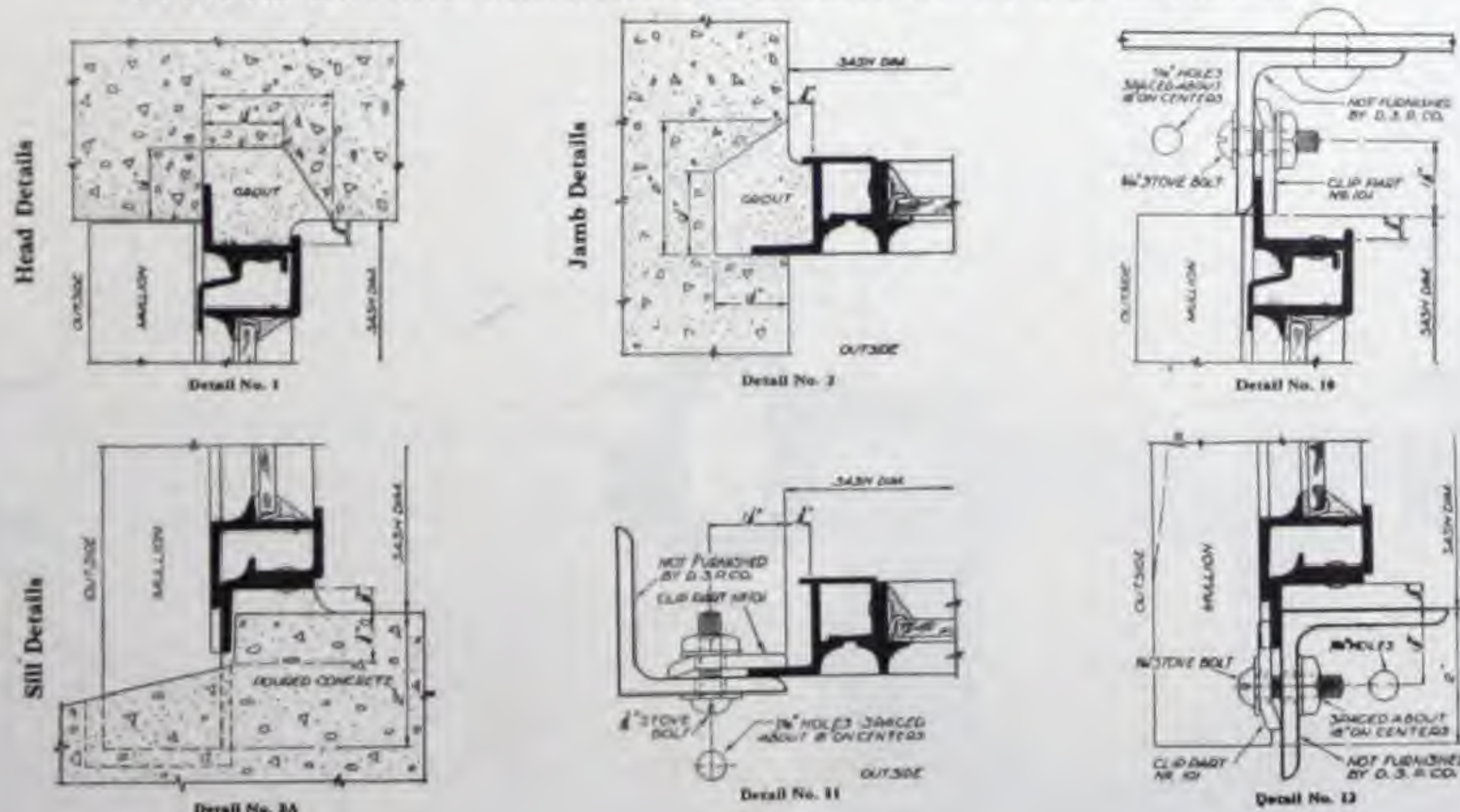
No. of Lights Wide.	WIDTH OF EACH LIGHT IN INCHES.			
	X-10	Y-12	Z-14	P-16
1	0-11 1/4	1-1 1/4	1-3 1/4	1-5 1/4
2	1-9 5/8	2-1 5/8	2-5 5/8	2-9 5/8
3	2-8	3-2	3-8	4-2
4	3-6 3/8	4-2 3/8	4-10 3/8	5-6 3/8
5	4-4 3/4	5-2 3/4	6-0 3/4	6-10 3/4
6	5-3 1/8	6-3 1/8	7-3 1/8	8-3 1/8
7	6-1 1/2	7-3 1/2	8-5 1/2	....

Combine X Widths with X Heights, Z Widths with Z Heights, etc.
Add 2 inches to allow for Tee Bar Mullion when combining Sash.

STANDARD UNITS OF FENESTRA SOLID STEEL WINDOWS.



TYPICAL DETAILS SHOWING INSTALLATION OF FENESTRA SASH.





THE CRITTALL MANUFACTURING CO., LIMITED

BRAINTREE, ESSEX, ENGLAND

CANADIAN METAL WINDOW & STEEL PRODUCTS, LIMITED

160 RIVER STREET, TORONTO

160 PEEL STREET, MONTREAL

Distributors for Canada

DATA ON CRITTALL UNIVERSAL CASEMENTS

SPECIFICATIONS

(1) BARS. All bars shall be of mild steel, mechanically straightened, free from scale, pit marks, or other imperfections.

(2) JOINTS AND CORNERS. All joints and corners shall be welded; no brazing shall be permitted in any part of the window.

(3) WEATHERING. Casements of all types, whether opening outwards, inwards or on centres, shall be doubly weathered at all points. All weathering shall be solid with the frames, and not obtained by attaching other pieces. Drip bars shall be of extruded brass.

(4) HINGES. The hinges used on all side hung casements, whether opening inwards or outwards, shall be of solid gunmetal with steel pins. Casements pivoted either horizontally or vertically shall be hung on phosphor bronze centres, fixed into steel plates.

(5) SECTIONS. The form of section used shall have a channel all round the outer frame to act as a key for cement.

The size of section shall be determined by the size of the window, and shall be such that the casement does not sag nor whip when glazed.

The glazing rabbets shall be $\frac{3}{8}$ " deep for all sections, and provision must be made for fixing the glass from inside with metal beads or hard wood beads.

(6) SIGHT AND GLASS LINES. Whether opening outwards, inwards or on centres, or all fixed, the sight lines of all windows of the same size shall be the same, and the glass shall be in the same plane.

(7) FINISH. Before assembling or applying fittings or hinges, all frames should be sandblasted and immediately coated with anti-rust prima. After assembling, it shall be given a further coat of priming paint.

(8) FITTINGS. All fittings shall be of the best quality and interchangeable.

(9) ERECTION. All windows shall be supplied with the necessary lugs and screws for fixing, and the services of a competent erector shall be provided to supervise the erection of all windows called for on this contract.

The sub-contractor is to be responsible for the maintenance of all windows for twelve months after completion of the building.

BRONZE WINDOWS. All material used for bronze windows shall be of Delta Metal No. 4 extruded sections, and the finish of these windows shall be of a dark bronze patina. They shall be coated with oil and carefully wrapped in calico before being packed in closed cases.



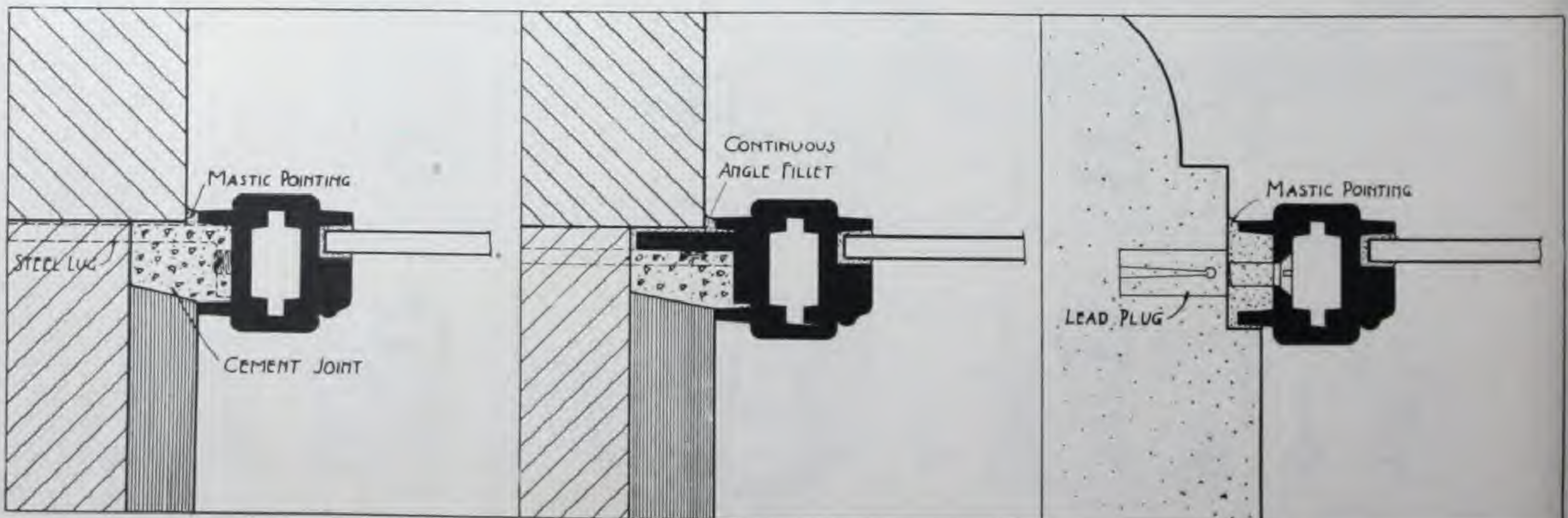
SMALL



MEDIUM



LARGE





THE CRITTALL MANUFACTURING CO., LIMITED

BRAINTREE, ESSEX, ENGLAND

CANADIAN METAL WINDOW & STEEL PRODUCTS, LIMITED

160 RIVER STREET, TORONTO

160 PEEL STREET, MONTREAL

Distributors for Canada.

DATA ON CRITTALL UNIVERSAL CASEMENTS

HANDLES



No. 205

Each of these patterns is made in two sizes, so that the appearance shall be in proportion to the size of the window. The plates to which they are attached are of solid steel, and are electrically welded to the casement.

The bevelled striking plate, which is rivetted to the frame, permits the nose of the handle to draw the opening frame tightly to the fixed one by means of a cam action. The plate is always supplied in gun metal, so that friction shall not cause rusting.

Handles can be supplied on either plate.



No. 206

STAYS



PEG-STAY No. 107

Supplied in all lengths, from 6 inches to 2 feet, to suit any size of window, the design being the same for inward or outward opening windows.

The knuckle is of forged bronze, and is provided with a spur to keep the stay from falling on to the cill. The ledge on the peg prevents the stay from being bent.

The bracket, which is welded to the frame, is provided with a shoulder to prevent the stay being knocked against the glass, which is a common cause of breakage.

Casements are divided into panes for four reasons:—

- (I) To conform to some architectural effect.
- (II) To economise in glass.
- (III) To make windows burglar-proof.
- (IV) To stiffen the opening-frame.

The Patent jointed glazing bar is distinctive in appearance, the slight swelling at the intersection breaking the monotony of line, and giving an appearance of strength, which it undoubtedly possesses.

It is essentially "metal" in appearance, and consequently more suitable for use in steel casements than the mitred joint which is an imitation of wood.

The T section is made in 4 sight widths to suit various types of architecture.

The Moulded section is made in one width only, but in $1\frac{3}{8}$ in. and $1\frac{1}{2}$ in. deep.

Metal casements divided into panes with glazing bars serve the double purpose of grill and ventilator.

Casements have often been pronounced as not watertight because water is found on the cill board. In nearly every case this is due to excessive condensation common to all new buildings.

The cill being the most conspicuous part of a window, it is advisable to protect it against the effects of condensation by means of a gutter of some non-corrosive material.

All condensation gutters supplied on Universal Casements are of solid bronze, and therefore are not subject to corrosion.

Gutters are fixed on to the opening frame, and are provided with large holes to allow accumulated water to fall into the fixed cill bar. This bar slopes outward, and the water eventually escapes through weep-holes.

All casements, with or without gutters, have weep-holes to allow water to get away which may have got into the cill channel when the casement was open.

Where gutters are used, the weep-holes are provided with copper baffle-plates to prevent wind blowing through.

The gutter on inside-glazed casements is always placed on the inner edge of the section, and the space between it and the glass, if any, must be filled up with putty.

All Economic Casements have the double-moulded strip at the cill, which also serves as a condensation gutter.

This strip can be treated with our Koperoid process, and so becomes rustless.



SLIDING STAY No. 108

This pattern has the advantage of giving no internal projection to interfere with blinds or screens, and also permitting variable adjustment of opening, holding the casement rigidly in any position.

