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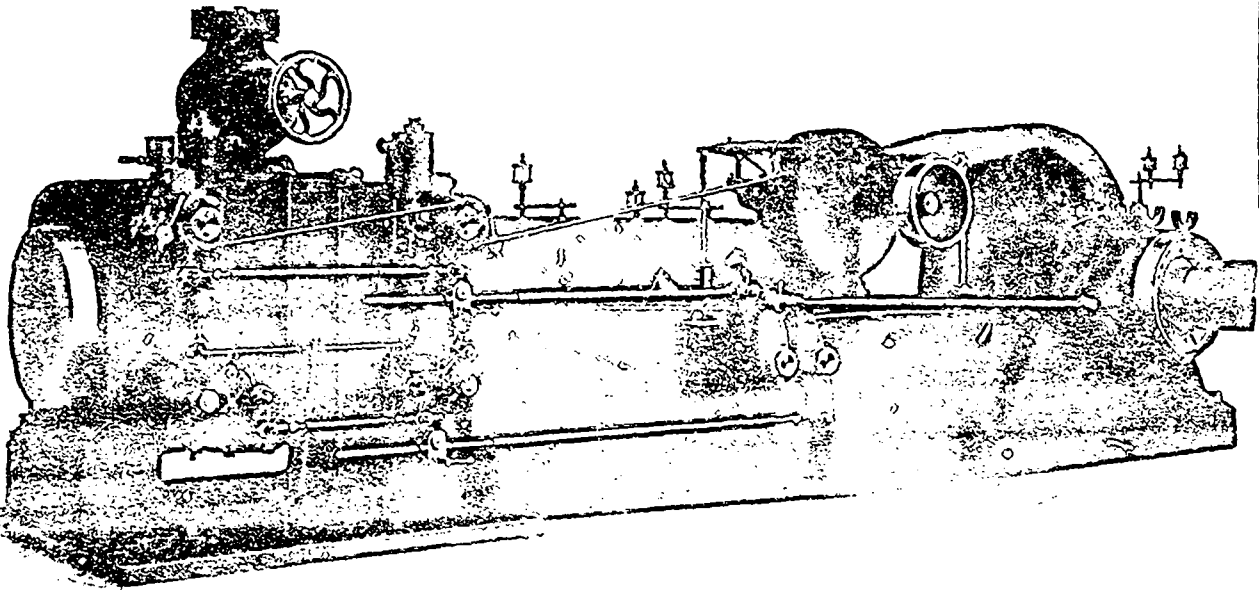
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Single Cylinder Heavy Duty Goldie Corliss, Steam Dash Pots.

We shall be pleased to forward to any address
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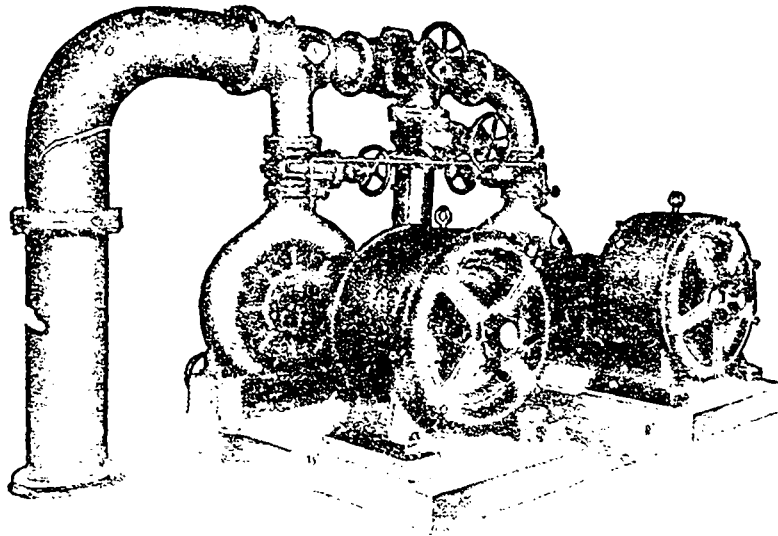
MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Rollers, Moffatt Heaters, Steam and Power
Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery,
Emission and Elevating Machinery, Safes, Vaults and Vault Doors. Ask for Catalogues, Prices and all information.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

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STEAM PUMPS
POWER PUMPS
FEED PUMPS
CONDENSERS

BOLLERS
METERS
TANKS
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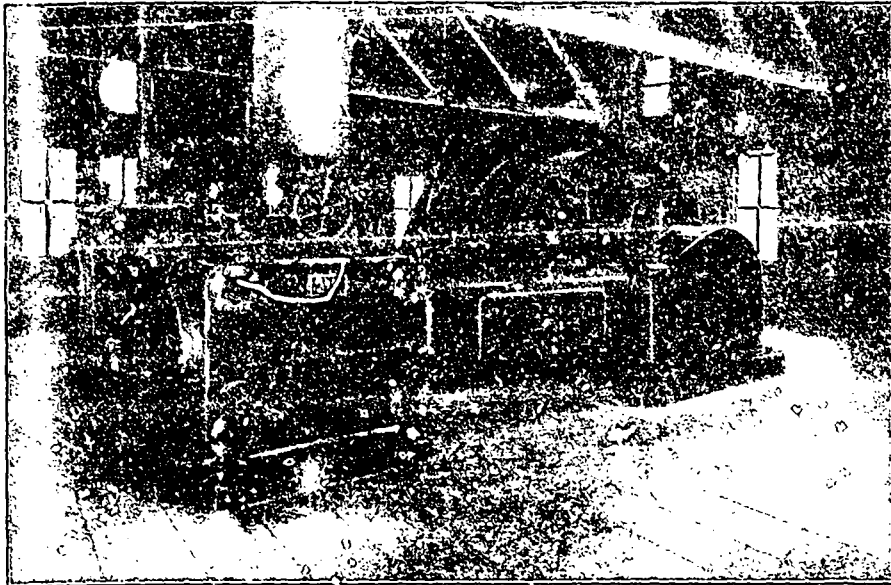
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The Turbine Pump, while operating at a constant speed, will maintain a practically constant pressure and deliver a variable amount of water from nothing up to the full capacity of the pump. This makes these pumps ideal for pumping directly into water mains. There is shown here a combination for either domestic or fire purposes at the Water Works Station of the Town of Lachine. It consists of two single stage 8 inch pumps, each driven by a 100 h.p. induction motor, and so arranged that they may be operated in series for domestic or in multiple for fire purposes. Each pump works against 160 lbs. pressure, and is capable of delivering 1,500,000 gallons in 24 hours. Bulletin 103 describing single stage Turbine Pumps will be sent on application to our nearest sales office.

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WORKS: MONTREAL. SALES OFFICES: NEW GLASGOW, MONTREAL, TORONTO, COBALT,
WINNIPEG, CALGARY, VANCOUVER

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 CORLISS ENGINE
 at Electric Station,
 Town of Owen Sound,
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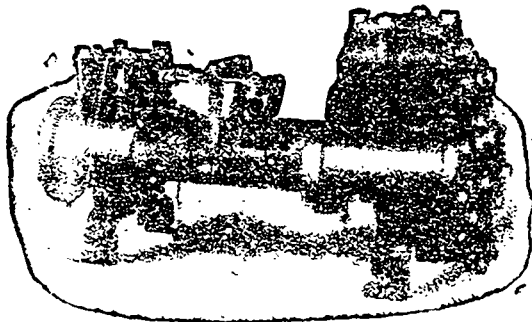
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DISTRICT OFFICES { Traders Bank Building, Toronto; William McKay, Manager.
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 Of Every Description



Any Capacity. Any Purpose.

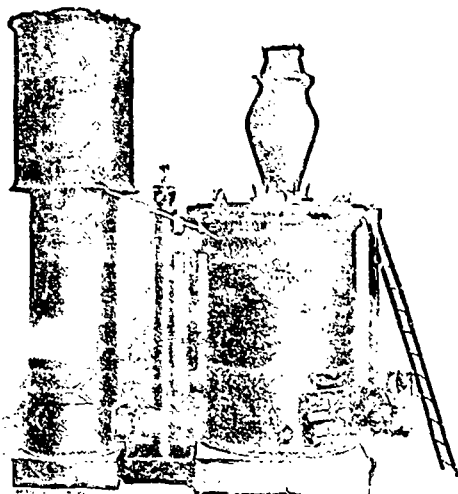
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Stronger, More Durable and 30% Cheaper than Leather.

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CROSSLEY BROS., Limited

(OF MANCHESTER, ENGLAND)

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Gas Engines, 1 to 1,000 H.P.

Suction Gas Plants up to 700 H.P.

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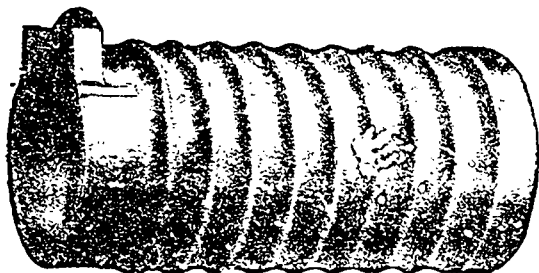
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Gas from Lignite, Sawdust, Wood, Peat, &c

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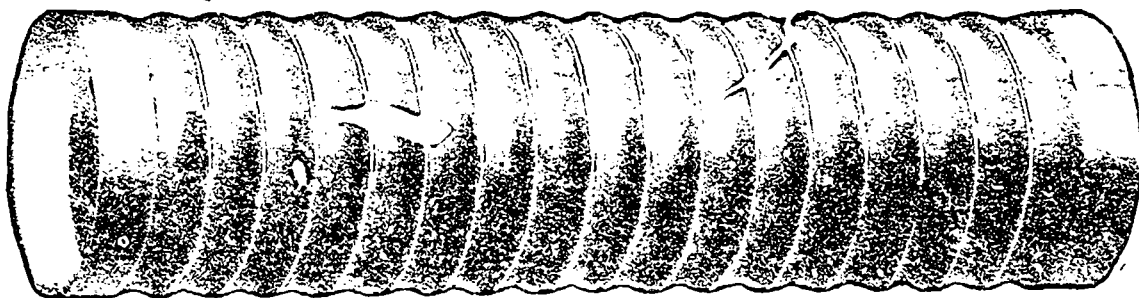


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With Plain Ends or Flanged to any required shape

Uniform Thickness, Easily Cleaned, Unexcelled for Strength, Unsurpassed for Steaming Capacity

The universally satisfactory record of "THE MORISON" proclaims it the best furnace made



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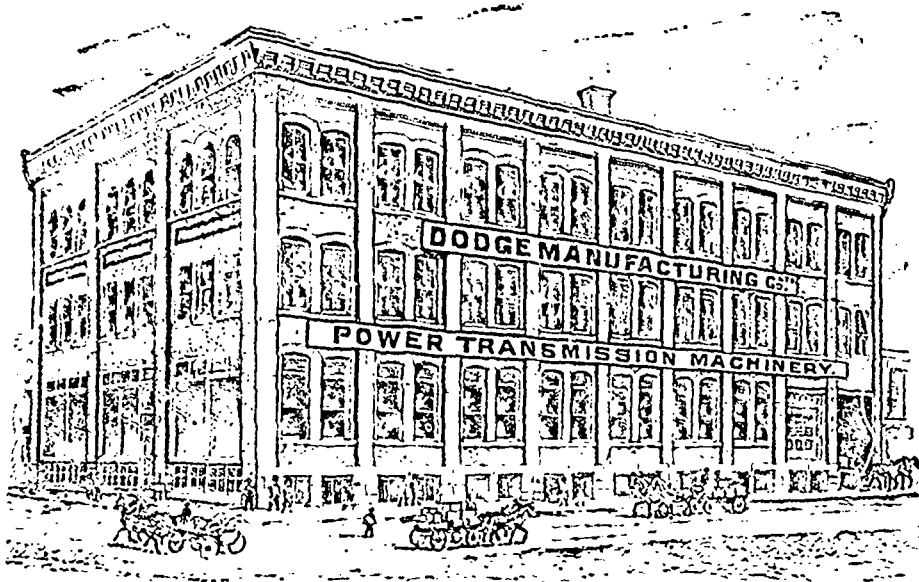
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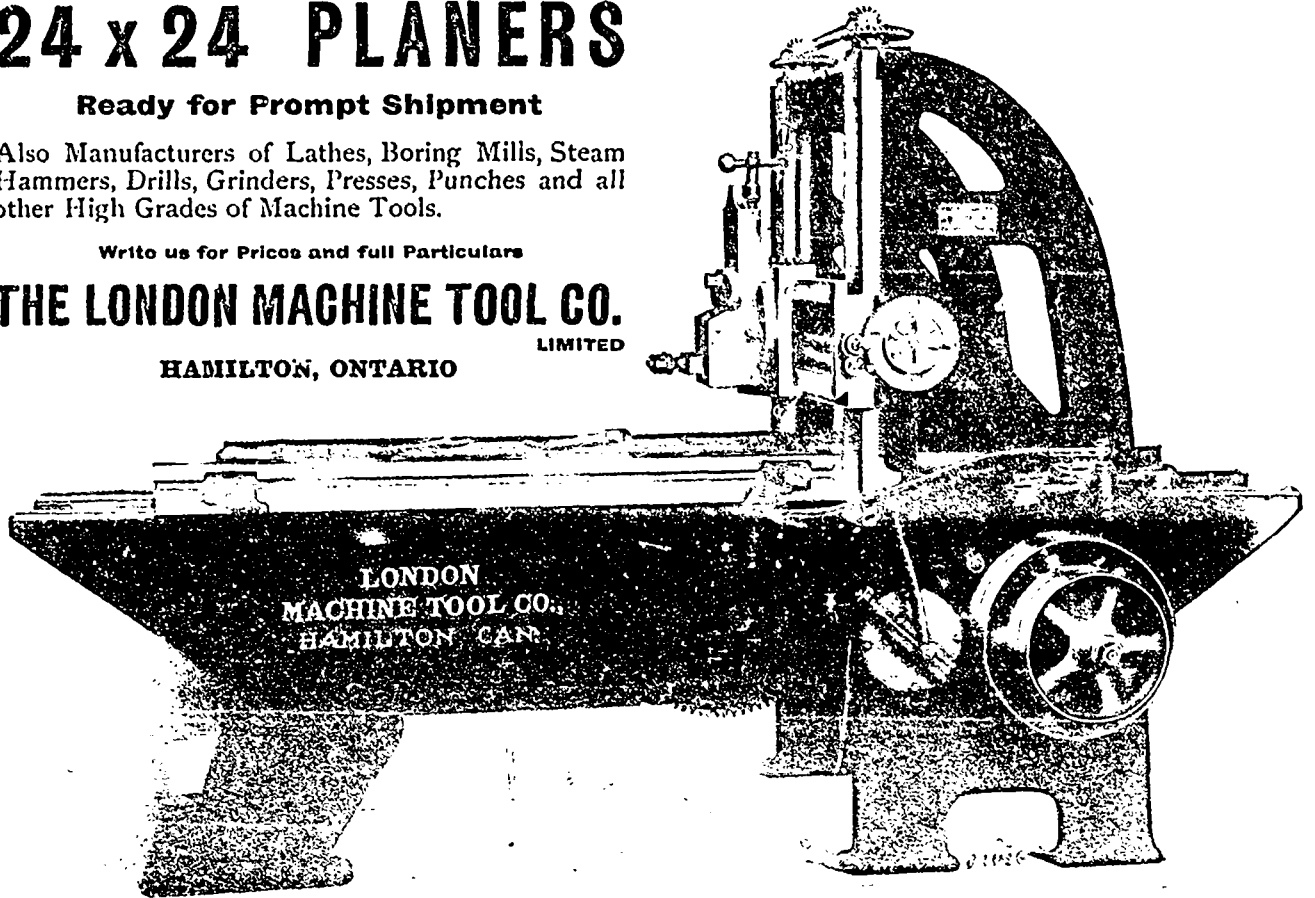
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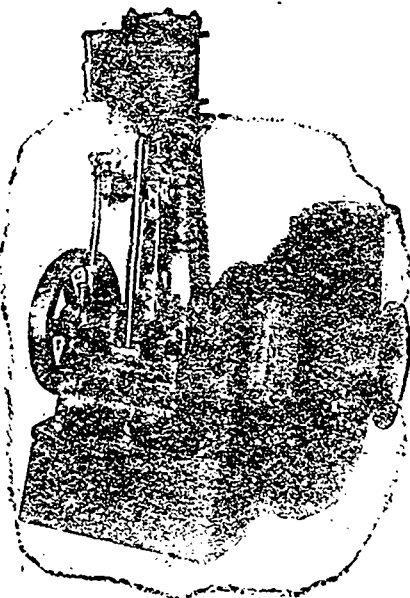
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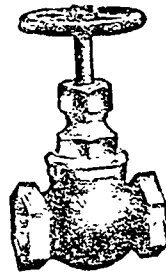


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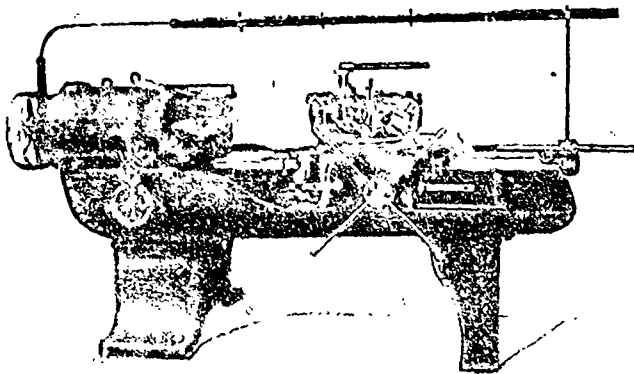
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HIGH GRADE,
TESTED &
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THE KERR ENGINE CO.

MANUFACTURERS
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The JONES & LAMSON or HARTNESS Type



FLAT TURRET LATHE

As built by the STEVENS COMPANY of Galt, Limited

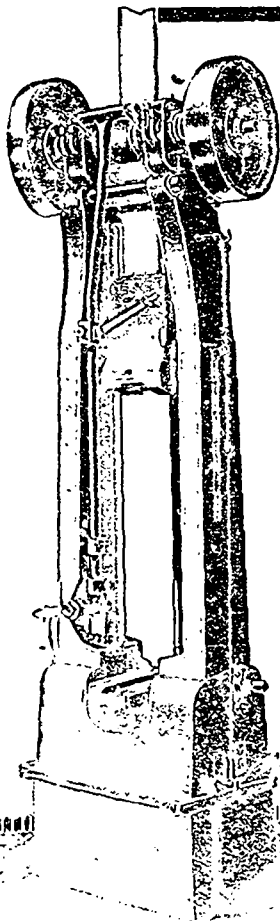
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The Flat Turret Lathe is now recognized as indispensable in all machine shops, it being a remarkable profit-maker.

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Ask for Catalogue describing this machine.

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All Machinery Parts in Steel, Iron, Copper and Bronze

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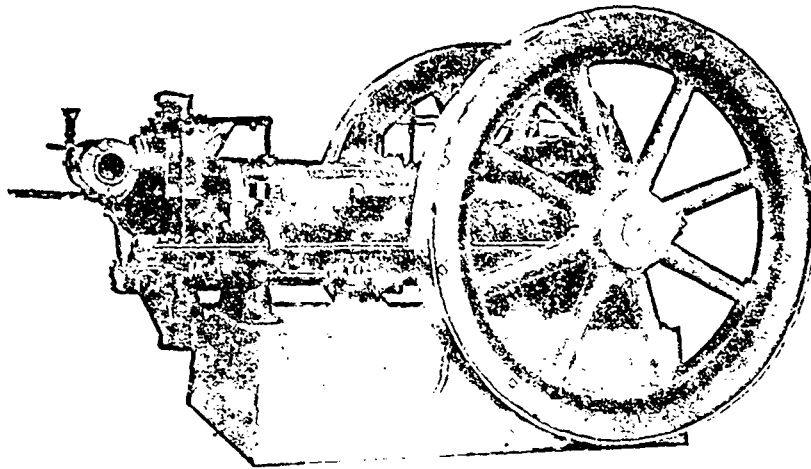
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MONTREAL ST. JOHN TORONTO WINNIPEG CALGARY VANCOUVER

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Mr. Power **You Are Anxious**
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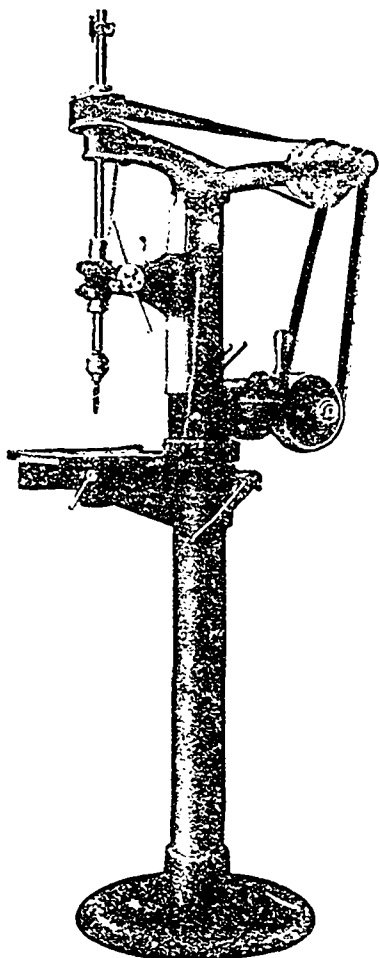
WILL CUT YOUR POWER COST IN HALF
SAFE EFFICIENT RELIABLE

Catalogues and Descriptive Matter on application

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MONTREAL TORONTO ST. JOHN WINNIPEG CALGARY VANCOUVER

Sensitive Drilling Machines

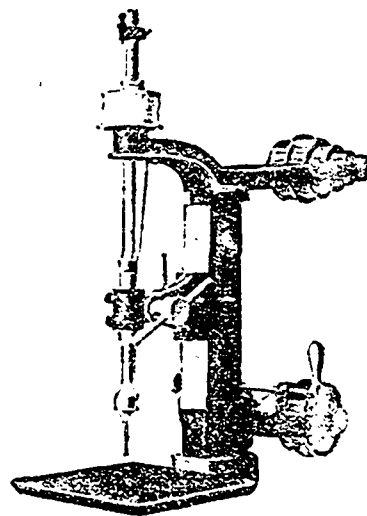


No. 1 Column Drill

To the Manufacturers of Canada: Why not buy sensitive drill presses made in Canada, which have time-saving features that no other similar machine on the market possesses.

These machines will take any drill with No. 1 taper shank, directly in the spindle, which is accurately bored to suit.

When used with chuck, any size from No. 0 to $\frac{1}{2}$ inch straight shank drills may be used.



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THE ONLY DRILL PRESS ON THE MARKET ON WHICH THE TABLE TURNS COMPLETELY AROUND THE COLUMN AT ANY POINT

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HIGH GRADE BAR IRON

COMMON IRON ROLLED FROM BEST
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SPECIAL REFINED IRON

FORGINGS

OF EVERY DESCRIPTION IN ROUGH OR
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CAR AXLES

OPEN HEARTH BAR STEEL

IN ANY DESIRED CARBON
SPECIALTY OF STEEL FOR SCREWS AND
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FOUNDRY - ASIC - MALLEABLE

DAILY OUTPUT, 500 TONS

R. R. SPIKES

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BRIGHT COMPRESSED STEEL SHAFTING

From 3/8 to 5 Inches in Diameter. Guaranteed Straight and True to within 1/500 of an Inch.

Spring. Reeled Machinery, Tire, Toe Caulk, Sleigh Shoe, Angles, Special Sections and all Merchant Bar Steel. Sheet Steel up to 48 inches wide.

RAILWAY AND ELECTRIC RAILWAY CAR AXLES, FISH PLATES, SPIKES AND TRACK BOLTS

Tee Rails, 12, 18, 24 and 28 lbs. per yard.

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HEAD OFFICE--NEW GLASGOW, NOVA SCOTIA

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MADE BY THE FAMOUS OPEN HEARTH BASIC PROCESS.

Any casting from $\frac{1}{2}$ pound up to 4,000 lbs. supplied from two days to a week after receiving order. Rush orders may be delivered in one day. We will be glad to quote prices for your work.

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SAULT STE. MARIE, ONT.

is now booking orders for

STEEL RAILS

For delivery during the Season of 1908

Parties intending purchasing will find it to their interests to let us have their specifications at an early date so as to ensure desired deliveries.

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Manufacturers of the well-known

**"C.I.F." Three Rivers
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Suitable for Car Wheels, Cylinders and Fine Castings, where the utmost strength is required.

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UNSURPASSED IN STRENGTH BY SWEDISH, RUSSIAN OR AMERICAN CHARCOAL IRON.

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**IRON, STEEL,
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"The World's Cheapest Artificial Illuminant"

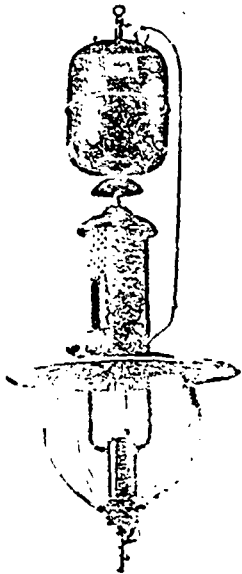
BURNS VAPORISED COAL OIL

An Absolutely Steady, Most Brilliant and Diffusive Light

**COSTS ONLY 2 CENTS PER HOUR
FOR 1,000 CANDLE POWER, ACTUAL**

Or About

One-Fourth the Cost of Electric Arcs, and
One-Sixteenth the Cost of Incandescent Electric



SELF-CONTAINED TYPE
FOR OUTDOOR USE
1,000 C.P.

Easily and Quickly Installed—No Machinery—No Danger

Each Lamp Complete in Itself, or they may be run in groups.

**DON'T INSTALL AN ELECTRIC PLANT UNTIL
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Largest Manufacturers in the World
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Thousands in Operation!**

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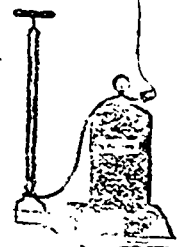
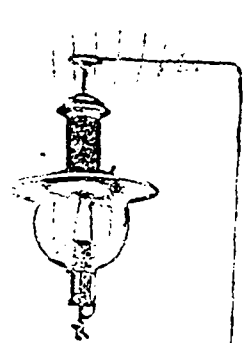
- The Grand Trunk Railway System
- The Canadian Pacific Railway Co.
- Messrs. H. & A. Allan
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FOR INSIDE USE

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TORONTO BRANCH,
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Bare and Insulated Electric Wire

Electric Light Line Wire, Incandescent and Flexible Cords.

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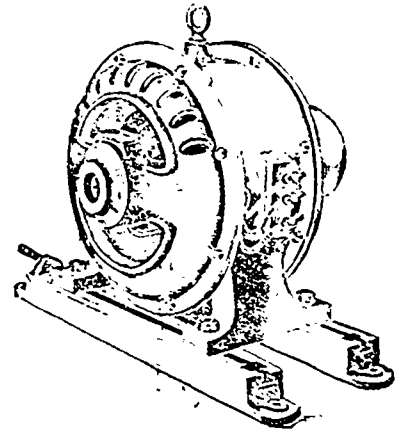
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**Motors, Dynamos,
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Telephones, Etc.**

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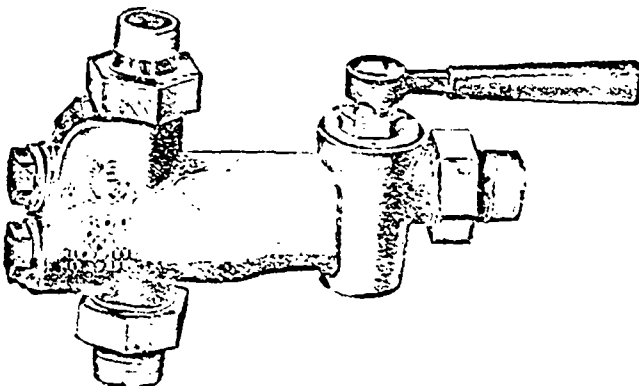
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**ALTERNATING CURRENT MOTORS
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REPAIRS PROMPTLY EXECUTED.

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EASY DOUBLE TUBE INJECTOR

Simple in Construction
No Moving Parts
No Complicated Valves
Not Restricted by Temperature
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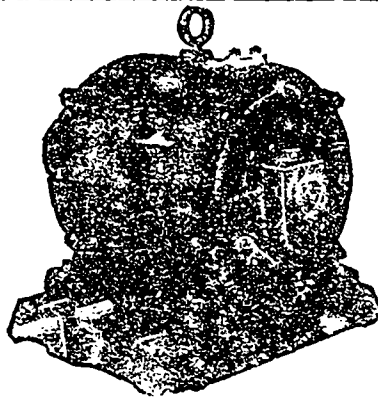
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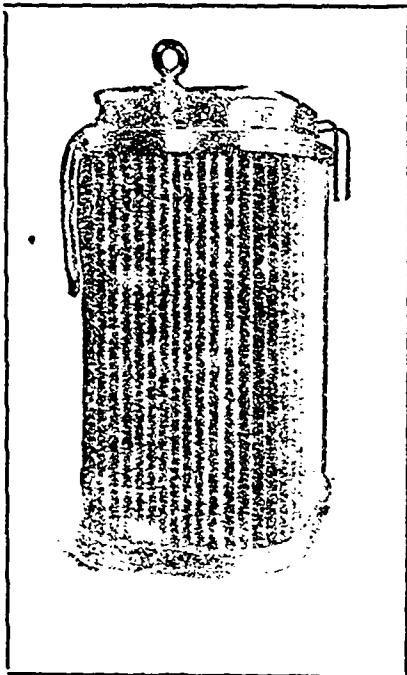
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DYNAMOS
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Over 2000 Machines in use
Repairs to all makes of
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LIMITED

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PURCHASING AGENTS' DIRECTORY

This department has been started to bring together those who have to sell specialties for the factory, mill or foundry and these buyers who are "in the market" for such lines. Readers of this paper will find this department one of the most useful features of the paper. Mention the paper when you make enquiries of advertisers.