Every part of this stay is of drop forged bronze, except the fixed bar, which is of drawn bronze, thus there is no fear of breakage. The fixed bar should be kept slightly greased to allow the box to slide freely.

It can also be applied to inward opening casements.

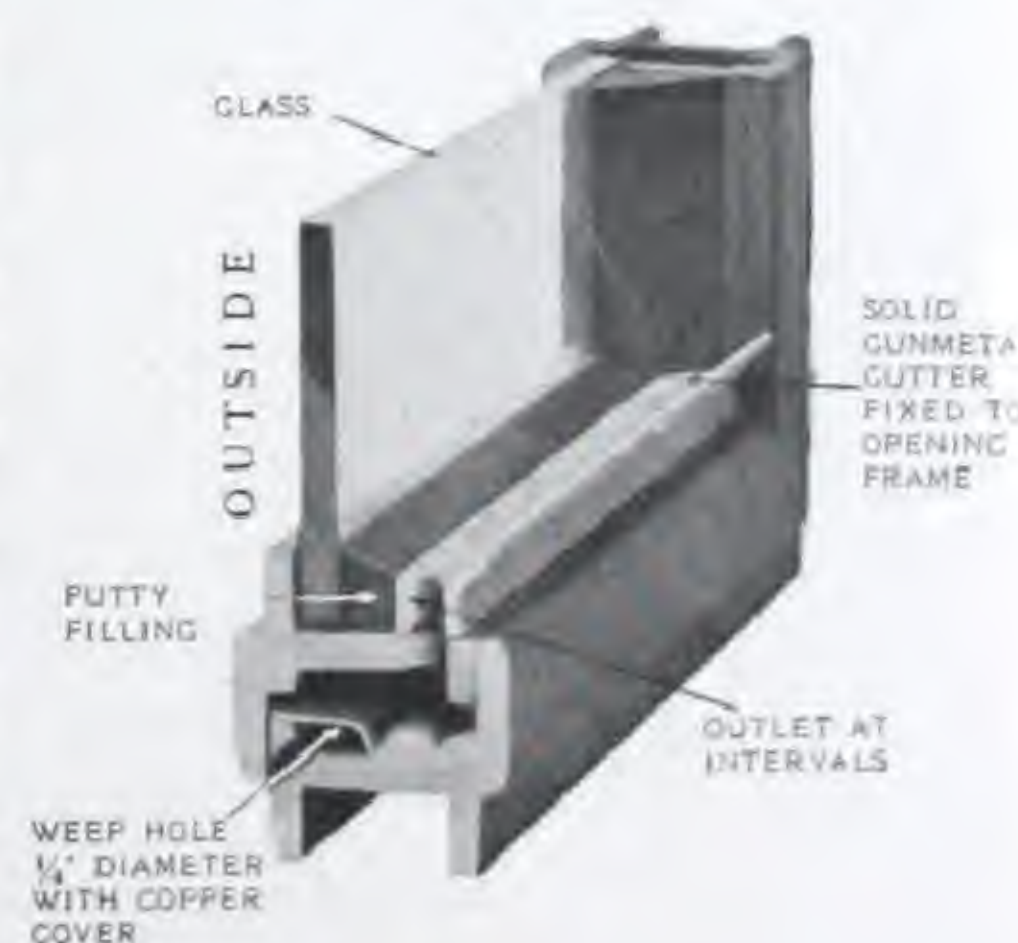
DETAIL OF INTERLOCKING T JOINT



CONDENSATION GUTTER

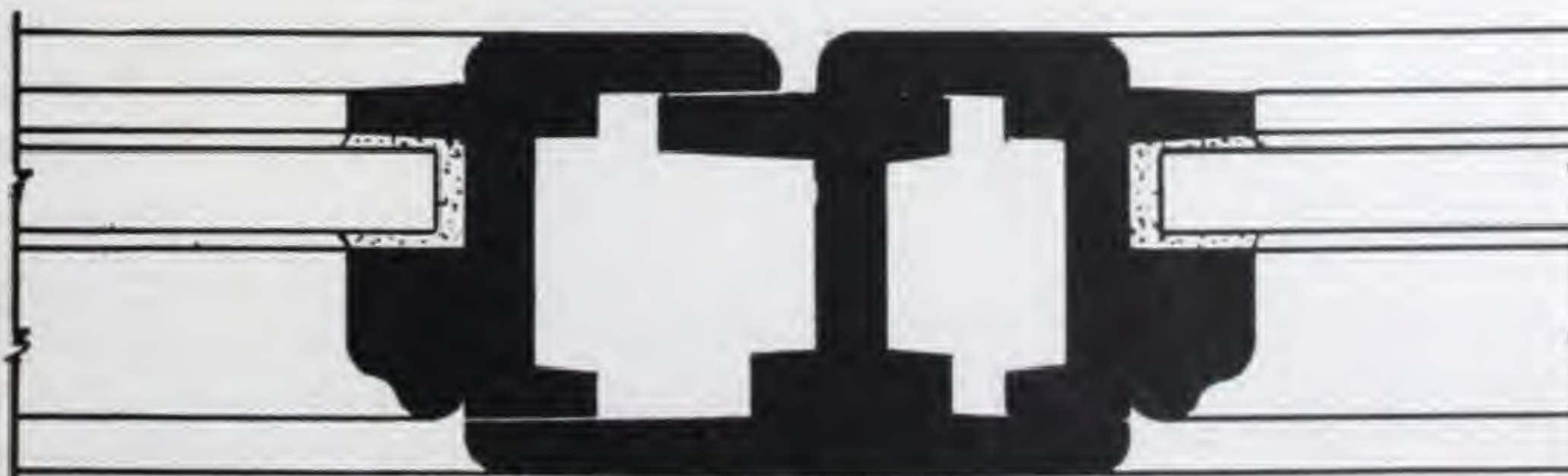
FOR INSIDE GLAZING

FOR OUTSIDE GLAZING



MEETING RAIL SECTIONS

Fixed meeting rails are sometimes required in folding casements, as it has been suggested by some manufacturers that folding casements whether opening inwards or outwards which have not a fixed meeting rail (that is to say a bar up the centre) when both leaves of the window are open, are dangerous on high buildings, as people opening these windows and looking out on the street below are liable to become dizzy and lose their balance, whereas a fixed meeting rail overcomes this. To meet this situation we have designed this bar.



MEETING RAIL SECTION.

ARCHITECTURAL BRONZE & IRON WORKS

830 LANSDOWNE AVENUE,
TORONTO, ONT.



DORMITORY BUILDING. BISHOP RIDLEY COLLEGE, ST. CATHARINES ONT.
SPROATT & ROLPH, ARCHITECTS

TESTIMONIAL

READ WHAT A FIRM OF PROMINENT ARCHITECTS HAVE TO SAY
REGARDING "INTERNATIONAL CASEMENTS.

SPROATT & ROLPH,
Architects,
36 North St.,
Toronto, 22-4-1921.

Attn. Mr. A. L. Young.

Messrs. Architectural Bronze & Iron Works, Ltd.,
Lansdowne Avenue,
Toronto.

Dear Sirs:-

RE. BISHOP RIDLEY COLLEGE DORMITORIES

The writer made a visit to Ridley College to inspect the case-
ment sash which your firm was installing.

I am pleased to say that without exception, they are the best sash
that we have yet used, barring none, and only trust that you can see your
way to keep the "out-put" up to the standard now reached. It gives us very
much pleasure in paying you this compliment.

Yours truly,

(Signed) Sproatt & Rolph.

STEEL CASE-
MENT SASH

We have the distinction of being the only steel casement sash makers in Canada. We contract
to make, install, and glaze, so as to become directly responsible for satisfactory results.

THE GOLDIE & McCULLOCH CO., LIMITED

HEAD OFFICE AND WORKS: GALT, ONT., CANADA.

WESTERN BRANCH:
248 McDermott Ave.,
WINNIPEG, MAN.

TORONTO OFFICE:
1101-2 Bank of Hamilton Bldg.

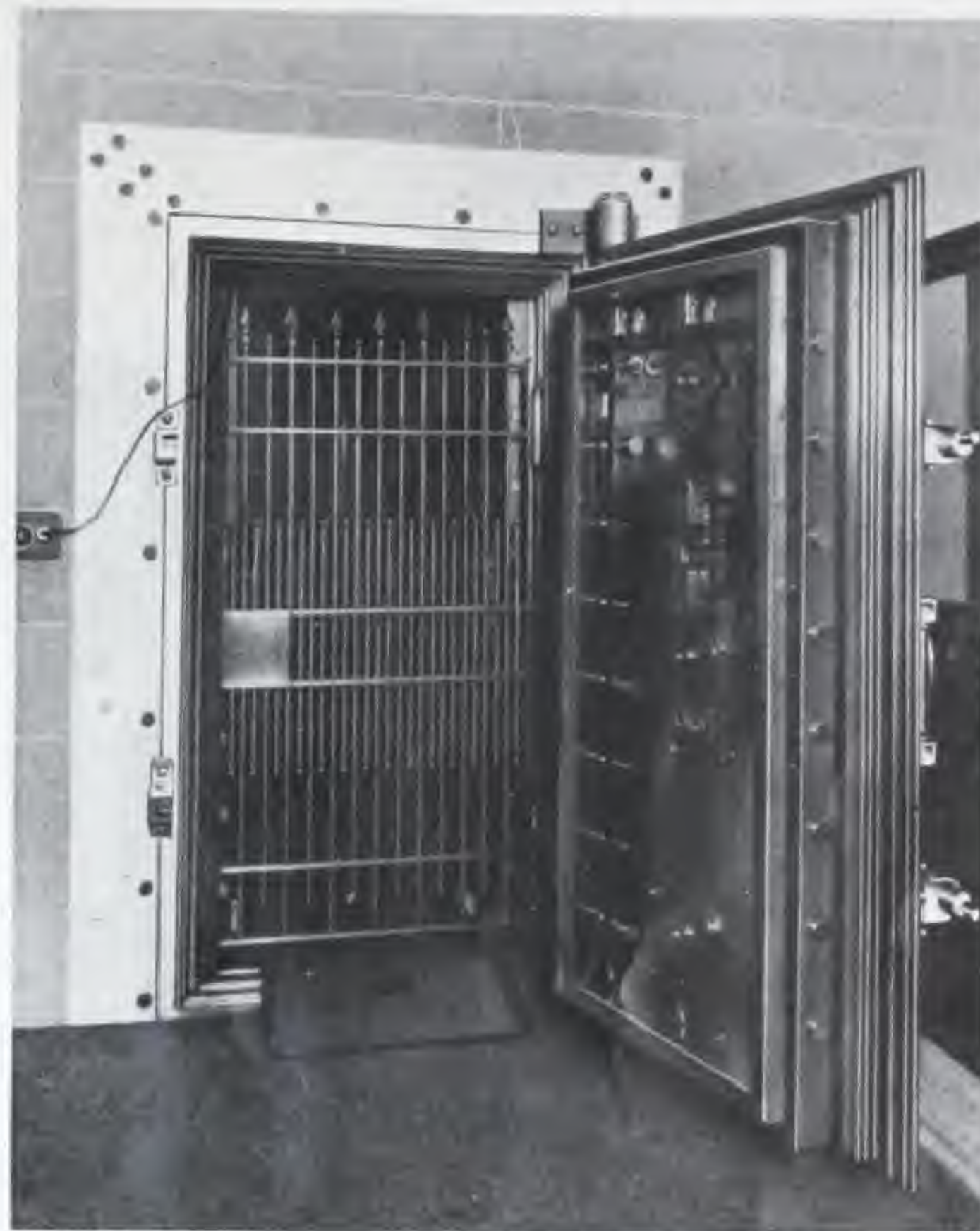
QUEBEC AGENTS:
ROSS & GREIG, 400 St. James St.,
MONTREAL, QUE.

BRITISH COLUMBIA AGENTS: ROBT. HAMILTON & Co., Bank of Nova Scotia Bldg., VANCOUVER, B.C.

B.C. SAFE AGENT: C. L. FORD, 569 Richards St., Vancouver, B.C. MARITIME SAFE AGENT: E. L. STAILING, 65 Granville St., Halifax, N.S.

PRODUCTS.

FIRE-PROOF SAFES, BANKERS' SAFES, FIRE-PROOF VAULT DOORS, BANKERS' VAULTS AND VAULT DOORS, VAULT LININGS, VAULT GRILLES, SAFETY DEPOSIT BOXES, EXPRESS MESSENGER BOXES, STATIONARY AND PORTABLE PRISON CELLS, LAND AND MARINE POWER EQUIPMENT.



FIRE-PROOF SAFES AND VAULT DOORS.

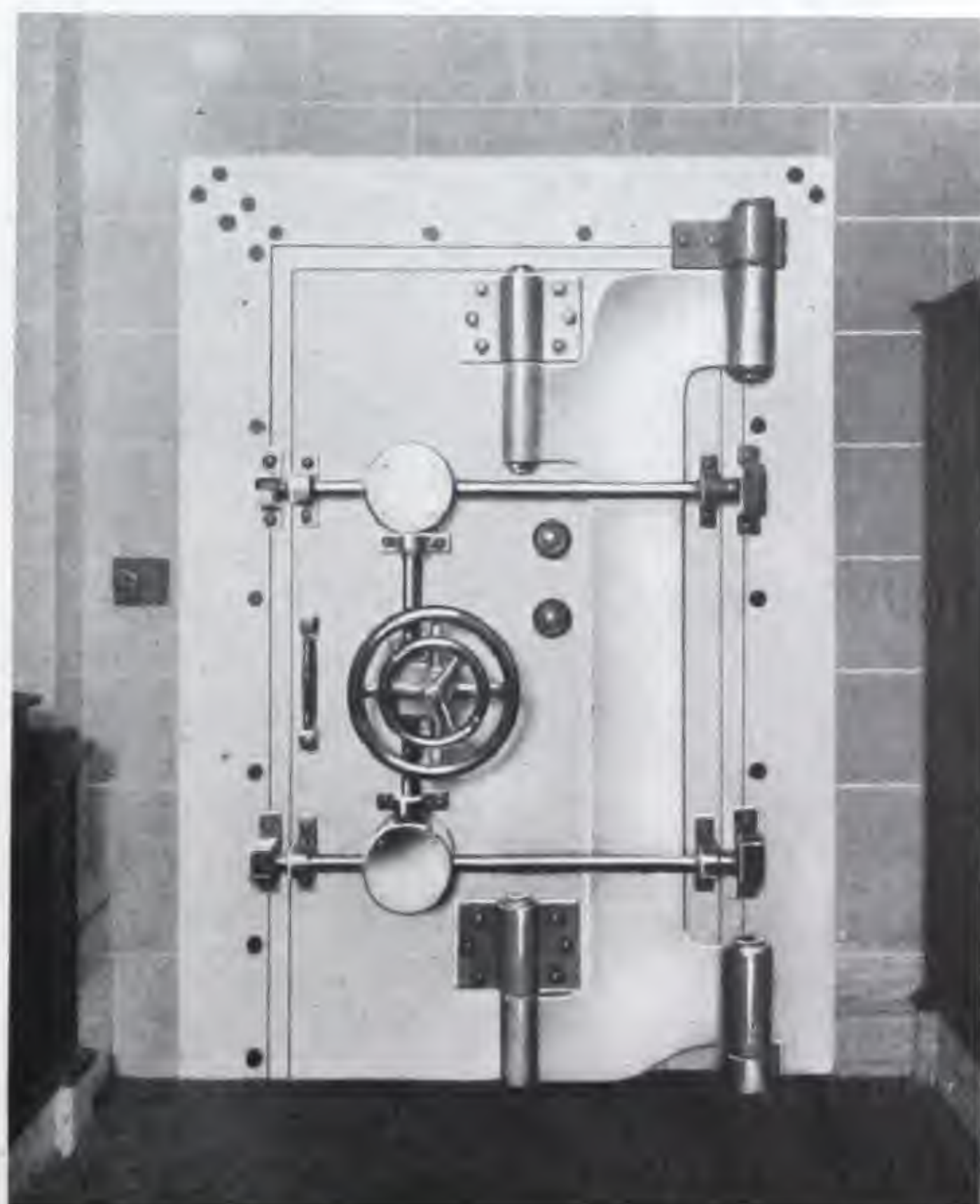
Canada has had some big fires "and hot ones" in the last forty years. Goldie & McCulloch safes and vault doors have passed through them all without loss of contents.

BANKERS' SAFES AND VAULT DOORS.

Banking and Monetary institutions must be assured the greatest possible protection against burglars. G. & McC. Banking equipment is of the very highest quality in design and workmanship and as nearly impregnable as it is possible to make it.

ILLUSTRATIONS.

The illustrations show open and closed views of the Safety Deposit Vault of the Mercantile Trust Company at Hamilton, Ont. These doors are of heavy construction and are fitted with two combination locks and time lock.



SPECIFICATIONS.

We shall be glad to forward to Architects and others who contemplate the installation of vault work of any kind, complete specifications, plans, photographs, etc.

Let us know your requirements.

CATALOGUE.

If our Safe and Vault Catalogue No. 32 is not in your files, it should be. Drop us a card and it will be mailed at once.

See our advertisement under Heating, Ventilation and Power section, page 213.

J. & J. TAYLOR, LIMITED

TORONTO SAFE WORKS,
TORONTO, ONTARIO.
(ESTABLISHED 1855.)

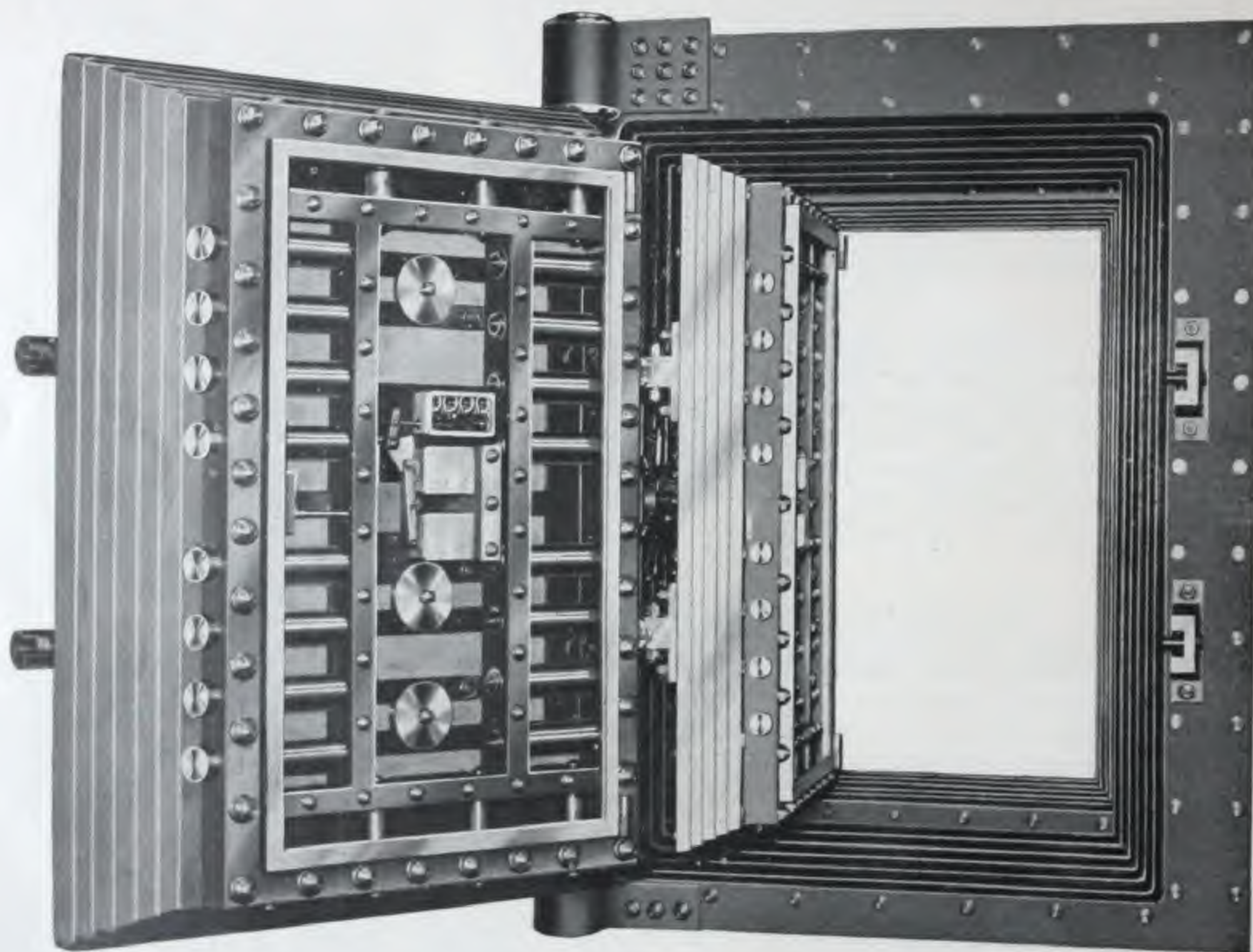
AGENCIES: MONTREAL. WINNIPEG. VANCOUVER.

WE HAVE SPECIALIZED FOR 66 YEARS IN

SAFES
DEPOSIT BOXES
SHUTTERS

VAULT DOORS
STEEL CABINETS
PRISON GATES

VAULT LININGS
STEEL CUPBOARDS
GRILLES, Etc.



REFERENCES.

Two of the above Vault Doors were built by us for the Bank of Montreal and the Royal Trust Co., Winnipeg, being the heaviest vault entrances now on the American Continent (weight, 52 tons each). This is an example of our competence to supply the best.

Over 85 per cent. of all of the Head Offices of Chartered Banks and Trust Companies in Canada are equipped with our Safes or Vault Work. Our goods can be found also in many foreign countries—China, India, South Africa, South America, Mexico, Australia, New Zealand, West Indies, Bermuda, etc., etc.

FIREPROOF

VAULT DOORS. Full information and sizes of Standard Fireproof Vault Doors will be found on pages 95 to 106 in our Catalogue. This will be gladly sent on request.

CO-OPERATION.

We are glad to be of assistance to those desiring information or requiring specifications on this class of work.

THE STEEL EQUIPMENT CO., LIMITED

UNION BANK BUILDING,
OTTAWA, ONT.

FACTORY: PEMBROKE, ONT.

AGENTS THROUGHOUT CANADA.

PRODUCTS.

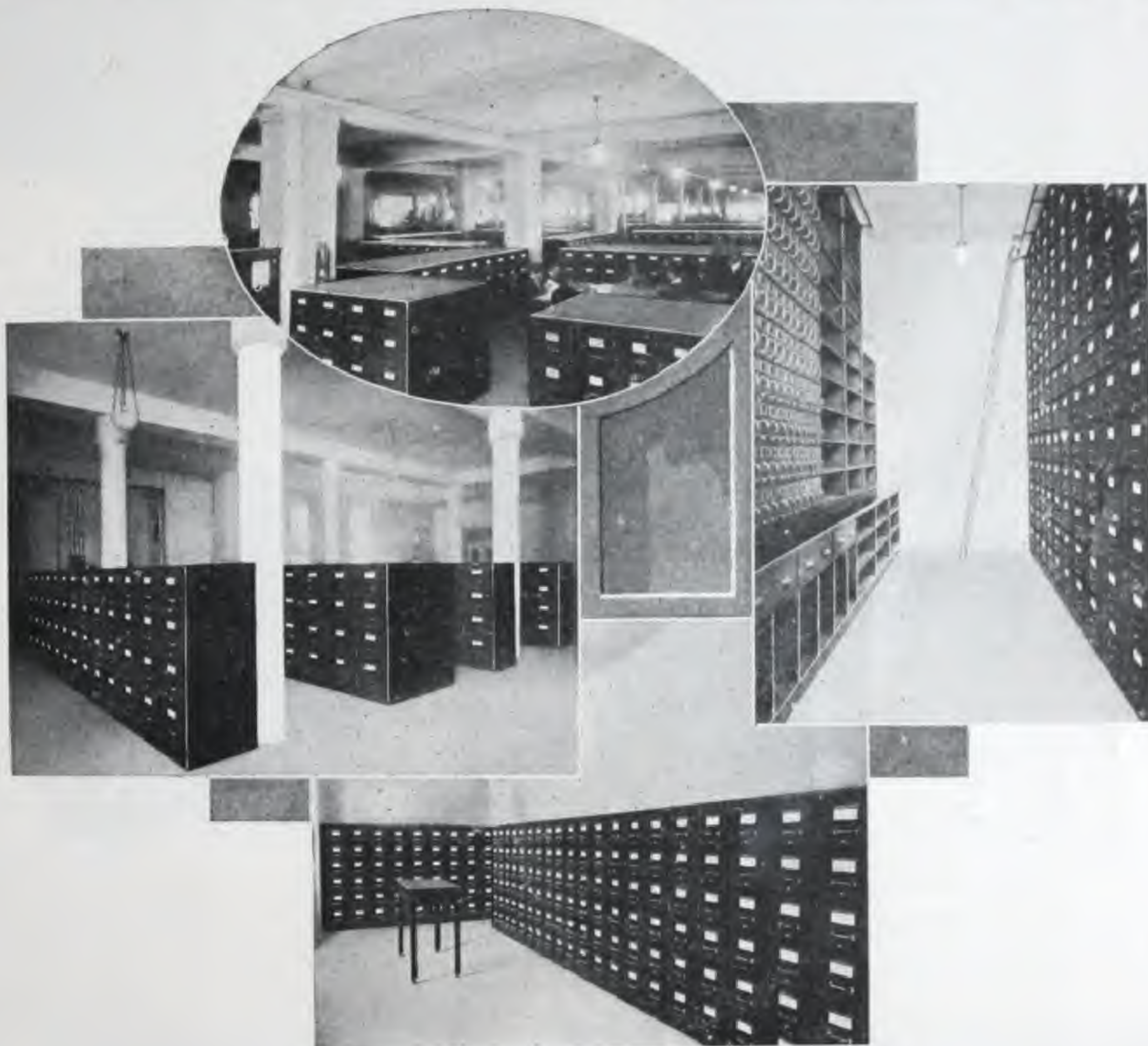
STEEL OFFICE EQUIPMENT of every description: FILING CABINETS, STEEL FURNITURE, STEEL SHELVING, VAULT FITTINGS, Etc. STEEL PLANFILES a specialty of particular interest to the Architect or Engineer.