Vises	Engraving and Die-Sinking	Buyers' Guide
 <p>VICES Bench Vises Drill Vises Miller Vises Pattern Makers Vises Got Our Prices. The Stevens Mfg. Co., Limited GALT, ONT.</p>	<p>TORONTO STAMP & WORKS, Ltd. (I. C. FELL & CO.) Rubber and Steel Stamps Seals and Brands. Memorial Brasses. Door Plates. 137 Church Street, - TORONTO</p>	<p>CANADIAN INDUSTRIAL BLUE BOOK Has advantages as a Buyer, and the Addresses of Manufacturers for the Seller. THE MANUFACTURERS LIST CO. P.O. Box 334, Toronto</p>
Files and Rasps	Gears	Rails
<p>R. SPENCE & CO. HAMILTON, ONT. FILE and RASP MANUFACTURERS AND RE-CUTTERS. A trial order solicited. Write for terms. C. P. MOORE, PROPRIETOR.</p>	 <p>RAWHIDE GEARS MANUFACTURED BY THE HORSBURGH & SCOTT CO Cleveland, Ohio.</p>	<p>JOHN J. GARTSHORE 83 Front St. W., Toronto. Rails and SUPPLIES, New and Secondhand. For RAILWAYS, TRAMWAYS, ETC. Old material bought and sold.</p>
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Furnace Cement	Hack Saws	Paper
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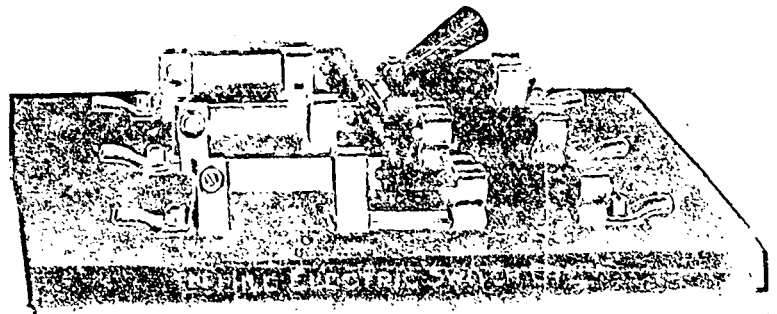
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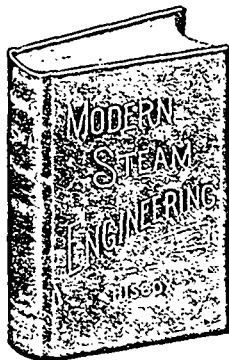
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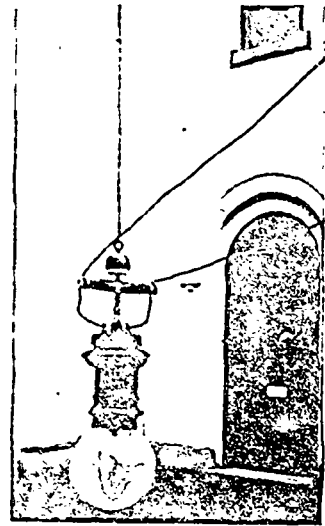
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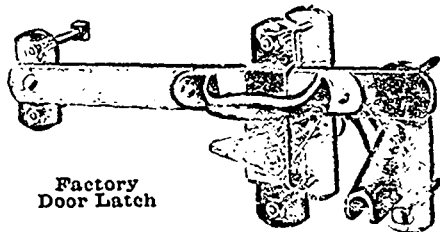
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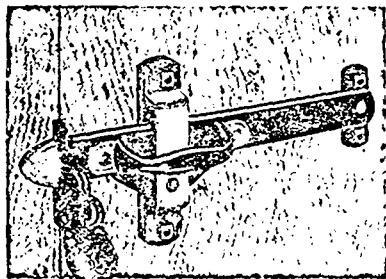
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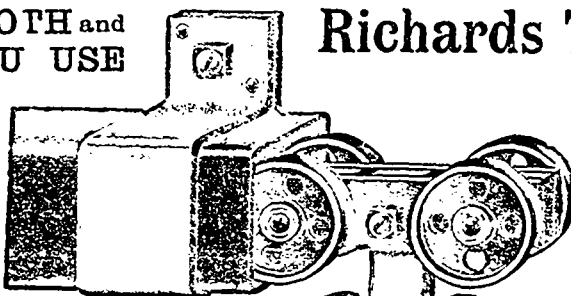
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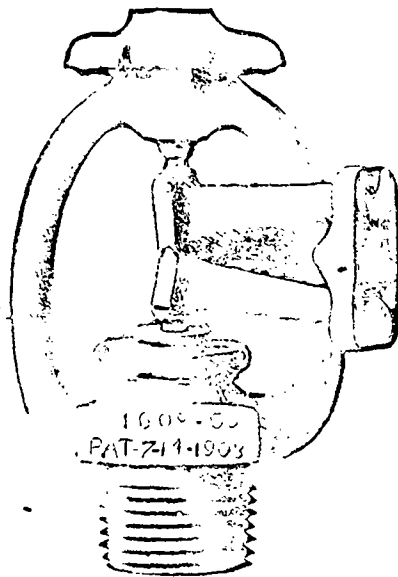
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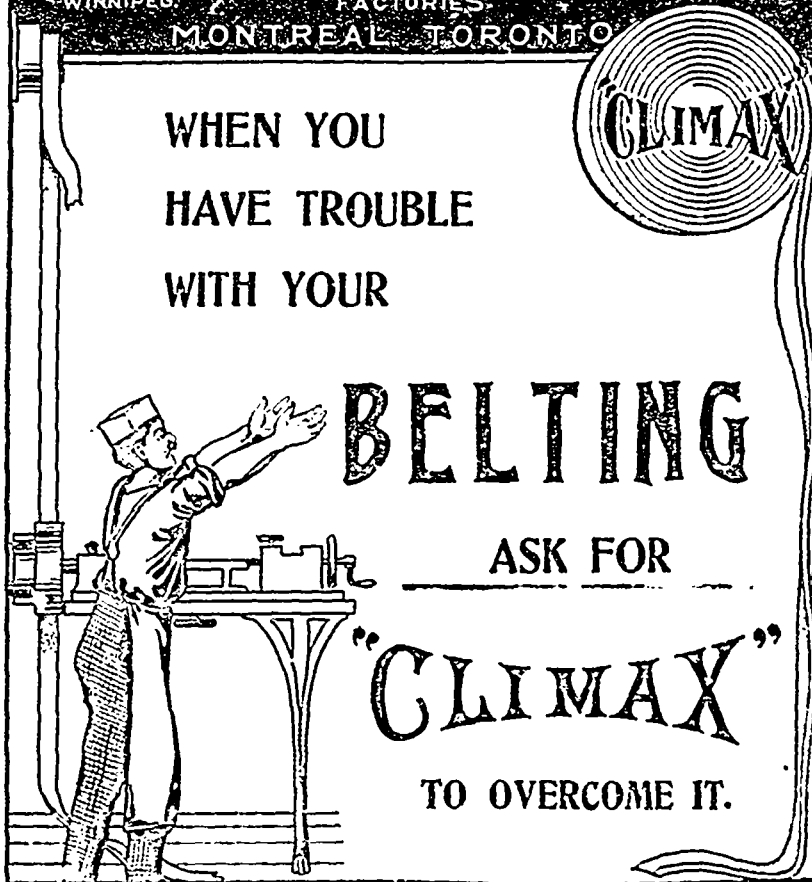
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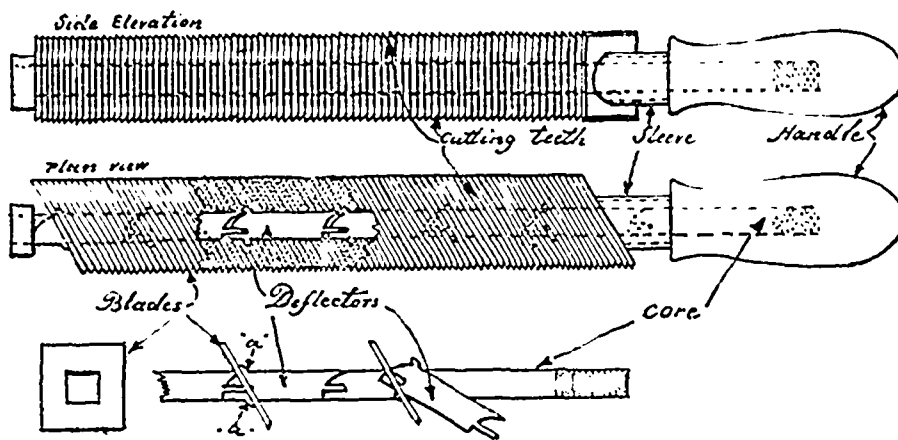
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A File That Can be Sharpened

It consists mainly of many blades having a square aperture through which a core of smaller cross section and the deflectors are inserted. A handle is screwed at one end of the core and clamps the various parts together.

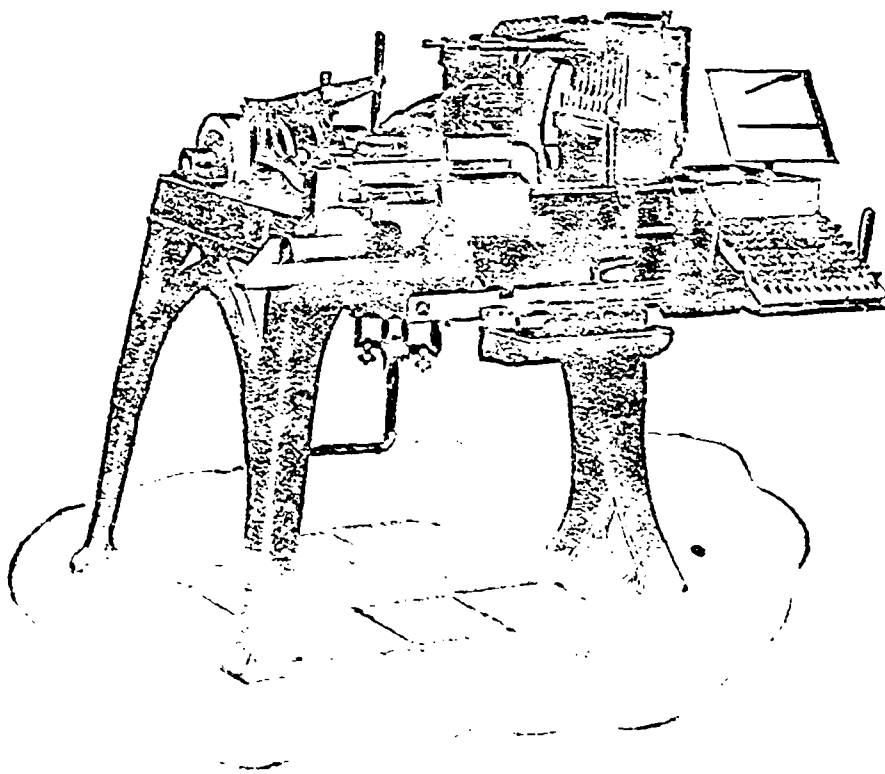
One of the faces of the tool presents a smooth surface, or it can be smoothed by grinding: This sharpens the cutting edges of that face which becomes the cutting face by withdrawing the deflectors and inserting them on the next side of the core and thus incline the blades differently, whence all four sides can be sharpened in rotation a very great number of times. When a set of blades is worn out a new set is substituted at little cost as they are punched out of sheet steel. Their shape can be either square, half-round, triangular, etc. A few of them have recesses to receive the two projections "a" "a" of the deflector which are intended to hold the blades properly inclined. The cutting edges being cleanly cut and really sharp the filing is not dust but small shavings, whence a maximum rate of cutting is obtained.

It is desired to have this tool manufactured on a royalty basis in Canada, where it is patented. Patent No. 107,315. Manufacturers willing to do that will please correspond with

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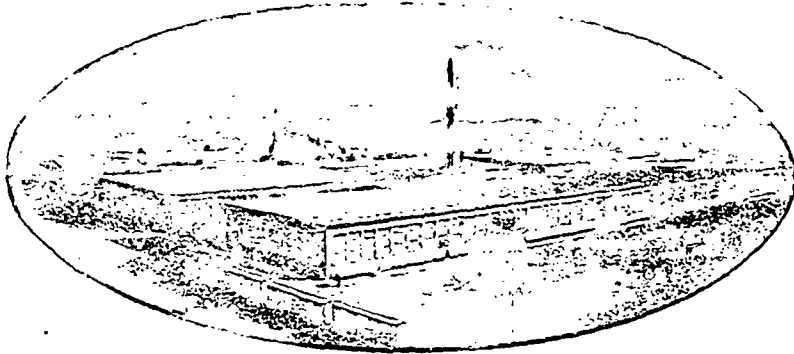
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JOHN FINDLAY

30 St. John St.,

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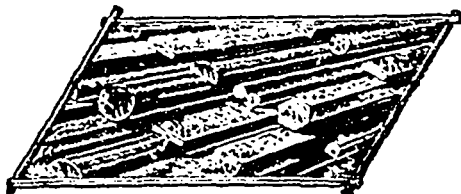
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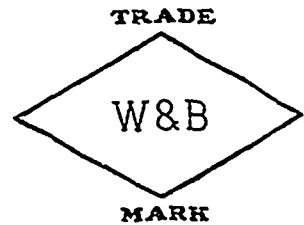
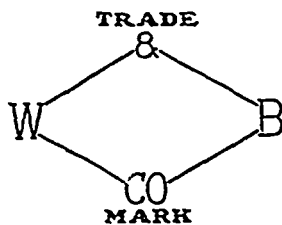
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This is the latest thing in High Speed
Twist Drills and the Drill that *will reduce your
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As it is *twisted* while hot, the grain of the
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the *strongest High Speed Twist Drill made.*

There is no twisting off of tangs or turning
in the socket with the "Norka."

It will pay you to write for Catalogue No.
67 and prices.



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Canadian Factory and Sales Office

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A Unique Canadian Foundry Plant.

NEW PLANT OF STANDARD FITTING & VALVE CO., LIMITED, GUELPH, ONT., ONE OF THE MOST MODERN OF ITS KIND.

By FRASER S. KEITH, B.Sc.