ADVANTAGES.

Modern fireproof building construction demands office equipment which prevents interior fires. Steel Equipment is modern; does not stick or warp; will not burn, and saves space. Steel Equipment Cases protect the records which fire insurance cannot restore.

ILLUSTRATIONS.

Illustrations herewith show modern Office Equipment in steel assembled from stock units.



MADE IN CANADA, AT PEMBROKE, ONT.

CONSTRUCTION.

Steel Equipment Cases are made of the best quality cold rolled steel, especially prepared of even thickness and full weight.

The welding process is used whenever possible, both electric and oxy-acetylene, in the frame construction and in assembling the various parts.

Each case is a complete working unit, and the parts joined together have the appearance of a solid cabinet.

The loose ends can be attached by anyone without the use of tools.

FRAME CONSTRUCTION.

Frame construction of heavy steel plates, welded together. Reinforced at all corners.

Note roller suspension slides permit drawer to extend full length—and the heavier the load to carry the easier drawer operates.

Standard finish: baked olive-green enamel, nickel-plated hardware.

Locks are automatic and permit locking without use of key.

INFORMATION.

Steel Equipment costs no more than good oak furniture, but the protection and service are far greater. We shall be pleased to forward upon request catalogue illustrating any of our Steel Equipment. Plans and estimates submitted for special work.

THE OFFICE SPECIALTY MFG. CO., LIMITED

HOME OFFICE AND FACTORIES:
NEWMARKET, CANADA.

TEN FILING EQUIPMENT STORES:

TORONTO, MONTREAL, OTTAWA, HALIFAX, HAMILTON, WINNIPEG, REGINA, EDMONTON, CALGARY, VANCOUVER.

PRODUCTS.

FILING CABINETS IN STEEL AND WOOD FOR EVERY PURPOSE. "FIRE-WALL" RECORD SAFES; FILING SYSTEMS FOR EVERY SERVICE; EFFICIENCY DESKS, STENOGRAPHERS' DESKS, OFFICE CHAIRS—TILTER AND REGULAR STYLES; "FIVE-S" STEEL SHELVING; VAULT EQUIPMENT; OFFICE AND VAULT TRUCKS; BOOKCASES; OFFICE AND BOARD ROOM TABLES; POST OFFICE EQUIPMENTS.

**"FIRE-WALL" STEEL VERTICALS**

With the modern business executive, maximum protection for his records is, in most cases, the deciding factor in the purchase of filing equipment for his valuable business papers. The only type of filing cabinets that gives any kind of worth-while resistance to heat, and consequent protection to their contents, is the "Office Specialty" "Fire-Wall" Steel Verticals, illustrated above.

These cabinets are built with double walls of steel and are insulated with corrugated asbestos and a large dead-air space. Each drawer is equipped with a Safety Latch which automatically locks the drawer when closed and prevents accidental opening in case cabinet tips forward in a fire. "Fire-Wall" Verticals may be obtained for filing bill, letter and cap-size papers, also a Storage Cupboard.

**SINGLE DRAWER STEEL UNITS.**

There are many uses in every office for one or more of these convenient Single Drawer Steel Units, illustrated below. For the private papers of either clerk or executive, they are particularly serviceable. In the smaller office one of these Units, which holds about 6,000 papers, may afford sufficient filing space to meet immediate requirements.

Professional men and retail merchants will also find these Units adaptable for their filing needs. Units may be stacked on top of each other and bolted together. Bases should always be used.

**SECTIONAL FILES**
Horizontal Construction
In WOOD and STEEL.

"Office Specialty" Horizontal Sections are designed for filing every kind of standard business record. Being of sectional construction, units for holding different kinds of file records may be combined in one stack, which thus economizes space. Another economy feature of this sectional construction is, that only sufficient filing equipment to take care of present requirements need be purchased, as additional sections may be added as the need arises. A stack should not be built up higher than six feet to ensure easy reference. (See left centre illustration.)

All "Office Specialty" Horizontal Sections are specially constructed so as to intermember rigidly. All sections are 33 inches wide and either 17 or 25 inches deep. Both depths may be combined in the same stack.

The standardized stock line of "Office Specialty"

Wood Horizontal Sections is finished in quartered oak of a golden shade and hand-rubbed to a beautiful lustrous polish. The Steel Horizontals have a highly polished, baked-enamel finish in a soft Corona green, an appropriately neutral color which harmonizes with any scheme of office equipment. Trimmings for both Wood and Steel lines are brush brass. Mahogany finish in both lines is supplied to order.

**"800" WOOD VERTICALS.**

The "Office Specialty" "800" Verticals, illustrated above on the right, represent the highest achievement of the cabinet-maker's art. They are a "de Luxe" line of filing cabinets. Neither thought nor expense has been spared in order to make them add to the dignity and atmosphere of the modern business office. The simplicity of their straight-line design and the beauty of their lustrous golden finish, immediately attract the eye of the executive.

In service these "800" Verticals offer the maximum. Fully loaded drawers coast in and out with the slightest pressure. Panelled ends are removable. Ends should always be used. One pair is sufficient for a single section or a battery. Sections for filing bill, letter and cap-size papers are obtainable, also storage section.

"Office Specialty" Counter Height Verticals are identical in construction with the "800's" except in height. As their name implies, they are only counter height. Three other lines of standard height verticals are also manufactured by "Office Specialty."

**"FIRE-WALL" RECORD SAFE.**

The "Office Specialty" "Fire-Wall" Record Safe, illustrated above, affords maximum protection for the records you can't insure—it reduces to the minimum the possibility of having your life's work wiped out in a night, should a fire work its havoc on you. Material loss engenders delay and inconvenience during reconstruction. But could you ever replace the records built up through a business lifetime?

The "Office Specialty" Record Safe is built on the same principle as "Fire-Wall" Verticals. Heavier steel is used, however, also more asbestos and an exceptionally large dead-air chamber. You can rely on the safety of records which are housed in an "Office Specialty" Record Safe.

EFFICIENCY DESK.

Until you've actually worked with an "Office Specialty" Efficiency Desk, illustrated below, it's difficult to appreciate the extent to which it helps you through the multitudinous details of the average executive's business day.

The purposeful arrangement of its drawers gives its user a great measure of independence, because he can have his important business data at his finger tips without encumbering himself with detail.



QUALITY.

ADVANTAGES.

INFORMATION.

The unquestioned superiority in construction of all "Office Specialty" Equipment is the natural result of our 30 odd years of manufacturing experience. The "Office Specialty" absolute guarantee stands back of every piece of equipment.

"Office Specialty" offers you Filing Cabinets and Desks and Chairs for every purpose—Filing Systems for every service. Whatever your needs "Office Specialty" can fill them, whether it be office equipment or a filing system devised to suit your particular business.

Catalogs and descriptive matter illustrating different "Office Specialty" products will be gladly sent upon request made on your business letterhead. Kindly specify the kind of equipment or system you are interested in when writing. Catalog No. 1975 covers Filing Cabinets and General Equipment. Catalog No. 1925 illustrates our complete line of Desks and Chairs. Catalog No. 1850 covers Filing Systems and Supplies.

THE OFFICE SPECIALTY MFG. CO., LIMITED

HOME OFFICE AND FACTORIES:
NEWMARKET, CANADA.

TEN FILING EQUIPMENT STORES:

TORONTO, MONTREAL, OTTAWA, HALIFAX, HAMILTON, WINNIPEG, REGINA, EDMONTON, CALGARY, VANCOUVER.

PRODUCTS.

STEEL OFFICE AND VAULT EQUIPMENTS, INCLUDING "FIVE-S" STEEL SHELVING; SECTIONAL STEEL FILING CABINETS; ROLLER SHELF AND STORAGE SECTIONS; SPECIAL STEEL EQUIPMENT.



The protection and filing of judiciary records is of primary importance to the welfare of the country. The illustration to the left shows part of the large installation of "Office Specialty" Steel Horizontal Filing Sections in the vault of Osgoode Hall, Toronto.



Many priceless records chronicling the events of Canadian history are among the valuable papers in the vault of the University of Toronto. The illustration above shows a corner of the vault, the whole of which is completely equipped with "Office Specialty" Steel Shelving and Filing Equipment.

A stack of "Office Specialty" "Five-S" Steel Shelving used for keeping stationery supplies. Note filing sections inserted to keep record of supplies. "Five-S" Shelving is supplied in two widths—33 1/8" and 17 1/8". Uprights are 6, 7 or 8 feet high. Shelving may be used with or without closed backs, as desired.



"FIVE-S" STEEL SHELVING.

"Office Specialty" "Five-S" Steel Shelving embodies five outstanding utility features—System, Storage, Sectional, Steel, Shelving. Hence its name—"Five-S". It affords you all the advantages of a high-grade sanitary steel shelving and in addition, its exclusive system feature increases its utility. "Five-S" Shelving is specially designed so that any 17-inch "Office Specialty" Horizontal or Half Sections may be fitted into any part of the shelving stack.

When installing vault equipment, "Five-S" Steel Shelving frequently meets every requirement and eliminates the need of specially built shelving. Being of sectional construction, "Five-S" Shelving may be erected to fit almost any desired space.

"Five-S" Steel Shelving is also largely used in the stock room. It keeps the stock neat and orderly and its system feature makes possible an accurate and easily accessible stock record.

STEEL VAULT EQUIPMENT.

To ensure permanent satisfaction from your vault filing equipment, we would suggest that you have the installation planned by "Office Specialty" Planning Service Experts.

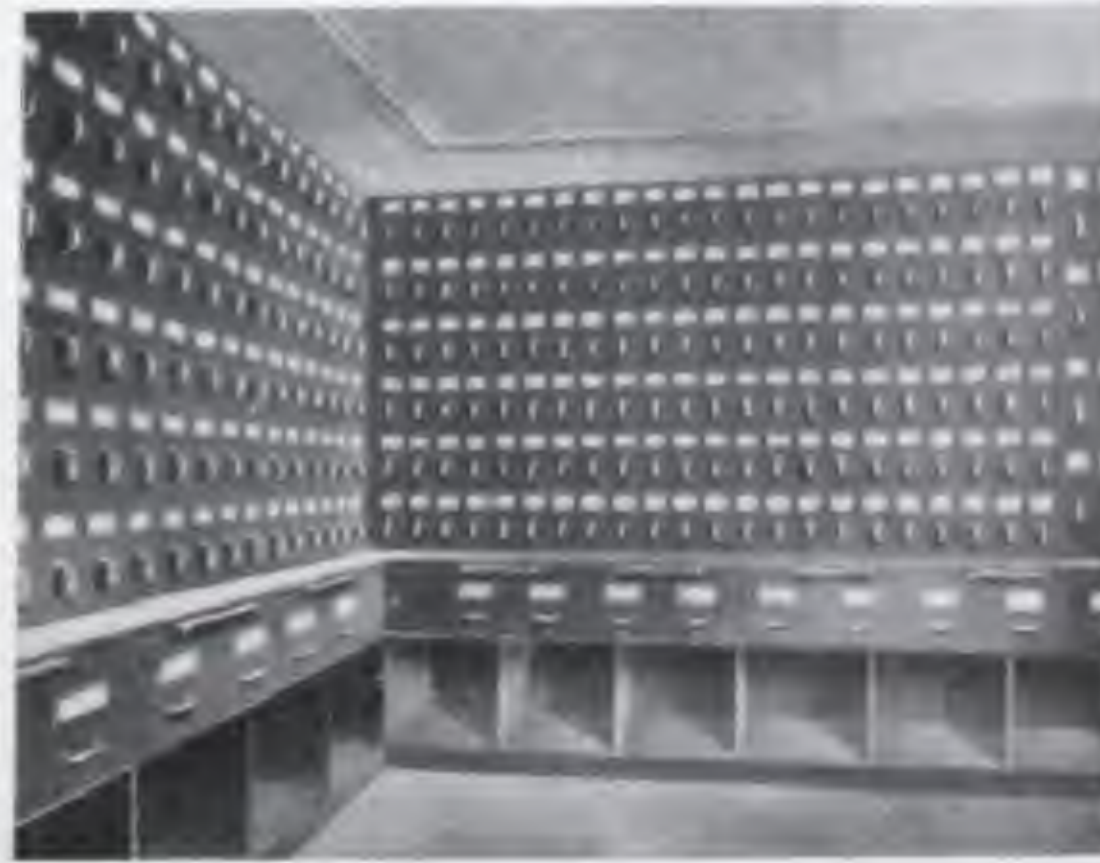
Wherever analysis shows it possible we adapt standard "Office Specialty" Filing Sections to the needs of our clients. This is always advisable in the interest of economy. Whenever necessary, however, specially designed and constructed equipment, to suit the interior dimensions of the vault and the needs of our client, is specified. Such orders are promptly executed.

Complete vault equipments are installed by "Office Specialty" including sections for filing all kinds of business records, shelving, deposit boxes, storage cupboards, roller book shelves, sliding doors, roller curtains, running ladders, vault trucks, etc.



The illustration on the left shows a portion of the vault of the Royal Trust Co., Montreal. Note the countless sections of "Office Specialty" Steel Horizontals which house the records of this institution.

To the right is a corner of the vault of the Yorkshire Guaranty & Security Corp., Vancouver. Thousands of irreplaceable documents are filed here.



PLANNING SERVICE.

The "Office Specialty" Planning Service is freely offered to our customers, present or prospective. Its work is founded on actual experience extending over a period of 30 odd years. Its plans are based on permanency, yet allow free scope for natural expansions.

INFORMATION.

The "Office Specialty" Stock Line of Filing Sections in Steel and Wood and Office Devices is illustrated in Catalog No. 1975. Vault Filing Equipment Installations are described in the "Steel Filing Equipment" booklet. "The Proper Care of Your Stock" and "Watching Your Stock" are two interesting booklets dealing with the use of "Five-S" Steel Shelving for stock-room storage and accurate stock record systems. Ask us to send you copies.

THE RUBEROID CO., LIMITED

FORMERLY
THE STANDARD PAINT CO. OF CANADA, LIMITED

52 VICTORIA SQUARE,
MONTREAL.

SALES OFFICES AND WAREHOUSES:

TORONTO.

WINNIPEG.

VANCOUVER.

FACTORY: HIGHLANDS, LACHINE CANAL, MONTREAL.

PRODUCTS.

We manufacture INSULATING PAPERS, DAMP-PROOFING PAINTS, RU-BER-OID ROOFING, Etc. (For full list of our products, see pages 48-51 and 92.)

"GIANT" PAPER.

Both *saturated and coated* with P. & B. Compound. The highest grade of insulating paper made. Absolutely waterproof, air tight, acid and alkali resisting. Used for sheathing dwellings and insulating cold storage warehouses, packing houses, refrigerator cars, etc. Made in the following weights:

2 ply, weighing 60 lbs. per 1,000 square feet.

3 ply, weighing 80 lbs. per 1,000 square feet.

"P. & B." PAPER.

This paper is *coated only*, and is used for certain kinds of refrigerator work where the thickness of the paper is of principal importance. Made in the following weights:

2 ply, weighing 45 lbs. per 1,000 square feet.

3 ply, weighing 55 lbs. per 1,000 square feet.

"HERCULES" PAPER.

This paper is *saturated only*, and is adapted for the same general purposes as "Giant," but recommended where a coated paper would prove objectionable, as, for example, in the manufacture of felt insulation, etc. Manufactured in the following weights:

2 ply, weighing 45 lbs. per 1,000 square feet.

3 ply, weighing 60 lbs. per 1,000 square feet.

"S.P.C." PAPER.

Made in two styles, Saturated and Single-coated. Put up in rolls 36 in. wide, containing 400 square feet. Average shipping weight:

Saturated..... 30 lbs.

Single-coated..... 45 lbs.

A high-grade paper stock. Either saturated or coated with P. & B. Compound. It is of unusually high tensile strength. Also vermin-proof.



WISCONSIN TELEPHONE BLDG., MILWAUKEE,
INSULATED WITH P. & B. PAPER.

JOHN HILLOCK & CO., LIMITED

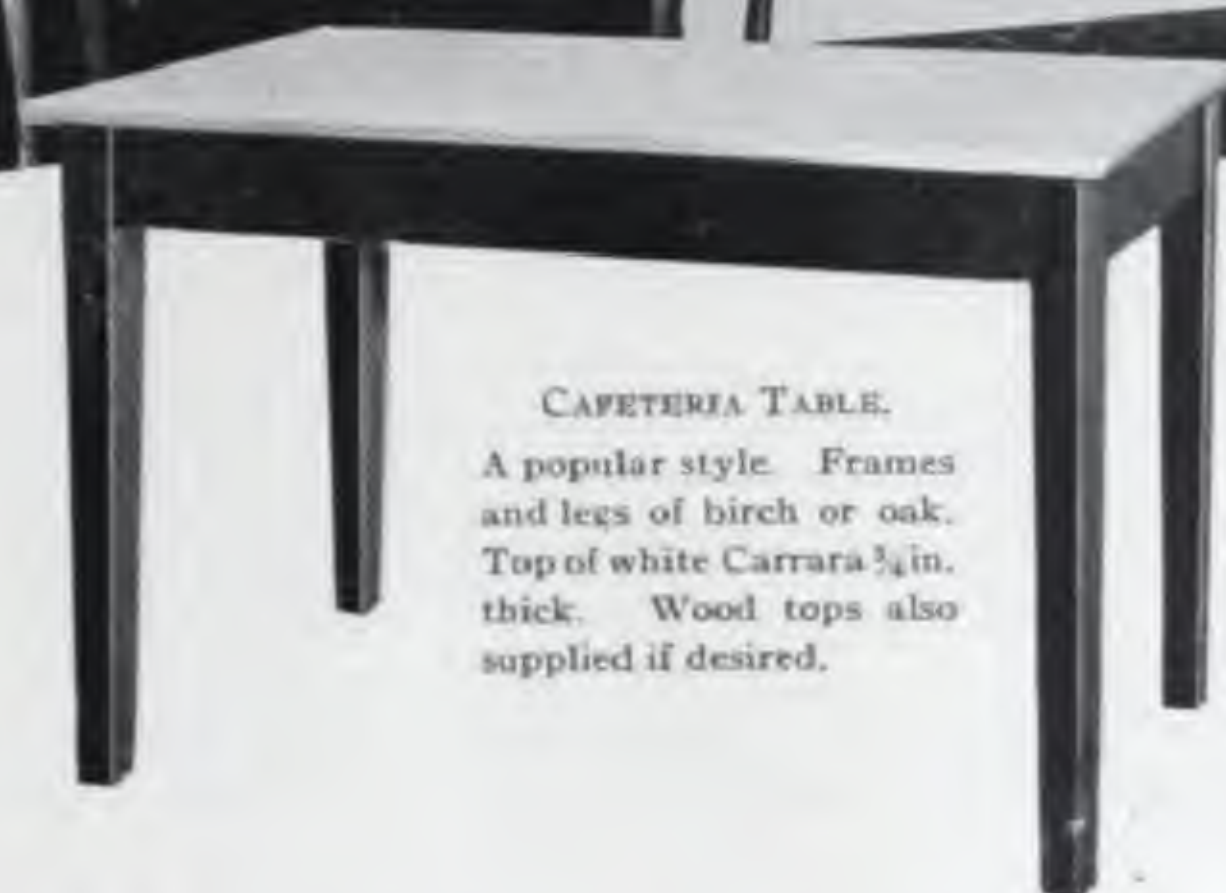
OFFICE, SHOWROOM AND FACTORY:
154 GEORGE STREET, TORONTO.



CAFETERIA INSTALLED
FOR THE MASSEY-HARRIS CO., LIMITED
TORONTO.



CAFETERIA INSTALLED
FOR HARRIS ABATTOIR CO., LIMITED,
TORONTO.



CAFETERIA TABLE.
A popular style. Frames
and legs of birch or oak.
Top of white Carrara $\frac{3}{4}$ in.
thick. Wood tops also
supplied if desired.

SPECIALISTS IN CAFETERIA EQUIPMENT, COLD STORAGE INSTALLATIONS AND REFRIGERATORS.

CAFETERIA EQUIPMENT.

These two illustrations of cafeterias designed, built and installed by us are typical of the service we are equipped to give. We have installed cafeteria equipment in large industrial plants and in restaurants in different parts of Canada.

Counters are made of pure white, non-porous glass; steam tables of polished steel and nickel with best of fittings; cold counters and refrigerators in nickel finish; all shelving clear polished plate-glass in nickel frame works; all parts detachable for cleaning.

We submit complete plans, specifications, and estimates for cafeterias of any capacity. Catalogue sent upon request.

ARCTIC REFRIGERATORS.

Arctic Refrigerators are designed to provide the perfect sanitary principle of cold dry air circulation. The details of construction make cleanliness and sanitary conditions easy to maintain.

WALLS.—Outside case of oak or ash, dark golden or white enamel finish, or clad with white opal.

INSULATION.—Best mineral wool or cork in granulated or compressed form and heavy air and waterproof papers.

LININGS.—White opal, tight joints. Rock enamelled, a special composition of our own preparation, providing a one-piece finish with no joints to collect dirt.

Galvanized iron in white enamel finish.

All floors white vitrified tile, set in cement.

COLD STORAGE DOORS.

By Cold Storage Doors we mean the door properly insulated and including the frame jamb and casings, with hardware complete, the door hung and ready for setting. We design and make our own hardware, the principal parts in malleable iron, the hinge leaf in best spring steel, highly tempered, all parts heavily hot galvanized or solid bronze; the door fitted with truss rod, preventing warping. Made in any wood finish, or iron clad, or fire proof.

STORE FITTINGS.

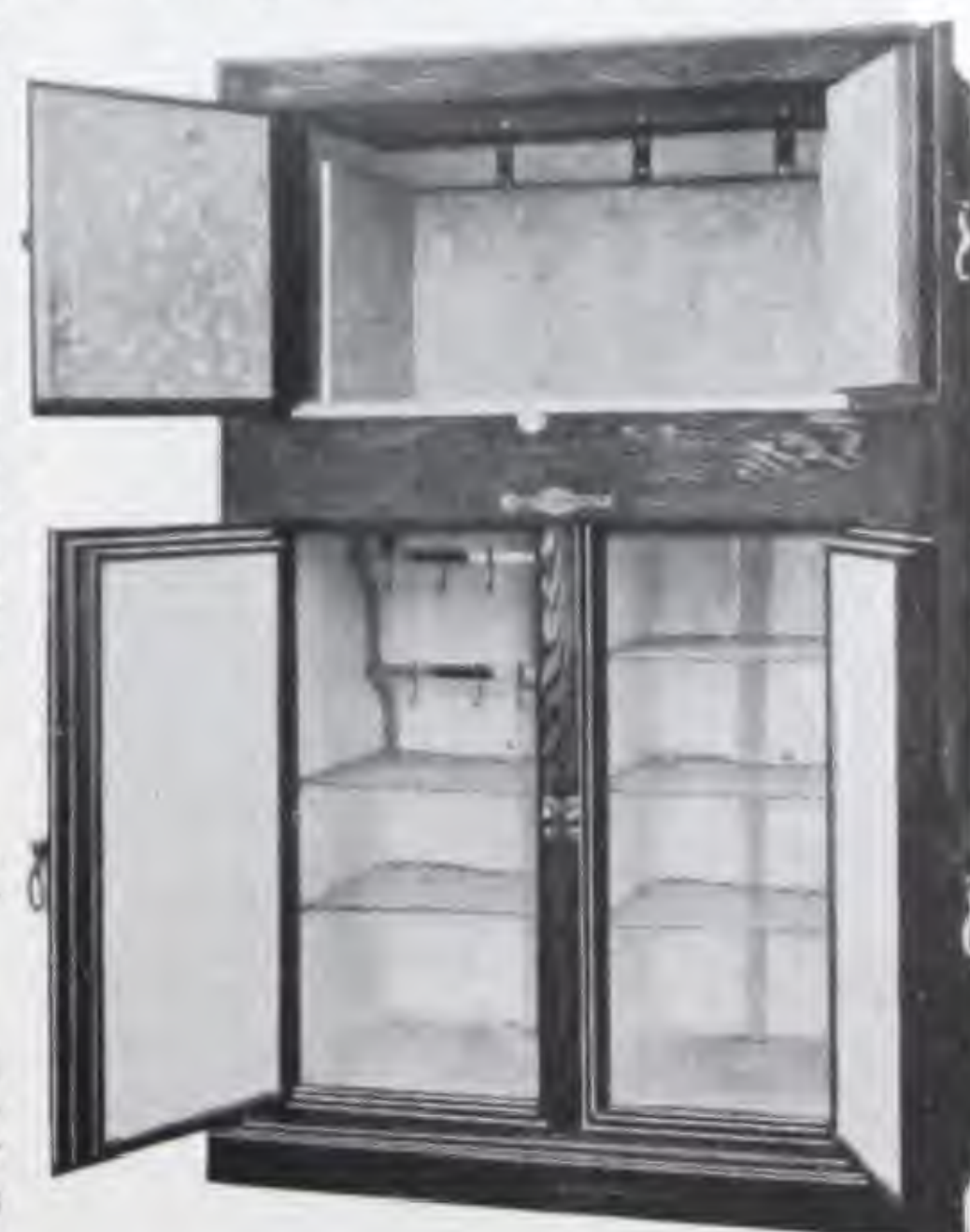
Counters of white opal, the most sanitary, and with protection plate-glass display, "Patented," for mechanical refrigeration or icing.