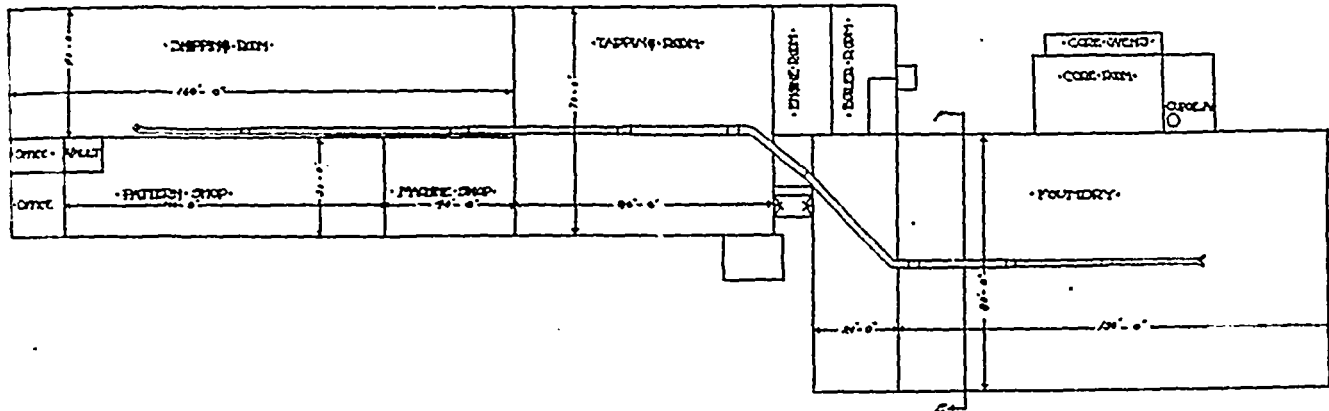
A walk through the new plant of the Standard Fitting & Valve Co., Guelph, Ont., shows to the casual observer a thoroughness of arrangement and systematic organization that is seldom found in foundry and machine shop design of earlier date and not superseded by any embodying the most modern methods, while a close scrutiny of the plan and detail and systematic carrying out of the various operations shows all the more how studied and careful and effective have been the plans that have materialized in the completion of this large and important industrial

a view to the greatest economy of operation and with no small success.

PERSONNEL OF THE COMPANY.

The Standard Fitting & Valve Co. is an entirely Canadian organization, with the following as officers:—Henry Aird, president; John M. Taylor, vice-president; Geo. W. Aird, managing director and secretary-treasurer. The company took over the property of the Aird-Platte Mfg. Co., of Watervliet, New York, and transplanted the plant that had been already in operation, together

and tool room, while the machine shop occupies the remainder of the main building to a width of 30 feet, the rest being devoted to the tapping room. Centrally located and just behind the tapping room are found the engine room and boiler house, which are connected and really part of both the tapping room and the cleaning room. The latter is situated directly between the tapping room and the foundry. The core room, core ovens, cupola and stock storage are in a separate wing of the foundry. The whole is, as it were, one enormous building of irregular

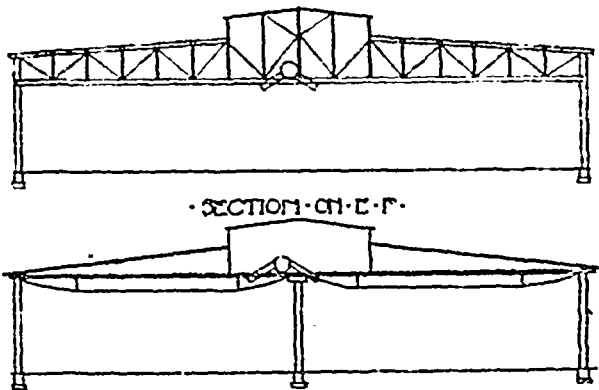


STANDARD FITTINGS AND VALVE CO.—LAYOUT OF PLANT.

institution. From the general arrangement of the buildings in their relation to one another to the practical equipment, designed with a view to the utmost economy, the entire plant suggests an harmonious arrangement that reflects great credit on the de-

partment with a large amount of new equipment, to the new works at Guelph. Five acres of ground were secured and building operations commenced in May, 1907. The work of manufacturing was begun on October 15, where over 100 men are busily employed

shape, but each department is separated from the other by a solid brick wall with fire doors leading to and from. The foundry is 160x80 feet, the tapping room 80x70 feet, the shipping room 120x40 feet, the metal and wood pattern and tool room 120x30 feet, the core room 40x20 feet, two story, and the office 30x20 feet. This plant was designed and planned by Geo. W. Aird, with W. A. Mahoney, architect.



STANDARD FITTING AND VALVE CO.—SECTIONAL VIEW OF FOUNDRY.

FOUNDRY PRACTICE.

Moulding in the foundry is entirely done by machinery. Two Berkshire moulding machines, with a capacity each of 120 moulds an hour are employed. These machines are conceded to be amongst the greatest labor saving devices introduced into foundry practice in recent years. One of these machines, with two men to operate it, can turn out more work than a dozen men working under old time conditions. The operation of the machines is of interest.

The flask and bottom board having been put into position and the lever thrown, the sand is sifted in the riddle at the rear of the machine, and then conveyed by a bucket-elevator to the hopper above the machine. The flask is next automatically carried to the rear, where it is filled with sand. It then travels forward and is met in its course by the bottom board supported upon the ram, which is forced down, thereby ramming the sand. At the instant of ramming, the vibrator is automatically thrown into action, which makes impossible the formation of any vacuum, and also prevents the sand from ad-

It has been found since the plant was commenced operations that the plans were well and truly laid and the economy effected in working out along the lines of the best practice have amply justified the time and expense necessary to bring them to successful operation. Great care has been taken from the start to have the apparatus installed worked with

turning out all ranges and sizes of cast iron fittings.

GENERAL ARRANGEMENT OF PLANT.

A glance at the plan shows the general arrangement of the plant with the main office adjoined by the shipping room facing the front. Back of the office and adjoining the shipping room are situated the pattern shop

hering to the pattern. The lifting pins then raise the flask off the pattern. While the flask returns to receive its supply of sand, the bottom board is supported by suitable

beneath, so that the moulds draw readily, without the use of any parting material whatever. By this method, with the proper grade of moulding sands, very fine work is

in the foundry organization is the automatic apparatus for conveying the moulds from the two Berkshire machines to the casting floor and when the castings are made to return to



STANDARD FITTING AND VALVE CO. - A VIEW OF TAPPING ROOM

hooks, but as the ram comes down, these hooks are drawn back so that the board remains upon the mould. All the operator has to do is to lift off the flask and set it to one side, blow the sand from the table with the air hose, and all is ready for placing the other half of the mould. The attendant may economize time at this point by placing the second half of the flask upon the machine, and throwing the starting lever before removing the half mould already completed from the bench. By the time he has removed the finished half-mould to the floor, the second half mould will also be completed, and will be ready to be lifted off. When using snap flasks and making light moulds, the mould may be assembled at the side of the machine, thereby making necessary but one trip to the floor. In such case, the moulder can have two sets of flasks, and arrange it so that the machine will be ramming the drag for the second mould while he is carrying the first to the floor.

The pressure of the ram upon the sand can be quickly adjusted, and as the flasks are filled automatically, every flask will be rammed alike. It is also possible to adjust the boards in such a way that the drag will be rammed harder than the cope. When making the cope, the machine is so arranged that it cuts the sprue. The pattern plates are placed in an ordinary table, or platen, at the front of the machine, and can be changed easily and quickly by removing four screws which hold the plate in position, and slipping in the new plate. One of the features is the heating of the pattern plates by gas jets from

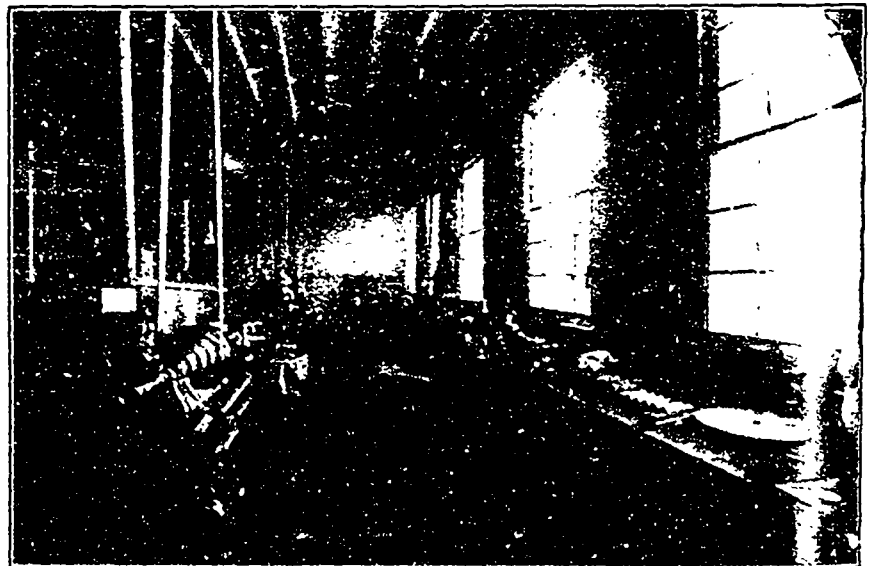
made possible without any facing. Moreover, since no parting sand is introduced, the life of the moulding sand is greatly increased.

Eight hand squeezing machines each with a capacity of 150 moulds a day and two stripping plate machines each with a capacity of 150 moulds a day built by the company are also part of the equipment.

CONVEYING MACHINERY IN FOUNDRY.

The main feature and most noticeable

feature of the foundry organization is the automatic apparatus for conveying the moulds from the two Berkshire machines to the casting floor and when the castings are made to return to the cleaning room. The man working at the Berkshire machine can place the mould on the table of this automatic carrier, which runs the length of the foundry and which allows the mould to be taken off at whatever part of the floor they are required, as the conveyer is reversible. This allows the moulds on being poured to be placed thereon and taken back over the



STANDARD FITTING AND VALVE CO. - MACHINE SHOP AND STORE ROOM.

hopper where the casting is knocked out and falls off into a car running on a trolley underneath and delivered to the cleaning depart-

ment. The sand falls through the rack into the hopper where augers feed it to an elevator by means of which it is carried to the sand mixer. This sand mixer thoroughly mixes the sand and delivers it back to the floor near the moulding machines.

THE CUPOLA.

The cupola situated as shown in the plan was made by Byram & Co., Detroit, Mich.

stack proper, the outer shell and encloses the inner one and is made air tight, forming the air chamber. In the outer shell are arranged two doors for shutters held in position by tap bolts, also made air tight, which may be removed and again replaced to allow for cleaning should any coke or slag accumulate in the air chamber, the air chamber is not fastened to the bottom plate, but is separate and distinct. Opposite each tuyere also is a sliding air tight gate with peep-hole. The tuyeres are so arranged that the blast is dis-

tributed over the entire area of the combustion chamber and are constructed in such form that the melted iron in its downward course cannot pass through them into the air chamber. The capacity of this cupola is

about 15 tons an hour and a cast is made every day. The raw material is delivered from the Canadian Pacific Railway siding to the door of the cupole room where it is transferred to an electrically operated elevator which lifts it to the charging floor.

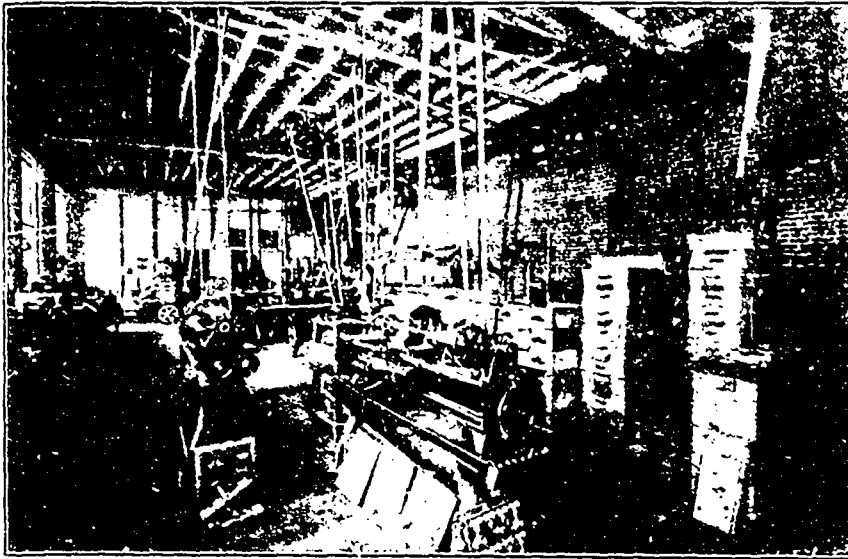
The cores are made on the second floor of the core room, which is really a separate building adjacent to the foundry. When made the cores are let down on a dummy elevator to the first floor, where they are baked and stored—the core ovens installed are of the Millett pattern manufactured by Millett Core Oven Co., Brightwood, Mass. The blower for the cupola was made by Wilbraham-Green Blower Co., Philadelphia, and is connected to a Canadian General Electric motor by means of a Renolds silent chain drive.

CLEANING.

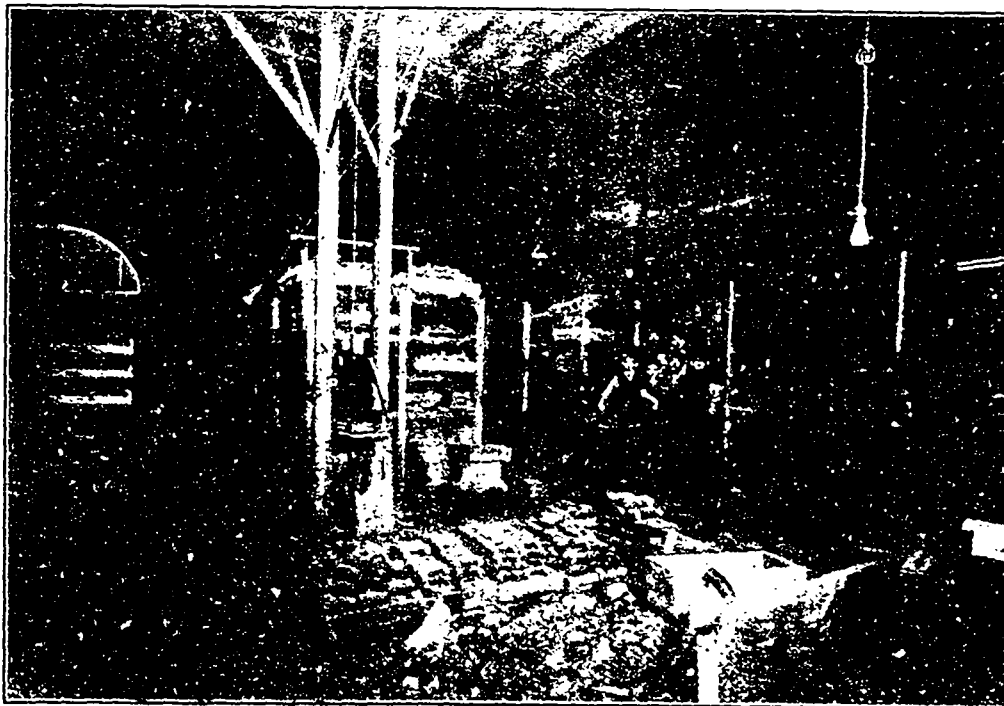
The castings, which are transported from the foundry by means of a trolley car, on being delivered from the automatic carner are taken to the cleaning room adjacent. They are here cleaned in tumbling mills, manufactured by the Cleveland Nickle Works, Cleveland. These have a dust arrester attachment, which keeps the cleaning room free from dust and dirt.