DESIGNING DEPARTMENT.

Most of the largest and important refrigeration installations in the country have been made by John Hillock & Co., and the experience of our Designing Department is entirely at your service either in an advisory capacity or for the submission of detailed designs and estimates of complete cost. You will also find it helpful to have the Hillock Catalogues of stock units conveniently at hand. Write for them.



ARCTIC COLD STORAGE DOOR.

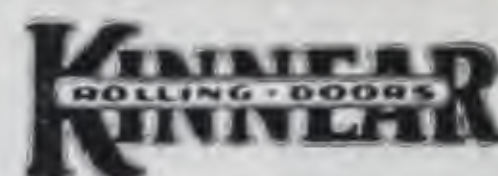


ARCTIC HOUSEHOLD REFRIGERATOR.

THE KINNEAR MANUFACTURING COMPANY

MANUFACTURERS OF

STEEL ROLLING DOORS.
STEEL ROLLING SHUTTERS.
WOOD ROLLING DOORS.
WOOD ROLLING PARTITIONS.



STEEL BIFOLD DOORS.
WOOD BIFOLD DOORS.
VERTICAL SLIDING DOORS.
CRANE OPENING DOORS.

FACTORY AND HOME OFFICE:

COLUMBUS, OHIO, U.S.A.

CLASSIFICATION. Kinnear Doors and Shutters are commonly classified under two heads, viz.: Service types and Labeled types.

Service types include all those types of doors used on openings where closure is for service purposes only and where installation of doors does not influence insurance rates. These types are usually non-automatic and can be constructed either for manual or motor operation. These types are available for any type of architecture and for large or small openings.

Kinnear labeled types have been tested and approved by the Underwriters' Laboratories and can be furnished bearing their label for the following types of openings.

- Class A.—Openings in Fire Walls.
- Class B.—Openings in Vertical Shafts.
- Class C.—Openings in Partition Walls.
- Class D.—Openings in Exterior Walls.

Under this classification we build a comprehensive line of doors, the newer designs carrying improvements covered by patents which are supplied only on Kinnear Doors.

We make a door for every purpose properly designed and manufactured of high class materials by an organization with a quarter of a century of practical experience behind them. Submit your door problems for expert treatment.



ABACUS NO. 2

This type is designed and labeled for openings in buildings of joist construction, brackets and mechanism being entirely removed from the possibility of falling timbers in case of fire.



BIFOLD.

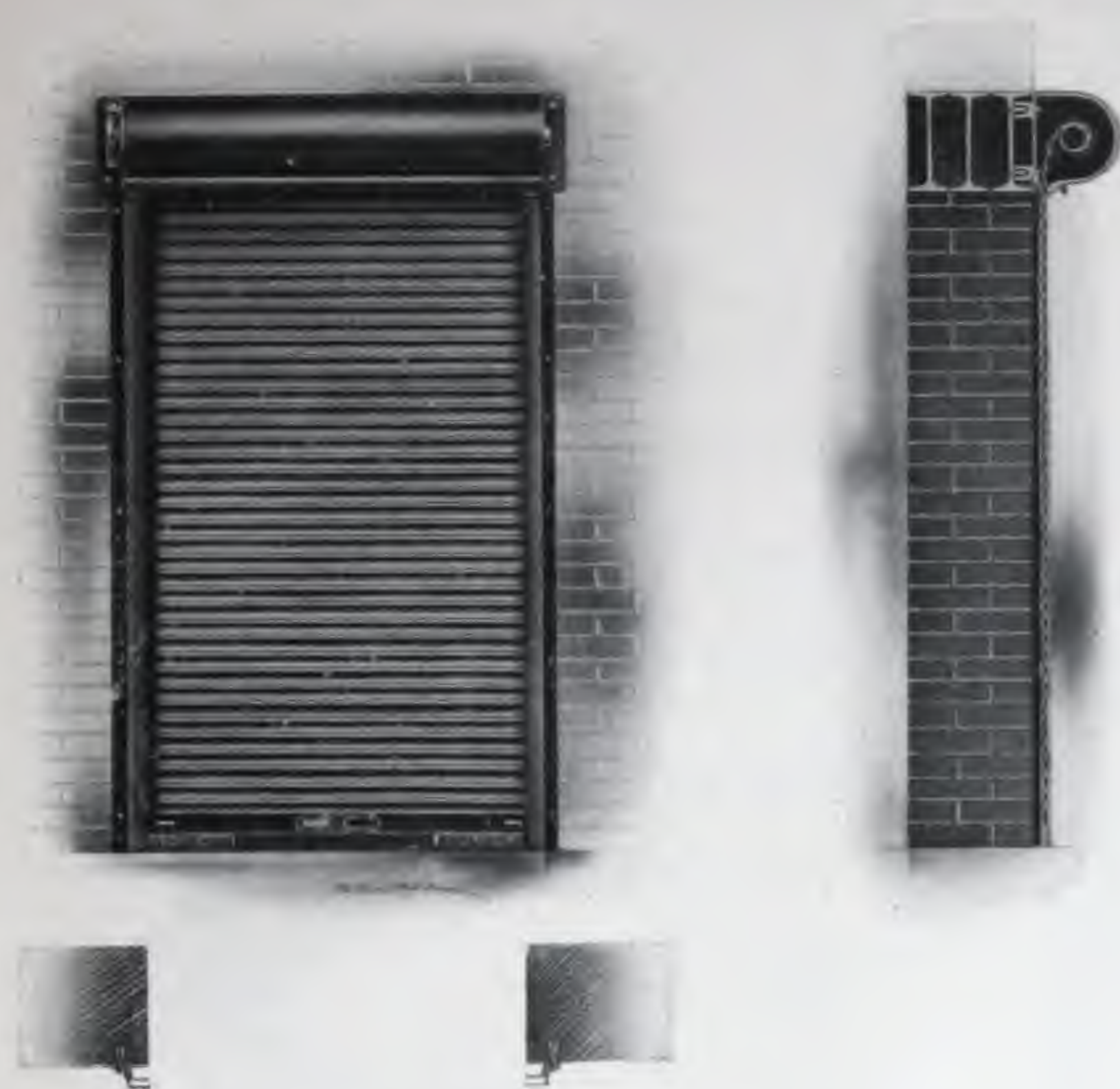
Wood or Steel Bifold doors are designed particularly for buildings where light is a necessity. The upper panel is built to carry large glass area.

Mounted on face of wall, counter-balanced and operated by means of reduction gearing and endless chain. Suitable for warehouses, piers and freight houses.



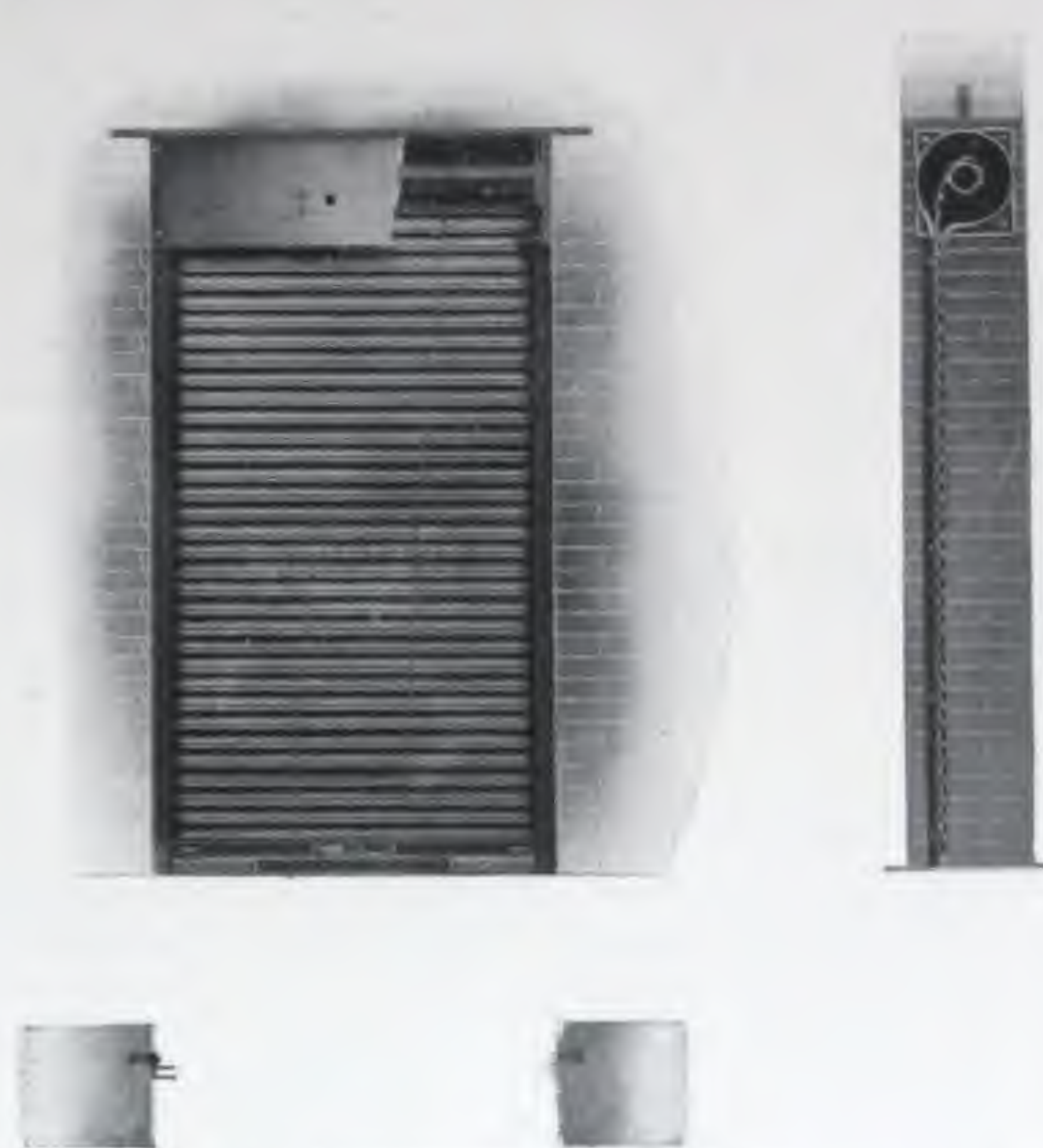
ABACUS NO. 1.

This type is designed and labeled to be mounted on the face of wall. It can be used in fireproof buildings or where the floor above is of fireproof construction.



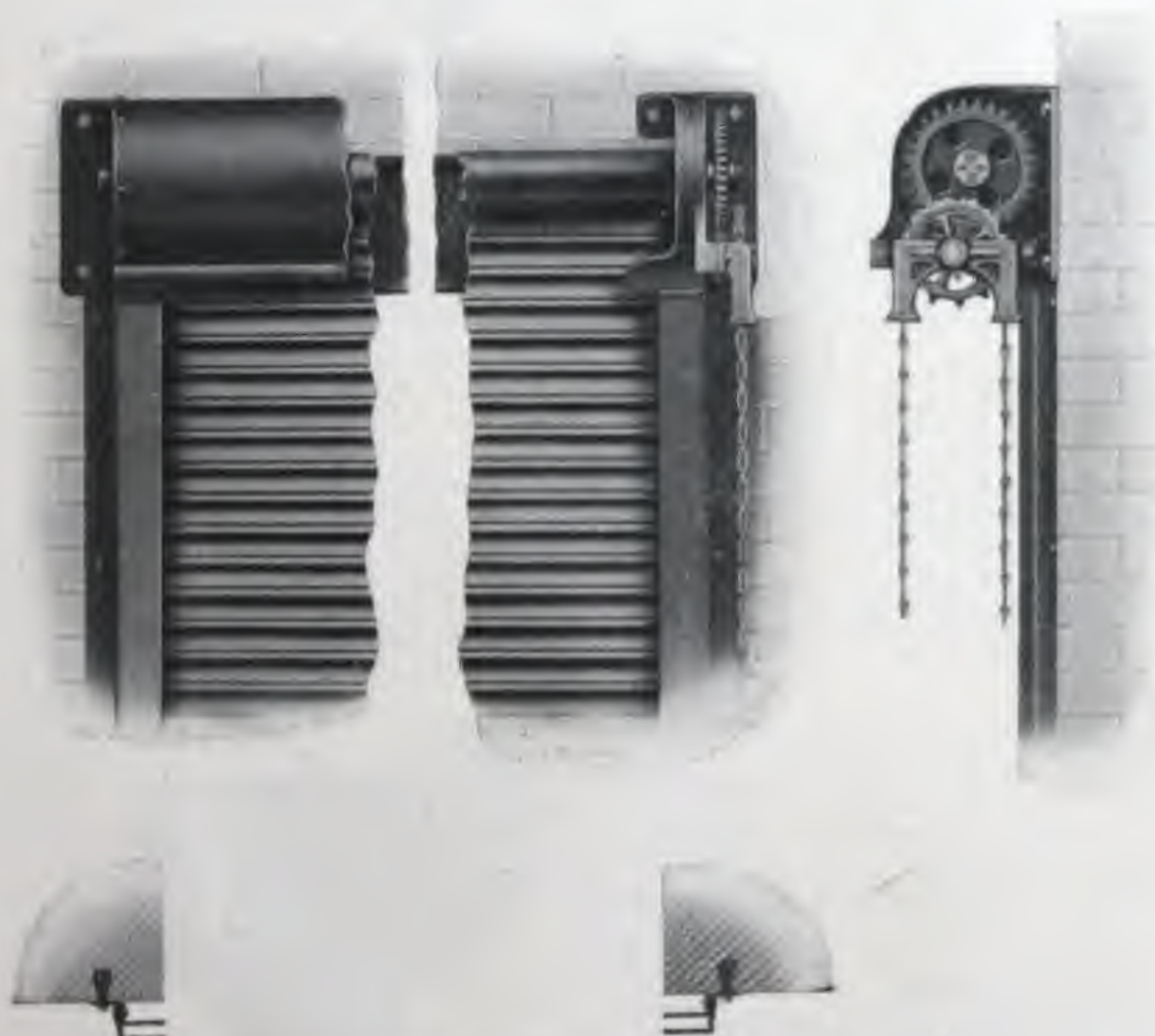
CONSTRUCTION No. F.M. 10.

Doors overlap the opening at sides and top. Coil and grooves are placed on face of wall. Door is counterbalanced by springs and operated by means of handle in bottom bar.



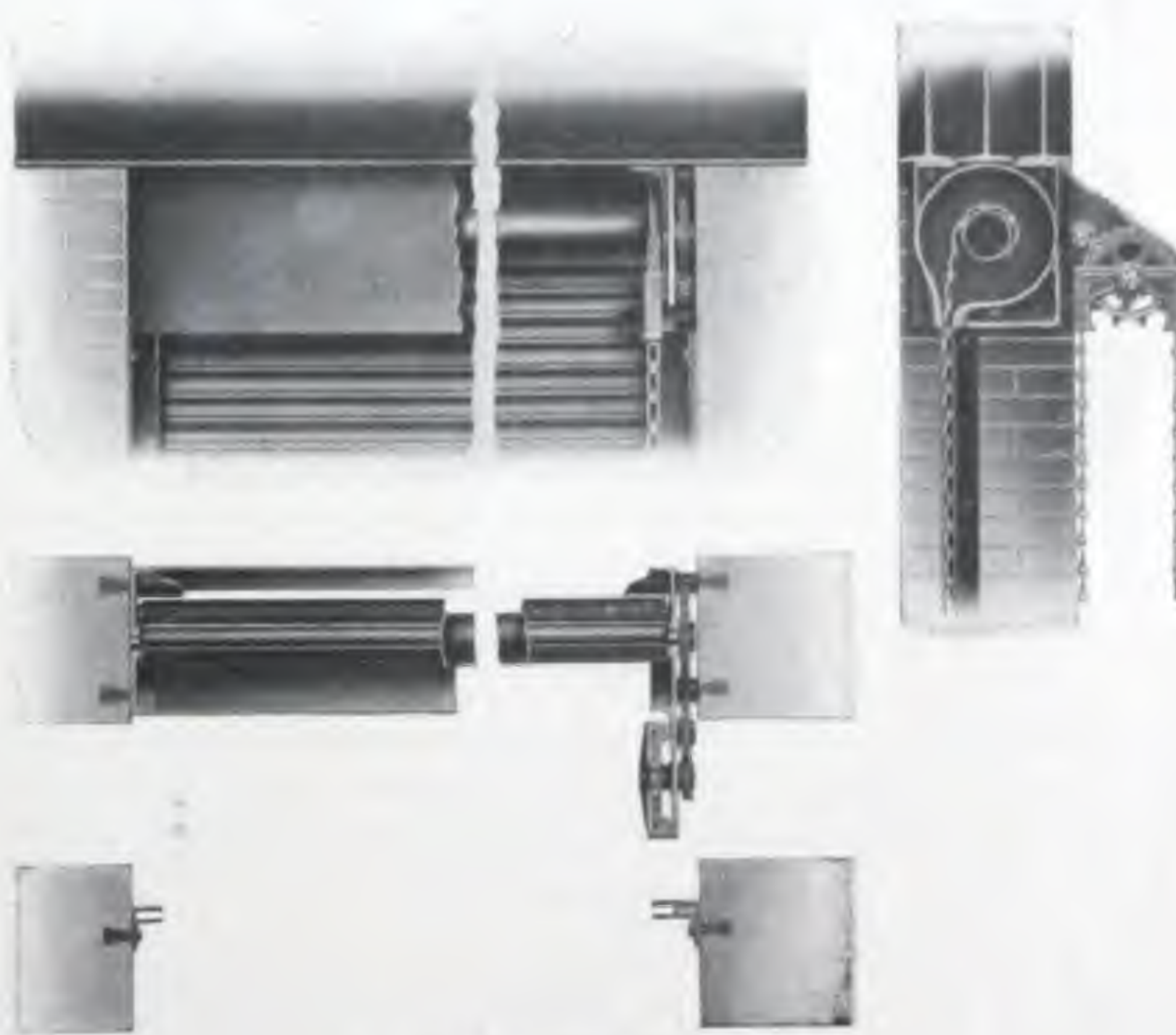
CONSTRUCTION No. B.M. 10.

Grooves and coil are placed between jambs. The door is counterbalanced by springs and operated by means of handle placed in bottom bar. Coil is enclosed in a plain galvanized hood. For special requirements this can be ornamented if desired.



CONSTRUCTION No. F.H. 20.

Grooves and coil are placed on face of wall. Door is counterbalanced by springs and operated by means of endless chain, sprocket and gear. When used as a fire-door it can, if required, be equipped with an automatic closing device. Special designs will be furnished on application.



CONSTRUCTION No. B.H. 20.

Coil and grooves are placed between jambs. Door is counterbalanced by springs and operated by endless chain and gear. Coil is enclosed in plain galvanized hood. Modifications of this design can be furnished.

GEO. W. REED & CO., LIMITED

37 ST. ANTOINE STREET,
MONTREAL, QUE.

PRODUCTS.

Manufacturers of "ALMETL" FIRE DOORS and SHUTTERS; "ANCHOR BAR" SKYLIGHTS; "BURT," "STANDARD ROTABLE" and other VENTILATORS; BOIS INTERLOCKING STEEL STAIRS.

SERVICE.

For the benefit of Architects, Engineers and Clients, we maintain a competent engineering staff, whose services are always at their disposal, gratis.

ALMETL FIRE DOORS AND SHUTTERS.

Since the last issue of this book, we have obtained the sole Canadian manufacturing rights for Evans "Almetl" Fire Doors and Shutters.

These Fire Doors and Shutters are designed on advanced scientific principles and are built of heavy corrugated steel, galvanized. The steel sheets are laid transversely, and are interlined with asbestos roll board. Ample provision is made for contraction and expansion without distortion to the frame.

Excess air space, combined with asbestos roll board, adds greatly to the non-conductivity of the "Almetl."

The frames are $\frac{3}{16}$ " or $\frac{1}{4}$ " x $2\frac{1}{2}$ " bar steel, reinforced on all edges by an extra heavy binder of galvanized steel, which forms a box for the panel and prevents damage to the door or shutter.

Evans "Almetl" Fire Doors and Shutters weigh much less per square foot than wood core metal-clad doors; the average being five pounds per square foot.

All hardware used is of the most modern type and has been approved by the Underwriters.

Evans "Almetl" Fire Doors and Shutters are built under the supervision of the Underwriters' Laboratories, and bear their label.

ROOFING.

Seventy years of experience lies behind our reputation as builders of good roofs of all types.

We will be glad to furnish estimates and collaborate in every way possible.

ANCHOR BAR SKYLIGHTS.

The "Anchor Bar" Cold Rolled Steel Skylight was designed to meet an ever-increasing demand for a skylight which would be rigid, efficient and indestructible. The bar proper consists of two structural members, a 2 " x $1\frac{1}{2}$ " tee and $1\frac{1}{2}$ " x $1\frac{1}{2}$ " angle, which are fastened together with forged steel clamps at sufficient intervals to insure great strength and rigidity.

Especially attention is called to method of securing skylights to curbs. This feature gives exceptional strength. The thrust of the skylight is directly against the heavy angle, which in turn is lag screwed to curb and cannot give way unless the curb breaks. The glass rests on flange of tee on a heavy bed of wool felt, rendering it impervious to vibration.

Joints are made tight by cold rolled copper or galvanized iron caps secured by means of brass bolts to non-corrosive metal saddles which are spaced on the bar at about three-foot centres.

Condensation is caught in angle of frame and carried to roof gutter by special channel. The many exclusive features of the "Anchor Bar" Skylight will commend it to all up-to-date designers and owners.

INTERLOCKING STEEL SHEET STAIR FORMS.

We are manufacturers of the "Bois" Patent Interlocking Steel Sheet Stair Forms, the most scientifically designed metal stair on the market. Owing to their interlocking feature which eliminates the iron angle supports necessary in other types of metal stairs, the "Bois" is more rigid and cheaper to erect. Suitable for any type of finished tread such as asphalt, cement, slate or marble.

VENTILATORS.

We are the sole licensed Canadian manufacturers of the celebrated "Burt" Ventilators. These ventilators are made in five distinct types, both forced and natural draft, in sizes to suit every possible condition.

FLOORING.

We specialize in flooring for public institutions, mills, factories, etc.

Reed's Rock Mastic Asphalt Floors are elastic, noiseless, tough, durable, non-absorbent, acid-resisting, sanitary, vermin-, water- and dust-proof. They present an absolutely smooth surface without joints or seams and afford an unusually sure foothold; will not crack from contraction, expansion or settling of building.

Vulcanite Flooring—Suitable for basements which are usually damp and cold. Vulcanite is laid as an under flooring, upon which either cement or wood finish can be laid, or can be laid as a finished floor. Vulcanite Flooring is an absolute insulator and will positively prevent dampness and vermin.

Mill Flooring (laid directly on ground)—This flooring prevents rot and dampness and gives a strong, solid foundation for machinery, etc.

STRIP FILLING.

Where strip filling is done with cinder concrete on top of reinforced concrete slab, the cinder concrete has a tendency to draw the latent moisture from the stone concrete, which in turn causes the wood flooring to swell and buckle. Reed's Strip Filling will overcome this trouble as it is impervious to dampness.

INFORMATION.

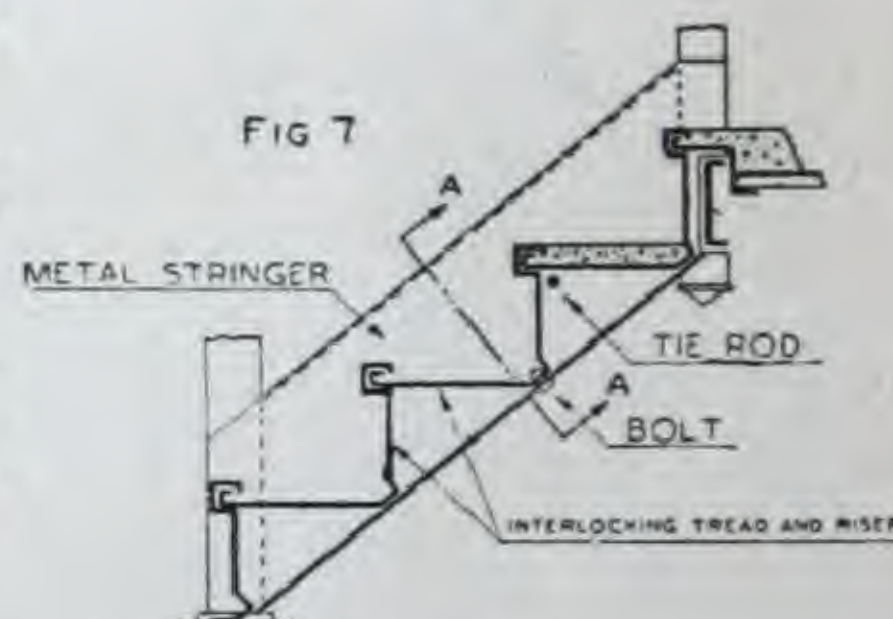
Detailed information in respect to any of the above items will be gladly forwarded on request.