THE TAPPING ROOM.

After cleaning, the castings are given any necessary grinding, whence they are taken by trolley to the tapping department and delivered to the tapping machines. On being tapped in one of the many machines for this purpose in the tapping room they are conveyed in a special metal tank to the cleaning tub. This tub is set in the floor, situated im-



STANDARD FITTING AND VALVE CO. - PATTERN MAKING ROOM.



STANDARD FITTING AND VALVE CO. - CORE ROOM.

known as the Colliat standard cupola furnace. An illustration of this is given. The lower portion of this cupola is composed of two feet steel shells, the inner shell being made very heavy and of the same size as the

tributed over the entire area of the combustion chamber and are constructed in such form that the melted iron in its downward course cannot pass through them into the air chamber. The capacity of this cupola is

mediately over which is an air hoist. The tank mentioned, which is conveyed on a trolley, passes the various machines and collects the fittings from them in a perforated iron bucket. On being brought to

the tub the air hoist lowers it into the cleaning bath where the now finished product is thoroughly cleaned. By trolley it is again taken to the stock and shipping room where

STOCK ROOM.

The stock room, which is a large airy department has the entire walls lined with bins to the ceiling. Each bin is 3 feet deep and 2

the upper tier of bins. A Fairbanks standard scale is situated in the centre of this room. Running the entire length of the stock room is a platform from which cars may be



STANDARD FITTING AND VALVE CO.—FOUNDRY SHOWING MOLDING MACHINE AND CONVEYOR

the fittings are sorted and placed in their respective compartments.

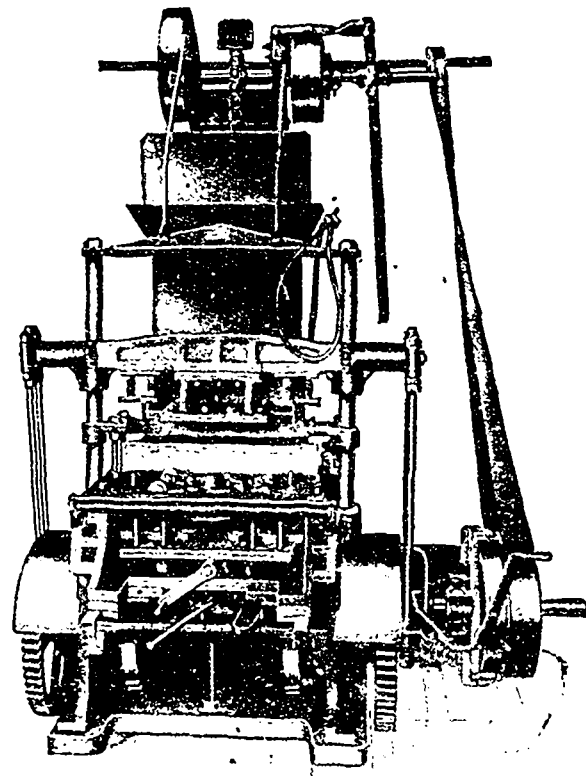
MACHINERY IN TAPPING ROOM.

One of the largest machines in the tapping room is for tapping threads four to eight inches, being built by Baker Bros., Toledo, Ohio. A notable machine is one known as the Walters three-way machine, which is the only one of its kind in existence, being built especially for the Standard Fitting & Valve Co. The taps, tees two inches and under all three ways at once. It is provided with a double chuck so that the operator may be taking out a tap tee and placing in a new one while the other is being tapped. It is entirely automatic, the lines of the fittings tapped by this machine are absolutely true when done in this machine, as the taps themselves are so adjusted as to render non-alignment impossible. The machine reverses itself and taps are withdrawn automatically, one starting after the other so that the strain on reverse does not come on one machine all at once.

Acme bolt cutting machines manufactured by the Acme Machinery Co., of Cleveland, Ohio, are used for cutting plugs and bushings. Flange unions are faced on a lathe and screwed on arbors so that the facing is absolutely true with the thread cut. The tapping of bushings is done on a four spindle tapping machine that works automatically, manufactured by the National Machinery Co., Tiffin, Ohio.

The tool room machinery includes planers, shapers, milling machines, lathes and drill press and also pattern making equipment for both wood and metal patterns.

feet square. There are 1,000 of these bins in all. Half way to the ceiling all the way directly loaded as the arrangement is such that the company's siding parallels the stock room. around is a platform to enable a man to reach

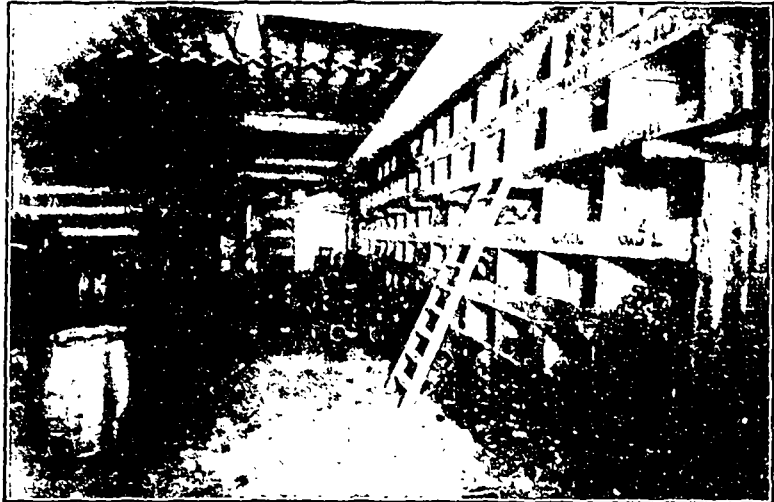


STANDARD FITTING AND VALVE CO.—THE BERKSHIRE MOLDING MACHINE

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

POWER HOUSE.

The power house is equipped with a Goldie-Corliss engine of 150 h.p. of similar design to that installed in the power plant of MacGregor-Gourlay Co., of Galt, described in a former issue of THE CANADIAN MANUFACTURER. The fly-wheel is 14 inches in diameter with a 20 inch belt manufactured by the Beardmore Belting, of Toronto. The boiler is of 150 h.p. at 120 pounds pressure, manufactured by Goldie & McCulloch, of Galt, as is also the Moffatt feed water heater installed. The lighting equipment consists of a 50 h.p. generator, manufactured by Canadian General Electric Co. It supplies power for the motors, for the blower and



STANDARD FITTING AND VALVE Co.—STOCK ROOM.

PRODUCT.

The product consists of cast iron steam, water and gas fittings from ½ inch to 10 inches inclusive, plugs and caps bush up to 12 inches, lock nuts, elbows, tees, crosses and heavy. Y's. Caps and lock nuts, flanges and flange unions, bushings and plugs and expansion plates, also flanged fittings from 12½ inches to 16 inches inclusive, both standard and extra heavy.

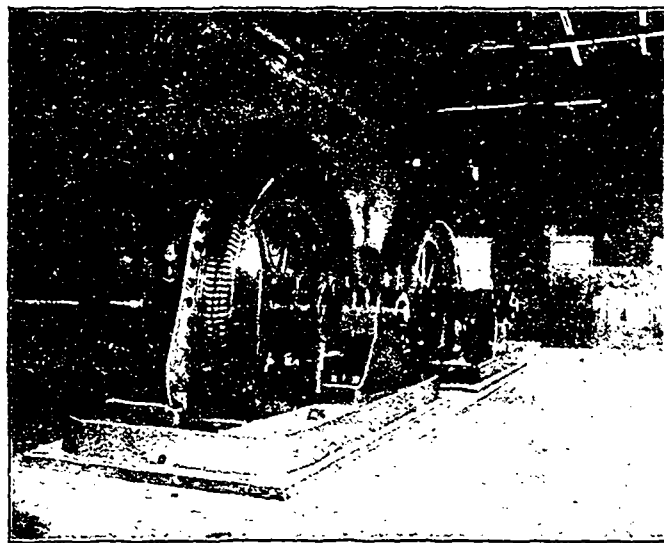


STANDARD FITTING AND VALVE Co.—THE COLLIAG COPOLA.

Electric Power for Asbestos Mining.

An application of electric power, which is rapidly extending is in the operation of asbestos mines in eastern Quebec. The first to build an electric plant for that purpose was the St. Francis Hydraulic Co., which, six years ago developed the water power on the

reference River from Three Rivers and is now transmitting over 3,000 h.p. into the same district. The electrical equipment of the St. Francis Hydraulic Co., which was built by Allis-Chalmers-Bullock, Limited, Montreal, in-



POWER HOUSE—ST. FRANCIS HYDRAULIC Co., D'ISRAELI.

elevator and the electric lighting of the entire plant, which consists of Nernst lamps. The ventilating and heating system is by the Dominion Heating & Ventilating, of Hespler, Ont., includes a system of heating the entire building, except the office, by forced draught. The fan is driven by a steam engine 12 h.p., 250 r.p.m., supplied by A. R. Williams, of Toronto. An air compressor is also installed for supplying power to the various departments where compressed air is used.

river of that name at D'Israeli, in the county of Wolfe, and then proceeded to transmit the electric current to Black Lake, ten miles and Thetford Mines, fourteen miles away. Starting with one 750 k.w. 60 cycle 3 phase alternating current generator, the company was obliged to duplicate its plant a little over a year ago in order to meet the demands from the mines. In the meantime the Shawinigan Water & Power Co., whose generating station is at Shawinigan Falls, on the St. Maurice River, laid two cables across the St. Law-

cludes, in addition to the two 750 k.w. water wheel type alternators before mentioned, two 50 k.w. direct connected exciters, six 250 k.w. self-cooled transformers, and six 150 k.w. self cooled transformers, all 2,400—15,000 volts, with necessary switchboard, instruments and other auxiliary apparatus.

Hutchison & Sticht, 39 Vitre St., Montreal, are supplying the ornamental iron work for the new Bank of Commerce Building, Montreal.

Industries Wanted in Ontario.

AS REPORTED BY THE CLERKS OF VARIOUS MUNICIPALITIES TO THE ONTARIO BUREAU OF LABOR.

Many manufacturers will be interested in the following statement of openings for industries, as given by the clerks of the municipalities concerned. The "initials" "Tp." refer to township. In all other cases the municipality concerned is included in "Dun's" or "Bradstreets'." All inquiries should be sent to the clerk of the municipality.

Acton—Good opening for boot and shoe factory.

Adolphustown Tp.—Good opening for canning factory.

Ailsa Craig—Opening for brick and tile yard; plenty of clay.

Alfred Tp.—For electric light plant and grist mill.

Aliston—For woodenware factory. New threshing machine factory now being started.

Almonte—For industry requiring hydraulic power and employing heads of families.

Alvinston—For foundry; ample water and good railway facilities.

Ameliasburg—For canning industry.

Amherstburg—For industry using limestone.

Anderson Tp.—For soda ash factory or steel plant.

Arkona—For canning factory.

Arnprior—For foundry or furniture factory.

Artemesia Tp.—For furniture factory, sash and door factory or grist mill. Power cheap and plentiful.

Assignack Tp.—For saw mill.

Aylmer—For shoe factory; sewer pipe and tile workers or Portland cement mill.

Ayr—Bonus will be given any industry.

Bagot Tp.—Immense water power going to waste. Opening for any kind of industry.

Barrie—Opening for foundry, woollen mill or wood-working factory.

Barton Tp. (near Hamilton)—For any kind of industry.

Bath—Opening for canning factory.

Bayfield—For flax mill or brick and tile plant.

Beaverton—Two railways: opening for furniture factory.

Beeton—Opening for carriage factory.

Belleville—All kinds of industries desired.

Berlin—For any iron industry.

Biddulph Tp.—Opening for cement works.

Blenheim—For canning factory.

Blind River—For saw mill or tannery.

Blyth—For many industries, two railways.

Bobcaygeon—Municipal electric plant; opening for wood-working plant.

Bonfield—Opening for furniture factory; ample power.

Bothwell—For canning factory and roller flour mill.

Bracebridge—For furniture and woodenware factories.

Bradford—Cheap sites for any kind of industry.

Brampton—Water power available for any industry.

Brantford—All kinds of industries sought.

Bridgeburg—Various industries desired.

Brock Tp.—For cement works; ample marl.

Brockville—For various industries.

Bruce Mines—For saw mill.

Burk's Falls—For flour mill or wood-working factory.

Caledon Tp.—Water power (40 h.p.) idle; any industry.

Caledonia—Two railways, abundant natural gas; any industry.

Camden East Tp.—For canning factory or pork packing plant.

Cannington—Carriage works are to be reopened.

Carleton Place—For any kind of industry.

Casselman—For sash, door and moulding factory.

Cayuga—For knitting or canning factories.

Chandos Tp.—Ample water for power near iron ore beds for electric smelter.

Chatham—Pork packing plant, oil refinery, beet sugar factory, boot and shoe factory or tannery.

Chippewa—Cheap electric power for any industry.

Clifford—For planing mill.

Cobden—For foundry and machine repair shop.

Cobourg—For canning factory, iron works, packing house.

Collingwood—For woodworking industries.

Cornwall—Seeks any kind of industry.

Creemore—For fruit cannery.

N. Crosby Tp.—For malleable iron works at Westport, Ont.

Dereham Tp.—For brick and tile yard.

Deseronto—For flour mill or canning factory or for industry requiring iron from smelter located here.

Drayton—For brick yard.

Dundalk—For furniture factory.

Dundas—Any kind of industry.

Dunn Tp.—Opening for brick and tile works.

Dunnville—For agricultural implement works.

Dutton—For furniture factory, flax mill or canning factory.

Dysart Tp.—For lumber and shingle mill, chair factory, tannery and chemical works.

Eganville—Two railways; any industry.

Elizabethtown Tp.—For brick and tile works; cement or cement block works.

Elmira—Any industry—two railways and waterpower.

Embro—For brick and tile works and machine shop.

Eramosa Tp. (Rockwood P.O.)—For planing mill and sash and door factory.

Exeter—For knitting factory or woollen mill.

Fenelon Falls—For wood-working factory; power at \$10 per h.p.

Fergus—Two railways; free sites and exemption from taxes; good openings for manufacturing.

Forest—For carpet factory, carriage factory or canning factory.

Fort Erie—Planing mill or flour mill; cheap electric power.

Fort Francis—For lumber mill, flour mill, pulp mill and furniture factory.

Fort William—About 30,000 h.p. electric power available for any industry.

Galt—For implement works or furniture factory.

Gananoque—Any industry; water and electric power; lake or rail shipments.

Georgetown—For various industries.

Georgina Tp. (Pefferlaw P.O.)—For foundry, woollen mill or paper mill; good water power.

Goderich Tp.—For brick and tile works.

Gravenhurst—For woodworking factory.

Guelph—Good shipping facilities for various industries.

Hagersville—For machine shop or foundry.

Hamilton—Inducements offered for all kinds of industries.

Hanover—Various industries; two railways.

Hawkesbury—For foundry and wood-working factory.

Hensall—For furniture factory and knitting mill.

Hespeler—For furniture factory.

Hilton Tp.—For woodenware factory.

Houghton Tp.—For brick and tile works and wood working factory.

Hungerford Tp.—For carriage factory and canning factory.

Huron Tp.—For brick and tile plant and Portland cement works.

Kenora—For flour mill and woodenware factory.

Keppel Tp.—For wood working factory and Portland cement works.

Kincardine—For glass works and canning factory.

Kingston—For various industries.

Kingsville—For tobacco and canning factories.

Laird Tp.—For brick and tile factory.

Lancaster—For foundry.

Laxton Tp.—For Portland cement works and wood working factory.

Leeds Tp.—For brick and tile plant.

Lindsay—For various industries, particularly those requiring timber.

Little Current—For foundry.

London—Agricultural implement works, furniture factory, woollen and cotton mills.

Loughborough—For brick yard.

Madoc—For barrel factory and canning factory.

Markdale—For woodenware and furniture factory, for foundry and machine shop.

Marmora—For woodworking industry.

Maryborough Tp.—For foundry or felt factory.

Massey—Water powers available for any industry.

Medonte Tp.—For furniture factory, fruit evaporator and brick yard.

Meaford—For boot and shoe factory.

Merrickville—Water power available.

Millbrook—For agricultural implement works or canning factory.

Milverton—For chair factory, sash and door factory, woollen mill and foundry.

Mimico—Three buildings available light or heavy manufacturing.

Minden Tp.—For furniture factory, ample water and hardwood.

Moore Tp.—For flax mill.

Mount Forest—For foundry and agricultural implement works.

Neebing Tp.—Opening for brick and tile works, and wagon factory.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

Neelon Tp.—For brick and tile plant.
 New Liskeard—For lime kiln.
 Niagara Falls—Any industry; cheap electrical power.
 Norwood—For tannery and woollen mill.
 Oil Springs—For flax mill and basket factory.
 Olden Tp.—For hub and spoke factory.
 Oro Tp.—For roller flour mill.
 Ottawa—Inducements for all kinds of industries.
 Owen Sound—Openings for wood working industries.
 Pembroke—For wooden ware factory; cheap electric power.
 Pembroke Tp.—For brick and tile plant and for wood working factories.
 Pentanguishene—For wood working industries.
 Peterboro—Cheap power and good shipping facilities for all industries.
 Petrolia—For canning factory and packing house.
 Picton—For can making factory.
 Port Arthur—For match factory, woodenware factory, woollen mill, and washing machine factory.
 Port Colborne—Cheap electric power and natural gas for industries.
 Port Dover—For planing mill, sash and door factory, smelting works, glass factory, etc., natural gas and good shipping facilities.
 Port Hope—For iron working industries.
 Port Perry—For canning factory, evaporator, brick yard and beet sugar factory.
 Port Rowan—For knitting factory and furniture factory.
 Powassan—For woollen mill, furniture factory, planing mill, foundry and tannery.
 Rainy River—For pulp mill, stave mill and other wood working industries.
 Raleigh Tp.—For beet sugar factory.
 Renfrew—For tannery, furniture factory, and other wood working industries.
 Richmond West—For foundry and carriage factory.
 Ridgetown—For carriage factory.
 Rockland—For cement works and brick yard.
 Roxborough Tp.—For brick and tile plant.
 St Catharines—Cheap electricity and natural gas, ample water and good shipping facilities by rail or water for all kinds of industries.
 Sandwich West—For steam works.
 Samia Tp.—For canning factory.
 Sault Ste Marie—For wood working industries.
 Sarnia—For knitting factory.
 Senece—For plaster mill.
 Selburne—For woollen mill, furniture factory and pork packing plant.
 Simcoe—For wood working factory.
 Smerville Tp.—Marl and clay for Portland cement works and for brick plant.
 Springfield—For brick and tile plant.
 Stord Tp.—For brick works.
 Stamford Tp.—Cheap electric power and gas for industries.
 Stratford—For canning or pickle factory and for shoe or clothing factory.
 Stratford—For stove foundry and shoe, piano, tinware and carpet factories.
 Sturgeon Falls—For foundry, woodenware factory and flour mill.
 Sudbury—For agricultural implement or carriage factory, foundry, nickel steel works and shoe shops.

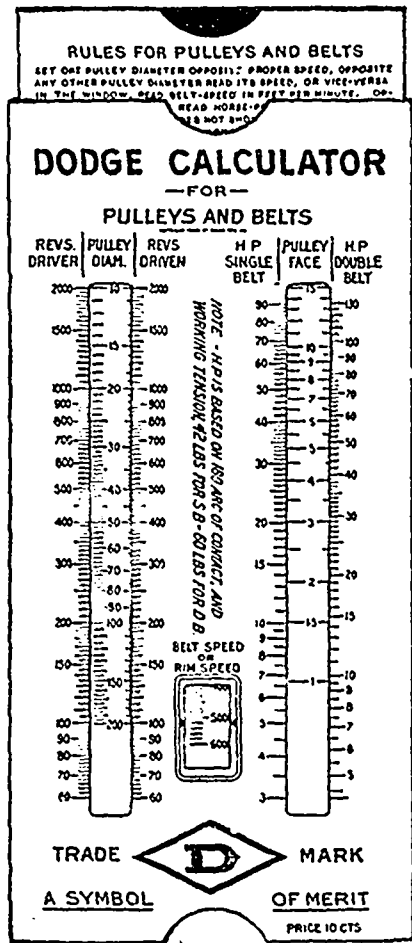
Sunnidale Tp.—Ample marl for Portland cement works.
 Thessalon—For tannery.
 Thessalon Tp.—For saw mill, box factory or smelter.
 Thornbury—For wood working factory.
 Thorold—Cheap electric power and water for industries.
 Thurlow Tp.—For canning factory, flour mill and tannery.
 Tillbury—For machine repair shop and canning factory.
 Tillsonburg—Good shipping facilities for industries.
 Toronto—Special site for large iron or steel works. All industries sought.
 Toronto Junction—Shipping facilities a feature.
 Tweed—For canning factory, woollen mill, stave factory and custom smelter.

Torbolton Tp.—For brick and tile yard.
 Van Horne Tp.—For flour mill and stave factory.
 Vienna—For brick and tile yard.
 Wallaceburg—For window glass factory, gas engine factory and pickle factory.
 Waterloo—For furniture frame factory.
 Webbwood—For saw mill, sash and door factory, spool factory and tannery.
 Welland—Cheap electric power, natural gas and good shipping facilities for industries.
 Windsor—For pork packing factory.
 Wingham—For casket factory and carriage factory.
 Woodbridge—For boot and shoe factory, etc.
 Woodstock—For iron working industries, shoe factory, felt factory and canning factory.
 Wyoming—For canning factory and basket factory.

The Dodge Calculator for Instant Solution of Transmission Problems.

The Dodge Mfg. Co. are inviting millwrights, machinists, draughtsmen, engineers, etc., to call at their new premises, 640 St. Paul St. corner Haymarket Square, Montreal, and get one of their new Dodge Calculators.

by a proper setting of the slide. The following problems and solutions will illustrate its practical convenience and suggest its scope. The view of the calculator, reproduced in Fig. 1, shows the scale referred to in the problems.



The Dodge calculator operates on the principle of the slide rule, with special scales to suit the special purposes for which the device is intended. Certain factors of a problem being known, the others may be ascertained

PULLEY SIZES AND SHAFT SPEEDS.

Problem 1:
 Driving shaft speed, 150 r.p.m.
 Driven shaft speed, 200 r.p.m.
 Driving pulley diameter, 50 in.
 Find diameter of driving pulley and belt speed.

Solution: Set slide so that 50 under Pulley Diameter is opposite 150 under Revolutions Driven. Then opposite 200 under Revolutions Driven, appears 38 under Pulley Diameter. The diameter of driven pulley therefore is 38 in. The Belt Speed scale shows 1,950 feet per minute for pulley rim speed or belt travel.

If the diameter of the driver is to be ascertained, the diameter of driven and the speeds of both shafts being known, set Diameter Driven to Revolutions Driven, and Diameter Driver will show opposite Revolutions Driven.

HORSEPOWER AND BELT WIDTH.

Problem II:
 Driving shaft speed, 400 r.p.m.
 Driven shaft speed, 500 r.p.m.
 Driven pulley diameter, 40 in.
 Power required, 69 h.p.
 Find diameter of driving pulley, belt width and belt speed.

Solution: Set slide (as shown by Fig. 1) so that 40 under Pulley Diameter is opposite 500 under Revolutions Driven. Then opposite 400 under Revolutions Driven will appear 50 under Pulley Diameter. Required diameter of driver therefore is 50 in. With this same setting of the slide, 69, under Horsepower Double Belt is opposite 7 under Pulley Face; 69 under Horsepower Single Belt is opposite 10 under Pulley Face. Hence required belt width is 7 in. double, or 10 in. single. Under Belt Speed, 5,200 f.p.m. is shown. Fig 1 shows the slide set for this solution.

In the same way, if the diameter of driver and the belt width are given, the diameter of driven and the h.p. are found.

Some 50,000 Volt Lightning Arrester Experience.

WRITTEN BY J. A. WALLS, FOR THE CANADIAN MANUFACTURER.

The Shawinigan Water & Power Co. is delivering power from its power house at Shawinigan Falls over about 300 miles of 50,000 volt transmission lines, from which branch lines of lower voltages such as 25,000, 12,000, 2,200 volts, etc., tap off to feed the adjacent territory. The lines variously traverse flat, high mountainous, open, or wooded country or run along river banks, thus being exposed to widely differing lightning conditions. Two of the 50,000 volt lines parallel each other closely for nearly 90 miles, and, being subjected to practically identical lightning exposures, afford a good opportunity for testing the efficiency of any lightning protective device, by installing it on one line only and then comparing the behaviour of the two lines.

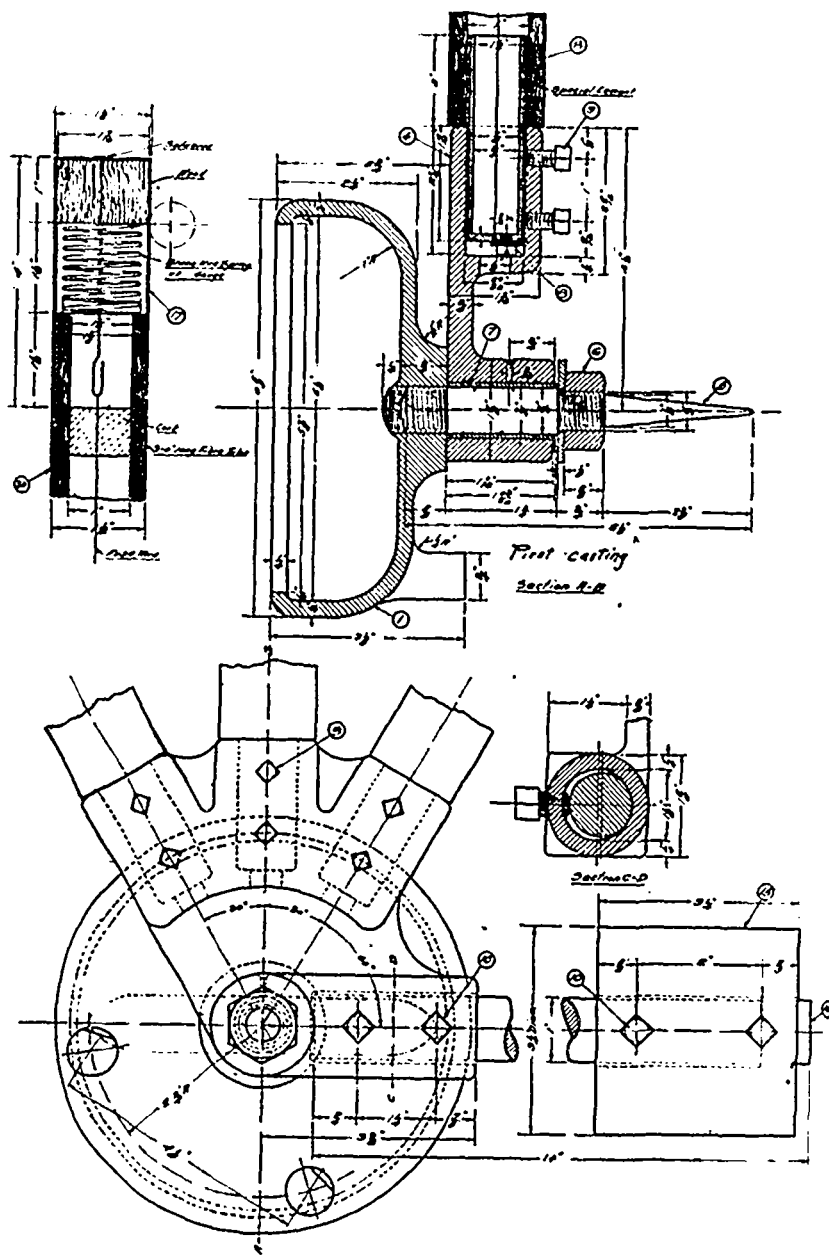
Soon after putting the high tension lines in operation serious lightning troubles began to manifest themselves, and the protective apparatus on the market at that time and the temporary expedients tried, proved so inadequate as to necessitate going into the whole question in a thorough manner and making extensive experiments, so that now after five years, quite a bit of experience has been gained in regard to the different methods of dealing with the problem. The troubles were chiefly broken insulators, shattered poles, burnouts of station apparatus and interruptions to service.

A single stroke of lightning might destroy anywhere from one to twenty poles, sometimes merely taking a strip out of a pole and at other times shattering it as completely as if an explosion had taken place inside. The installation of a few additional arresters at various points along the line did not, as may be expected, remedy this phase of the lightning trouble. The line itself shows considerable impedance to the propagation of such disturbances along it, so that to be effective in relieving the line of such stresses, arresters would probably have to be installed at distances of not more than a few poles apart. That which seemed to give the best results was the installation of ground wires stapled along the length of the poles and carefully grounded. This, by providing a metallic path to ground, practically did away with the splitting of the poles of the line on which it was tried, while splitting continued as badly as ever on the adjacent parallel line, not so equipped. It has been urged that such grounding wires running up and down the poles would increase the liability of poles to be set on fire by lightning or straying currents from defective insulators, but however that may be, the number of poles set on fire by such causes has been so few as to make the question of little importance for our conditions. These ground wires are not to be confused with a grounded wire, running along the line, which has not proved of decided benefit under the conditions as installed on one line.

Those interruptions to service, due to damage to the line caused by lightning, were minimized by duplicating pole lines and equipping them with reverse relays on the low tension sides of the step down transformers and overload relays in the high tension

neutral grounding wires at the step up transformers. By this arrangement, a line damaged by lightning will in most cases cut itself off without knocking out of step, synchronous apparatus. The actual benefit received from the arrangement is dependent upon many factors, such as the line constants, load, location of trouble, delay in getting back into service a line after a stroke in the case of the lines being struck alternately at brief intervals, etc., and on the whole,

turning of transformers and burning up of arresters occurred only too often. After many experiments with various gaps and fuse sizes, a horn arrester combination was developed, using at first open air fuses and later fine wire fuses supported by rods, that seems to furnish excellent protection to station apparatus, for since their erection several years ago, no station apparatus, while protected by horn arresters, has been damaged by lightning, although on several occasions



without efficient lightning protective apparatus, the duplication of lines cannot be considered as a sufficient safeguard.