EVAN'S "ALMETL" DOOR.



SECTION OF BAR.



SECTION OF METAL STAIRS



BURT BALL-BEARING REVOLVING VENTILATOR.

THE PELLE COMPANY

MANUFACTURERS OF ELEVATOR AND WAREHOUSE FIRE DOORS.

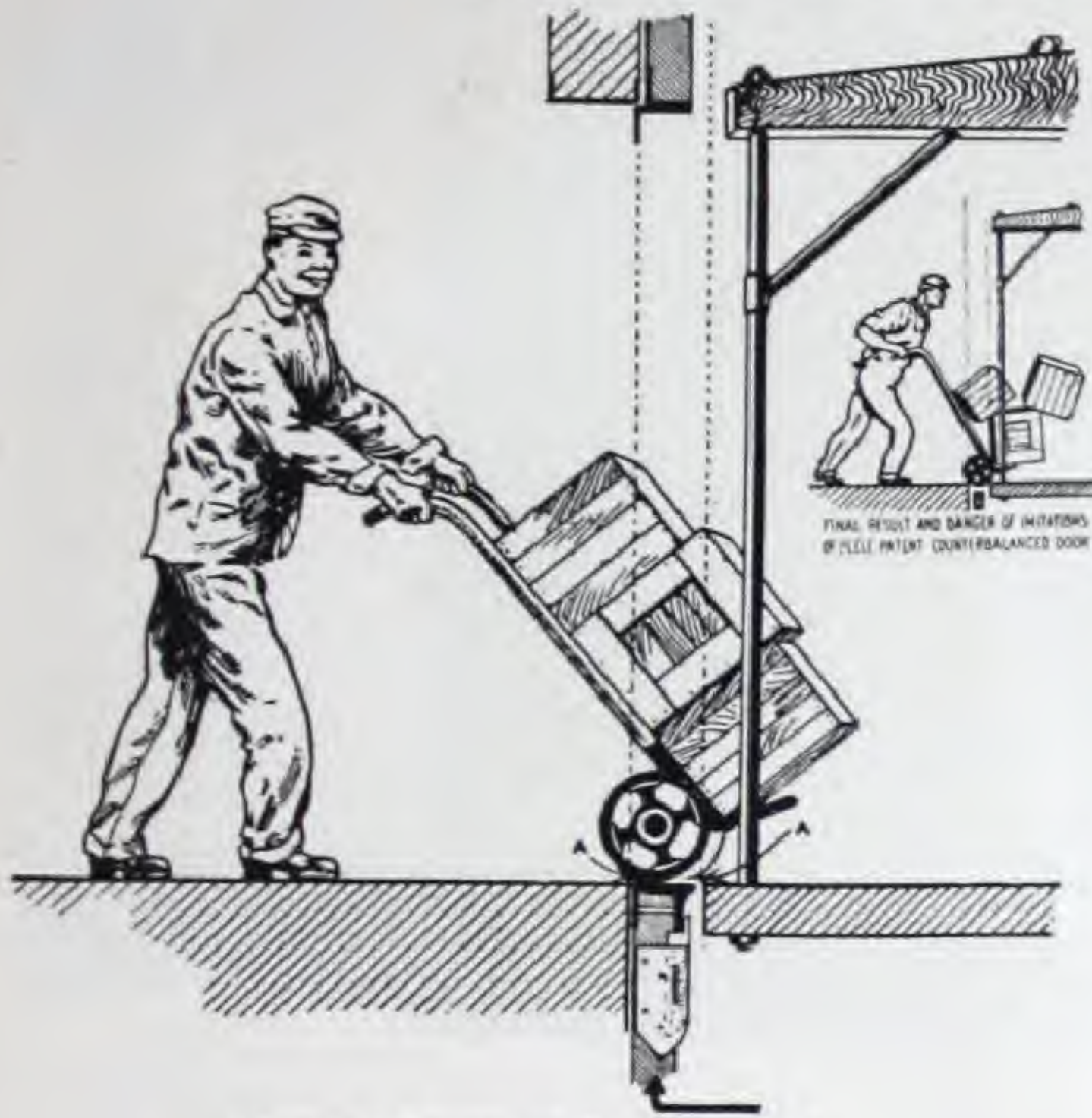
STEWART AND FLUSHING AVENUES,
BROOKLYN, NEW YORK.

FOR AGENT NEAREST YOU, COMMUNICATE WITH MAIN OFFICE.

PRODUCTS.

Approved and labelled by the Underwriters' Laboratories:—

"PEELLE" COUNTERBALANCE TRUCKABLE ELEVATOR FIRE DOORS (PATENTED), "PEELLE" TEL-CO-DOR-PATENTED, "PEELLE" ALL-METAL TRUCKABLE COUNTERBALANCE ELEVATOR DOORS (PATENTED).



"PEELLE" TRUCKABLE ELEVATOR DOOR.

Note special adjustable stop which firmly binds door, when open, to building sill. This is the only counterbalance door that fills gap between car and building floor firmly and perfectly flush with building sill. "Peelle" Corrugated Steel Elevator Door has additional similar binding and supporting at centre or at more frequent intervals according to size of door and amount of trucking it is subjected to. Running chains are not used in the support of "Peelle" Doors when open. The "Peelle" patented truckable feature has been infringed and users should beware of imitations.

STANDARD SPECIFICATIONS.

The hanger bar at the upper surface of the lower panel is reinforced and extended beyond the panel frame, resting on solid adjustable stops riveted to the guide rails so that all weight is removed from the turnbuckles and chains when door is open. This permits the continuous trucking upon the sill thus formed, which can be made to sustain any specified load.

The doors are made of two thicknesses white pine covered with best grade I.C.terne tin, set and bolted into angle iron frames with reinforced corners, hung on $\frac{1}{2}$ " turnbuckle rods and No. 5 Morton steel chain running over $4\frac{1}{2}$ " double race ball-bearing pulleys. The doors operate on the inside of the hatch with anti-friction guide shoes working in substantial steel guides.

A FEW CANADIAN INSTALLATIONS.

INSTALLATIONS.

CANADIAN PACIFIC R.R. Co., Windsor Station, Montreal.
McCORMACK MFG. Co., London, Ontario.
AMERICAN CAN CO., LTD., Vancouver, Hamilton, and Niagara Falls.
LAKE LOUISE CHALET, Alberta.
NORTH TORONTO STATION.
HEINZ MFG. Co., Leamington, Ontario.

BARRETT MFG. Co., Montreal.
ARMOUR & Co., Hamilton, Ontario.
IMPERIAL TOBACCO CO. LTD., Leamington, Ontario, and Montreal.
JERGENS SOAP Co., Perth, Ontario.
HOLEPROOF HOSIERY, London, Ontario.
JULIAS KAYSER, Sherbrooke, Quebec.
WM. NEILSON, Toronto.



TYPE R-6 WOOD TIN-CLAD DOORS FROM LOFT SIDE.

A few of the "Peelle" Doors installed in the Albermarle Building, showing metal-clad panels. 65 "Peelle" Patented Doors installed in this building.

DOUGLAS BROS., LIMITED

124 ADELAIDE ST. WEST,
TORONTO, ONT.

19 ST. MAURICE STREET,
MONTREAL, QUE.

PRODUCTS.

Manufacturers of UNDERWRITERS' STANDARD FIRE-DOORS; METAL WINDOWS; KALAMEIN IRON, COPPER AND BRONZE DOORS; SKYLIGHTS; SHEET METAL AND ROOFING WORK.



SERIES OF KALAMEIN COPPER DOORS AND TRIM INSTALLED BY US IN SHRA'S THEATRE, TORONTO.

FACILITIES.

Our entire organization is made up of skilled mechanics with lifelong experience.

We carry a large stock of standard mouldings, jambs and trim, and are in a position to produce anything of a special nature required.

ESTIMATES.

We will gladly submit estimates on receipt of architects' plans and specifications, or from rough sketches. Send us your enquiries.



KALAMEIN IRON DOORS, TRIM AND FANLIGHTS, INSTALLED BY US THROUGHOUT THE KENT BUILDING, TORONTO.

HORTON STEEL WORKS, LIMITED

FORMERLY

CANADIAN CHICAGO BRIDGE & IRON CO., LIMITED

FOUNDED BY HORACE E. HORTON.

GENERAL SALES OFFICE: - 1009 BANK OF TORONTO BLDG., MONTREAL.

WORKS:

BRIDGEBURG, ONTARIO.

PRODUCTS.

Our specialty is the design, manufacture and erection of ELEVATED STEEL TANKS and STEEL STANDPIPES for Water Storage for Municipal, Railway and Automatic Sprinkler Service.

We also build various classes of Steel Tanks for the storage of wood pulp, molasses, alcohol, oils, acids, tar products and other liquids.

Also miscellaneous steel plate work, such as Steel Smoke Stacks, Steel Coaling Stations, Plate Girders, Steel Lock Gates, Penstocks and Steel Sector Dams.

STEEL WATER TOWERS.

Approved designs for all kinds of service and to meet any insurance board specifications—the results of fifty years' experience. We build three main types, known as the hemispherical, elliptical and conical bottom tanks, the merits of each type being given in our illustrated catalogues.

SERVICE.

Our engineering department offers its services in the design of any special tanks or plate work under consideration.

LITERATURE.

Our Catalogue, No. 11, will be gladly mailed upon request.



STEEL SPRINKLER TANK FOR INDUSTRIAL PROTECTION.



STEEL STANDPIPE, MUNICIPAL WATERWORKS.



STANDARD CONICAL BOTTOM RAILWAY WATER TANK.



STEEL PENSTOCK, HYDRAULIC POWER HOUSE.



FITTING UP A SPECIAL OIL STORAGE TANK.



STEEL DIGESTER, SULPHITE PULP MILL.



ELEVATED WATER TANK, WESTERN LUMBER MILL.



SURGE TANK FOR HYDRAULIC POWER LINE.



CANADIAN SPECIAL, ANTI-FREEZING RAILWAY WATER TANK.



PULP STORAGE TANK, ONTARIO PAPER MILL.

CANADIAN DES MOINES STEEL COMPANY, LIMITED

DESIGNERS, MANUFACTURERS AND ERECTORS OF STRUCTURAL
STEEL AND STEEL PLATE WORK.

OFFICE AND PLANT:

207 INSHES AVENUE, CHATHAM, ONTARIO.

70 ST. JAMES STREET, MONTREAL, QUEBEC.



DES MOINES

SPECIALTY.

ELEVATED STEEL TANKS and STANDPIPES for Municipal and Industrial Water Supply and Fire Protection, and for Railway Locomotive Service.

PRODUCTS.

ELEVATED STEEL TANKS, STANDPIPES; and STEEL STORAGE TANKS of all Types and Sizes, for Industrial, Municipal, and Railway Service.

Also AGITATORS; CONDENSERS; COMPLETE OIL REFINERIES; CYLINDRICAL CONTAINERS for Storage, or for High or Low Pressures; STILLs; RIVETED STEEL PIPE; SMOKE STACKS; MILL BUILDINGS and MANUFACTURING PLANTS; STORE, OFFICE, SCHOOL and CHURCH BUILDINGS; BARGES; BINS; DREDGES; COALING STATIONS; WIRELESS TOWERS; BRIDGES; VIADUCTS; Etc.

FACILITIES.

Our plant, with but probably one exception, is the most complete and best equipped of any structural steel company in Canada. Large stocks of channels, angles, bars and beams are carried at all times.

SERVICE.

We maintain an Engineering Department to study your requirements and to assist without obligating you. We but ask the privilege of preparing designs and estimates on your requirements—and we give you the benefit of many years of concentrated effort and experience.

Further, we maintain a permanent erection organization of experienced men, who have erected Des Moines products in every section of the Dominion.

LITERATURE.

Printed matter, and any information you may desire, will be cheerfully sent, upon receipt of your request.

DES MOINES HIGHWAY BRIDGE, NEAR TILBURY, ONT. WE HAVE
EXCELLENT FACILITIES FOR THIS CLASS OF WORK.PART OF A COMPLETE OIL REFINERY DESIGNED, FABRICATED AND
ERECTED BY DES MOINES MEN.WE DESIGN AND FABRICATE CYLINDRICAL CONTAINERS FOR ALL
PURPOSES—STILLS, STORAGE AND PRESSURE TANKS, ETC.DES MOINES ELEVATED WATER TANK AT
HAMILTON.WE SPECIALIZE IN THE DESIGN, FABRICATION, AND ERECTION OF
STEEL STRUCTURES OF ALL KINDS.

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