Injury to station apparatus was frequent and serious, at the commencement of the operation of the lines. Arcs occurred on the high tension switches, terminals, and buses, jumping at times several feet and the punc-

apparatus has been damaged, when, during the lightning season, the horns were disconnected temporarily.

But the horn arrester, though it reduces injury to apparatus, yet under certain conditions it takes enough current from the line to knock synchronous apparatus out of step. The ordinary type of multi-gap ar-

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

rester will, when protected from heavy strokes by horn arresters, take care of small over potential discharges due to switching surges, etc., without drawing enough current to cause a shut down. Experiments on the size of fuses blown by lightning strokes on dead lines showed that often a considerable amount of current must be passed to ground and, where resistance was used to limit the generator current, high potentials were developed around the resistances, as shown by spark gaps in parallel with the resistances, and again, unless resistances of such amounts were used, the arc was not interrupted

Choke coils are used to prevent, in some measure, the over potentials from getting into our stations, though their real value we have not been able to establish. We therefore, depend upon removing lightning charges from the line so completely as to make unnecessary any choking devices at the station, and so it was desired to obtain a horn arrester, which would have a high discharge capacity, i.e., little impedance to lightning discharges, and which would suppress the resulting arc quickly and which would further be self replacing, as once a fuse is blown the arrester is inoperative until a new

the opposite terminal being connected to ground.

The fuse itself is normally at line potential. When the line potential rises due to lightning or surge effects, sufficiently to arc across the spark gap, the short circuit current to ground blows the fuse and in effect shoots the cap off of the upper end of the tube, thus permitting the tube to clear the spike and pass it, the counter-weight bringing a new fuse into contact with the spike, and the apparatus is again ready for another stroke. The quick suppression of the arc in the tube was obtained after considerable experiment and special precautions have to be taken to effect it. Occasionally the disturbance is so slight as to not knock off the brass cap. To take care of this, a spring is provided between the cap and the end of the fibre tube. The spring is held compressed by the fuse and when the latter blows, the spring is released and forces off the cap.

A cut off switch operated by ropes from the ground is provided by attaching a blade to the spike insulator, and turning the insulator axially to move the blade into or out of contact with a jaw mounted on an insulator vertically above. The jaw is connected directly to the line. The cut off switch is necessary to enable tubes to be replaced and the spark gap adjusted.

The apparatus in single pole units is assembled on a cross arm and shipped complete to various parts of the line, ready for erection, which consists merely in fastening the cross arm in a vertical position to a pole or other support and connecting to the line and ground.

Considerable trouble was experienced in getting fibre tubes which would stand the weather, the ordinary fibre being unsuitable. The apparatus as a whole, however, is easily made up, being manufactured locally for the company by the Hill Electric Switch Co., Montreal.

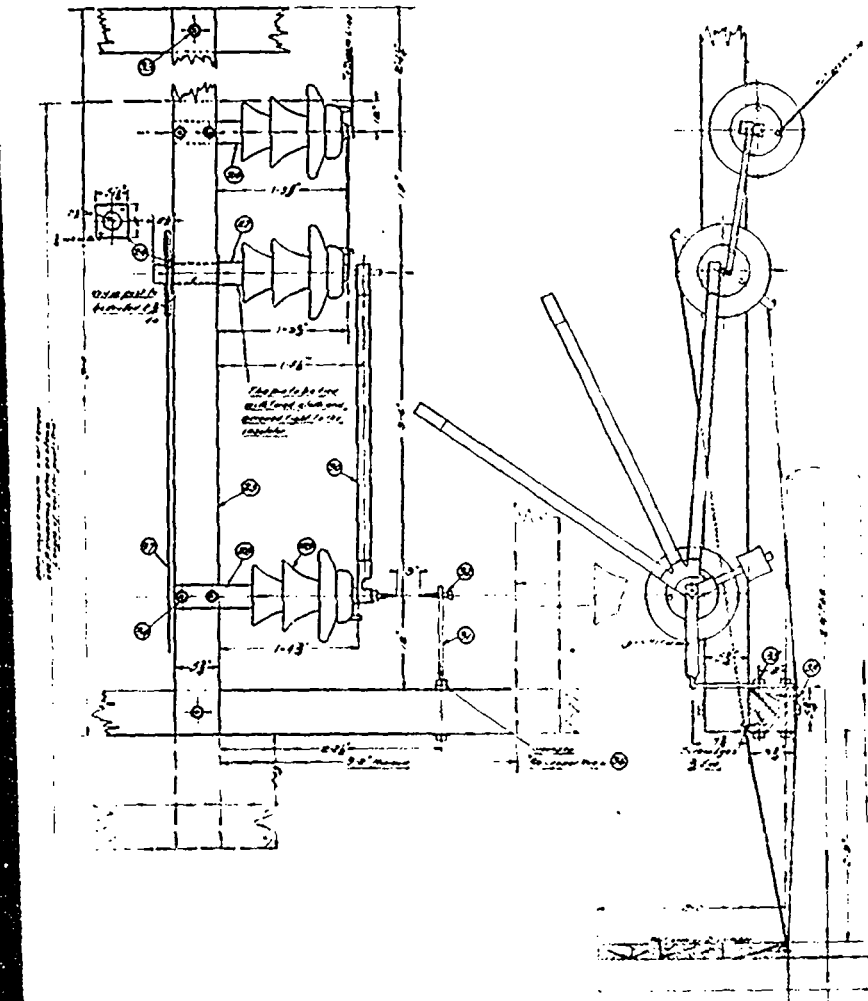
At present, therefore, interruptions to service, burnouts of station apparatus, and shattered poles have been fairly well disposed of. The breaking of insulators still remains and experiments are continually in progress to decrease it, but it is not a very serious matter as a line on wood poles can usually be operated for a time, even with pretty badly broken insulators, and too, the breakage of insulators may be reduced by appropriate insulator design.

A CANADIAN BRANCH.

The British Insulated & Helsby Cables, Limited, have opened a head office for Canada and the United States in the Power Building, Montreal, with Mr. Lawford Grant as chief engineer and manager.

With a capital of \$7,300,000.00, works at Prescott Helsby and Liverpool, and a score of branch offices and warehouses in all parts of the world, this company have long held a prominent place as contractors to H.M. Government, War Office, and Admiralty, and principal corporations in England and abroad, for electric traction, lighting, power, telegraph and telephone equipments, and as manufacturers of electric cables, wires and equipment of every kind.

Mr. Lawford Grant, prior to coming to Canada, was in charge of the installation of a very large equipment for his company for the British Admiralty at the H.M. dockyards at Malta.



ably enough to prevent synchronous apparatus from going out of step, and to prevent burning of the arrester. The limited discharge capacity, spoken of, does not apply to multi-gap arresters on our lower potential lines of 25,000 volts and less, possibly in part because, providing for the suppression of lower generator voltage, accompanies the production of an arrester of low impedance to lightning discharge, rendering it capable of handling higher discharge currents. The smaller insulators on lower potential lines are also a factor in preventing the lines of lightning charges. Ordinary arresters take care of these lines very well, and horn arresters which are not well adapted to low potentials, by reason of the variation in gap breakdown voltage, are frequently used on such lines to care for the frequent strokes of great magnitude.

fuse is connected in, for a line may be struck twice in quick succession.

To this end various types of automatic fused horn arresters were designed and tested under operating conditions. The type now being used consists of three special fibre tubes fanned out from a casting, pivoted on a standard 50,000 volt line insulator, and swinging in a vertical plane. A counter-weight on an arm on the pivoted casting causes the tops of the tubes to be brought successively nearly into contact with a spike on an insulator vertically above. The upper end of each tube is covered by a brass cap, forming an extension to the tube and bearing against the spike, to which cap the upper end of the fuse is attached. The lower end of the tube is held by a cap on the lower end of the tube. An adjustable spark gap is provided, the pivot forming one terminal,

The Fan System of Heating and Ventilating Factories.

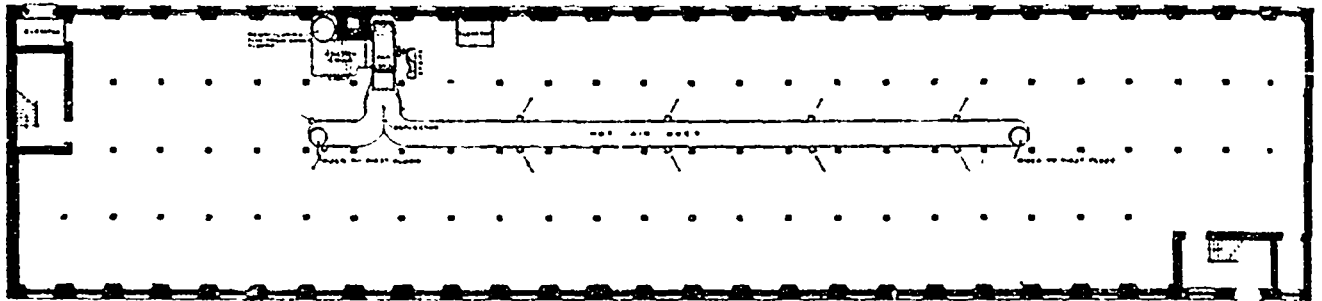
WRITTEN FOR THE CANADIAN MANUFACTURER, BY S. R. SHELDON, OF SHELDONS, LIMITED, GALT, ONT.

When designing a modern factory building, one of the first problems that confronts the architect or engineer is what kind of heating system to install. Many have jumped to the conclusion that ventilation is very expensive but they overlook the fact that when in a modern plant a combined system of heating and ventilating is installed, it is done at a comparatively low cost. Exhaust steam if desired can be used and the system can be operated as cheaply as any other known system. In many cases there is a decided saving of fuel. The fan system, of course, insures, without reference to outside conditions, an unvarying supply of fresh air at the right temperature to maintain the air in the building at a healthful degree of heat. The fan system differs from other heating systems, in that the

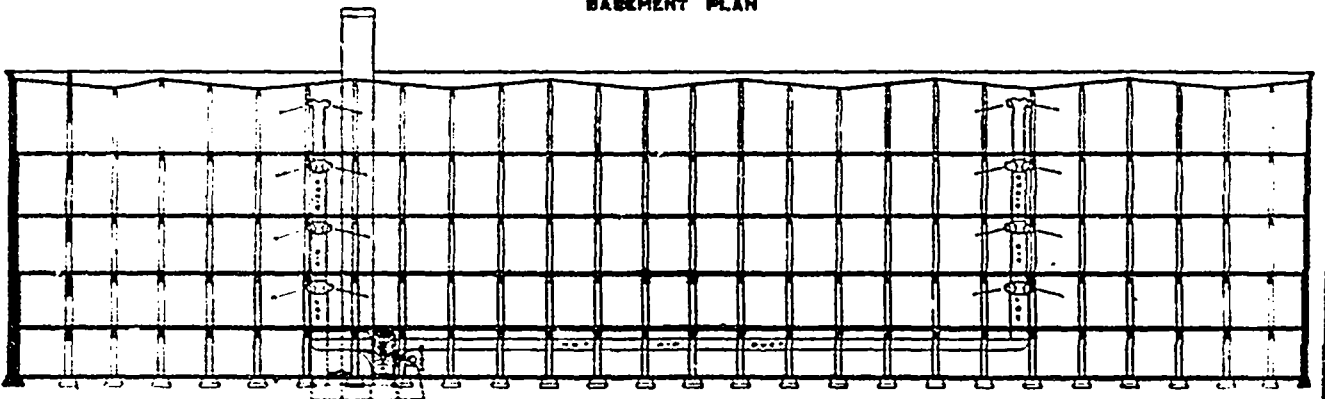
direct connected to the shaft which arrangement permits of the heating system being operated at any time without in any way being dependent on the main source of power supply; the exhaust steam from this fan engine is used in the heater coils which reduces the cost of operating the fan considerably.

The fan in this installation was arranged to draw the air through the heater and discharge the hot air into a galvanized iron duct, which duct connected to two risers which conveyed the heated air to the several floors of the building; these risers or ducts are reduced in size after the openings or air outlets are taken off so as to maintain a suitable pressure in the pipe, these sizes being calculated carefully so as to convey the requisite amount of air to the several

building is not thickly peopled or where the process of manufacture does not vitiate the air to any appreciable extent. In instances where the air is heavily vitiated by smoke, dust, etc., or where absolute cleanliness is essential to a good product, the air can be washed by an "airwasher"—this air washer consists of a series of water sprays through which the air is passed at a comparatively low velocity, the air is then passed through a series of baffle plates or eliminators so arranged as not to retard the air flow to any extent but to catch and cause to be deposited any floating particles of water or dust that may have been carried through the water spray by the force of the air currents. These air washers are very dependable when properly designed and installed and besides cleansing the air they act



BASEMENT PLAN



LONGITUDINAL SECTION

temperature throughout a well constructed building, to which it is properly applied, is uniform. The air being forced into the room and a slight pressure maintained therein, the tendency is for an outward leakage of warm air instead of an inflow of cold air around the windows.

The relative position of the heating apparatus, as used with this system, to the space to be heated, should be as central as possible, as in that case the arrangement of the galvanized iron ducts or pipes used to convey the hot air to the several parts of the building will be the least complicated and will entail the smallest outlay.

In the accompanying plans is shown an installation of the fan system of heating and ventilation. In the basement are placed the engine, fan and heater, the engine is

parts of the building, to insure perfect ventilation; the temperature of this air being governed by the number of sections of the heater in use. In many cases the temperature of the air is regulated by means of thermostats which control the amount of steam admitted to the heater, by this means the temperature can be maintained throughout the building at a fixed degree regardless of the outside conditions or temperature.

In the installation shown in the accompanying drawing the air is recirculated through the building, that is the air is drawn back to the fan again through the recirculating flue which is so designed and proportioned as to return a certain quantity of air from each floor. This arrangement permits of the building being quickly heated up and gives adequate ventilation in cases where the

efficiently as humidifiers and are used in many textile mills principally on that account.

The arrangement of the fan or blast system of heating and ventilating can be varied so easily that the system can be successfully applied to almost any class of factory or public building. In ordinary factory heating a complete change of air every fifteen or twenty minutes would be ample, but for schools, hospitals, etc., air should be changed much more frequently, usually in from eight to twelve minutes. In this class of building the air supply is calculated from the number of occupants of the rooms.

The blast system of heating has been applied successfully to schools, colleges, halls, textile mills, paper mills, machine foundries, carsheds, and roundhouses.

halls and dye houses there is an excess of moisture which renders the atmosphere foggy and unbearable; by introducing this

carefully checked over, and the heating system should be designed by a competent engineer or manufacturer of these articles.

a canal boat built by the firm of Fellows, Morton & Clayton, Limited, and a series of trials were conducted on the canal between Birmingham and London to ascertain what would be the economy, and particularly the reliability of a plant of this type for canal boat propulsion.

For the test the boat was loaded with a cargo, and in addition to this another boat was taken in tow in the customary manner. The boat left Birmingham at 11.30 p.m., December 2 last, loaded with a cargo of 15 tons, and upon arriving at Braunston, 43 miles from Birmingham, another boat, laden with a cargo of 22½ tons, was taken in tow. London was reached at 9.30 a.m. on December 5; the total occupying 58 hours, this being just the same schedule of time as that taken by the regular steam barges. The suction gas plant with the engine was in operation continuously for 60 hours. The engine was of the Crossley vertical, enclosed type, designed to work at comparatively low speeds; it has two cylinders, developing about 14 b.h.p. The engine is started by means of compressed air, and runs without stopping until the completion of the journey. The boat could be stopped, driven ahead, or driven astern quite readily, by means of clutch gearing, which was under absolute control of the driver of the boat. The coal used in the producer was anthracite of very small variety and cost 25 shillings and 5 pence—\$6.18—per long ton. The total fuel used during the 60 hours was 661 pounds; the total mileage, 138 miles, during which 141 locks were passed through. The fuel used per mile was 4.8 pounds; fuel used per hour was 11 pounds. The total cost in fuel for the trip was only 7 shillings and 6 pence, or \$1.83, being a cost per mile of a little over 1¼ cents, or less than 2¼ cents per hour.

When the fact is taken into consideration that during the journey of 138 miles, 141 locks—more than one lock per mile—had to be passed through, it seems a remarkably low cost. The proprietors of the canal boat said that the saving in the cost of fuel as compared with steam, and using coke fuel, was nearly 50 per cent.

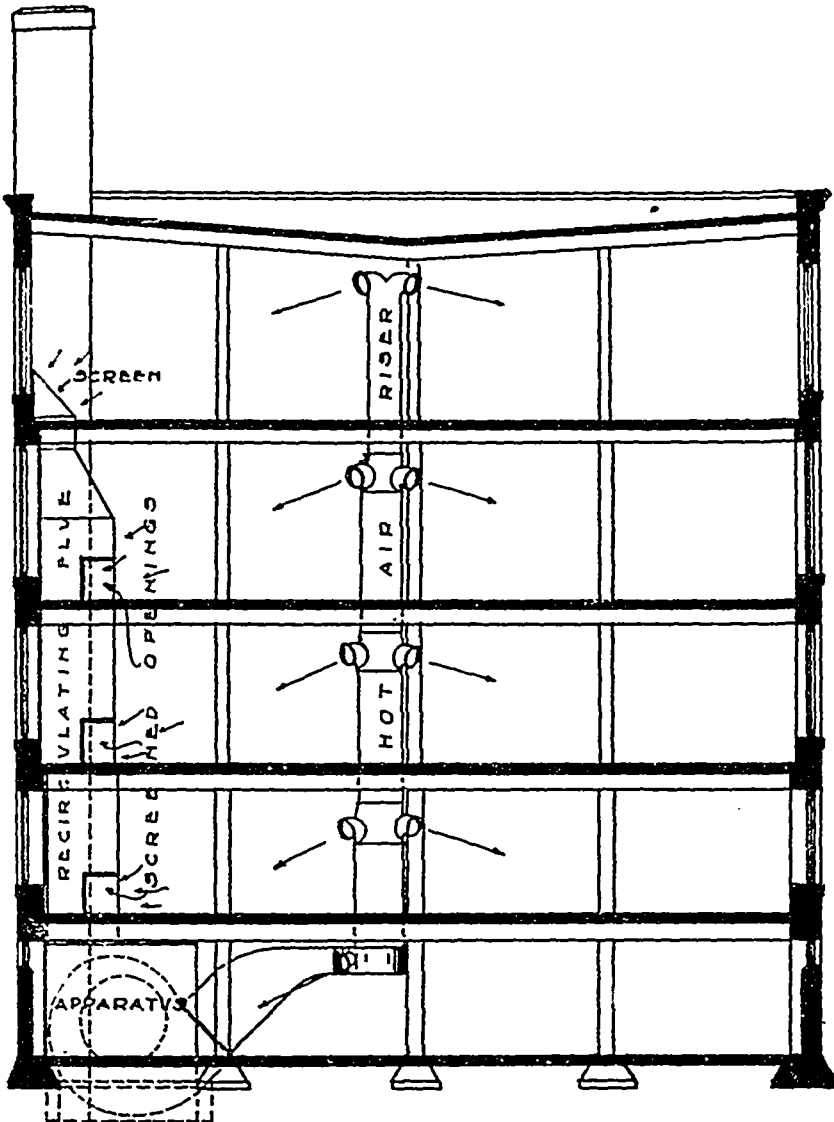
As suitable coal can be purchased in Canada for less than \$5.00 per ton, and the stretches of water without interruption by locks, or otherwise, are considerably longer than in the case of the above test, it would seem as if very much better results could be secured in Canada.

BIG STEAMERS FOR CANADIAN SERVICE

A press dispatch from London says, that the White Star Line Co. have decided to order four great steamers for the Liverpool-Montreal service. They will have a maximum speed of 24 knots and will carry from 2,000 to 4,000 passengers. These boats will not be in service until the season of 1909.

Ore shipments from Cobalt for 1907 were 29,981,010 pounds or 14,040 tons as compared with 5,129 tons in 1906; 2,144 tons in 1905. The value of the 1907 output is estimated at over \$10,000,000 as compared with \$3,900,000 in 1906.

The contract for construction of new western channel into Toronto Harbor has been let to Rosa Weddell, of Trenton, for \$195,000. The channel is to be 400 feet wide.



CROSS SECTION

Producer Gas for Canal Boats.

Written for THE CANADIAN MANUFACTURER.

With our extensive system of waterways in Canada, it is surprising that more has not been said about the utilization of producer gas engines for the propulsion of barges and heavy cargo boats. With the low fuel consumption claimed for this type of plant, and the economy in space, resulting from the comparatively small quantity of coal to be carried, it would appear to be a matter worthy of fuller enquiry on the part of the inland marine transportation companies.

The matter is particularly suggested to us just now by particulars we have received of some tests made by the well known Crossley Bros., Limited, of Manchester, England, details of which we have had from their Canadian office, Board of Trade Bldg., Montreal. This firm fitted a gas plant into

large volumes of warm air discharged into the rooms will absorb the moisture and prevent the deposition of the moisture on the ceiling, and the consequent dripping which is annoying and causes, in many cases, considerable damage. In the foundry equipped with the fan or blast system, large volumes of air at moderate temperatures can be used while the iron is being run off, thereby clearing the atmosphere and rendering it non-healthful and comfortable for the workers. In other classes of buildings where noxious objectional odors, vapors or gases are evolved from the process of manufacture the circulation of large volumes of air tends to partially reduce the inconvenience and possibility of damage. Numerous adaptations occur in the convenience of the massed ventilation and the effects of perfect ventilation have considerable commercial value. Of course individual conditions must control the method of application and installation, and for the reason each plant has to be

Recent Developments in English Cotton Mill Construction.

BY AN ENGLISH MILL ARCHITECT IN TEXTILE WORLD RECORD.

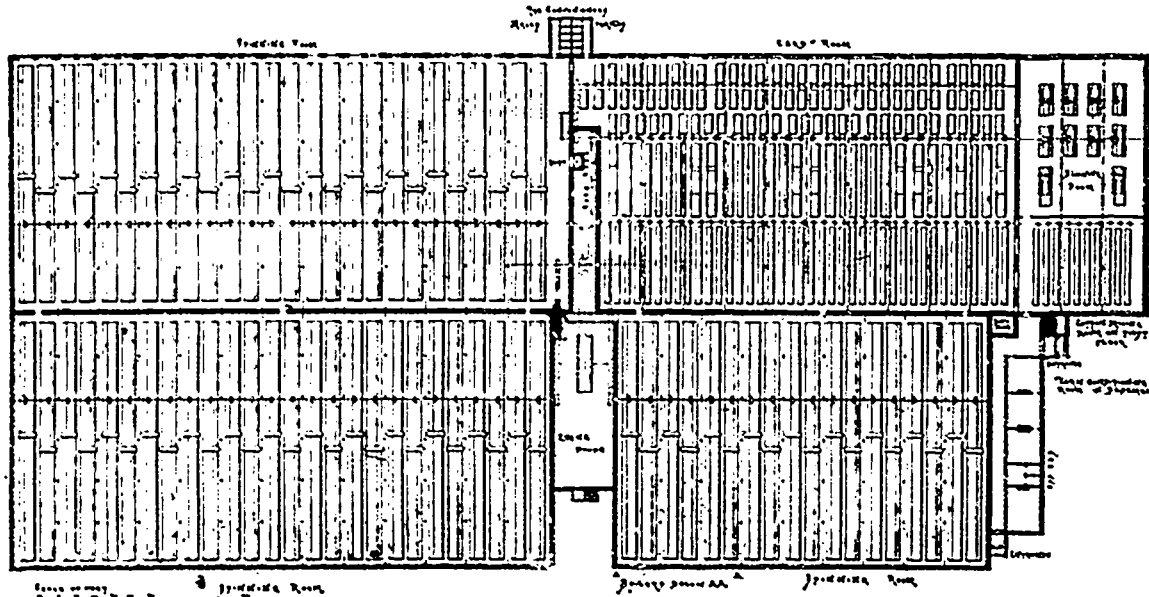
In the year 1900 there were approximately 104,000,000 spindles at work in the cotton spinning industries of the world, of which 44,000,000 were in England. The number in England has now grown to nearly 55,000,000, mainly through the erection of new mills, during the last three years. The majority of the buildings are of the ordinary type, but in a few instances new ideas have been introduced, which may in course of time become general whenever circumstances will allow. Mills have recently been erected with the whole or the main portion of the machinery on one level, top lighted, a system which facilitates supervision and saves both labor and time. There are practically no stairs or only to a very limited extent, and with fire-

Underneath the card room is the conditioning room for the storage of yarn. The other three rooms are the spinning rooms, two larger one containing each 26 self-acting mules, and one smaller one provisionally shown to contain 18 mules, but which may be increased in size by the addition of another bay so as to hold 20 mules or even 26 if ultimately desired. The machinery would then be as follows.

- 2 vertical openers and scutchers.
- 1 intermediate scutchers.
- 4 finishing scutchers.
- 93 carding engines.
- 63 finishing deliveries of drawing.
- 792 slubbing spindles.
- 1,716 intermediate spindles.

engine, the inverted vertical and the side-by-side horizontal triple expansion engine are those most generally used. A piston speed of 650 feet per minute and a steam pressure of 150 to 200 pounds are the ordinary requirements. Opinions as to the advantages of superheating are divided in England, as it occasionally gives rise to trouble, due possibly more to defective construction than to defect of the principle. Economy of coal consumption may result from its use, which may, however, be to some extent neutralized by greater wear and tear. Steam consumption with dry steam is about 11½ pounds per horse power.

Cotton factories in England are never very far from coal mines, in fact, all the manufacturing towns are either on or close to the coal fields. The coal consumption of large cotton mill engines ranges from 11 to 12 pounds per indicated horse power. Turbine engines have only just been introduced into one cotton mill and some years must elapse and good results be obtained before mill owners, who are generally slow to change



proof doors to all openings fire risk is reduced to a minimum. At most one room could be burnt out in case of fire.

The plan illustrated is typical of those which have been erected, and is one of a mill to be built this year. For one-story mills cheap land is the main consideration, given that there is no advantage in erecting buildings five or six stories in height, as it has been ascertained that the cost of a one-story mill containing, say, 100,000 spindles is less than that of a mill containing the same number of spindles with rooms placed one above the other. There is no difficulty in finding sites in the cotton spinning centres of England suitable both as to price and all other requirements for buildings of this class.

The plan shows a factory with four large rooms and several smaller ones. In the centre are the mill or rope race and the engine room, while the boiler house is placed in basement excavated under the corner of the smaller spinning room. The blowing room is placed at the end, over it is the cotton store room provided with outside loading doors and directly adjoining is the card room for the whole of the preparatory machinery.

6,680 roving spindles.
70 or 72 self-acting mules.

The clear height of the rooms is 16 feet; there are, as shown, large window openings in all outside walls and roofs with north light as in a weaving shed. The roofs are carried by light cast iron columns. The walls are of brick. Reinforced concrete has as yet only been tentatively used for floors, but in the mill illustrated it may possibly be also used for the external walls. The objection to that is its unsightly appearance. Mill owners in England take considerable pride in the appearance of their mills. All those erected during the last few years are well designed, faced with the best made bricks and form, in the majority of cases, attractive and imposing buildings. No mill architect could make concrete for outside walls into an attractive building material, it is doubtful, therefore, whether it will ever be used except for floors and in positions where it is concealed.

The type of engine to be used has not yet been definitely decided. Several are in use for driving cotton mills in England. Economy of working and of upkeep are the essentials. The horizontal compound tandem

themselves or new ideas are likely to adopt them.

BRISTOL COMPANIES CONSOLIDATED.

The Bristol Co., of Waterbury, Conn., has come under the control of Prof. William H. Bristol, whose inventions this company has been manufacturing since it was first organized in 1889. Prof. Bristol assumed active charge of the management of the business on Friday, March 28, and now owns the majority interest.

The business which has been carried on under the personal name of Wm. H. Bristol at New York, will hereafter be conducted with the Bristol Co., and by this consolidation of interests the Bristol Co. will represent probably, the most complete line of measuring instruments in the world, for pressure, temperature, electricity, and for a great variety of other applications.

The Bristol Co. was organized in 1889 under the name of "Bristol's Manufacturing Company" to manufacture Bristol's Pressure Gauges and Bristol's Steel Belt Instruments which Wm. H. Bristol had taken out patents

To these were added many other inventions from time to time, and in 1894 the business was incorporated under the name of "The Bristol Company."

Two years ago Wm. H. Bristol withdrew from the presidency of the company, and since that time has developed many new inventions, including the Wm. H. Bristol electric pyrometers and patented smoked chart recorders. The new pyrometers have come into wide use, there being, for instance, fifty of these pyrometers in service in one of the large steel plants.

Mr. Bristol has taken out a large number of patents during the last three years on new instruments. One of these which will be soon put on the market is the long distance electric thermometer, designed especially for indicating and recording refrigeration, atmospheric and drying temperatures. This instrument will fill a long felt want for use where it is desired to quickly indicate at some central station by means of switches the temperatures at several distant points.

The new lines of Wm. H. Bristol instruments supplement those of the Bristol Co., supplying a variety for applications for which the old instruments could not be recommended. For example, the standard Bristol's recording thermometers cannot be successfully used for temperatures above 600 degrees F., while the Wm. H. Bristol pyrometers are being applied to great advantage for the higher ranges of temperature, especially for ranges from 600 degrees to 2,600 degrees, F.

The new lines of Wm. H. Bristol pyrometers are fitted with special movements made by The Weston Electrical Instrument Co., and are designed for extremely accurate measurements. The combined line of recording instruments to be hereafter manufactured by the Bristol Co. will make it possible for the company to co-operate better than ever before with its customers in giving them perfectly satisfactory service.

An Ideal Layout for a Shoe Factory.

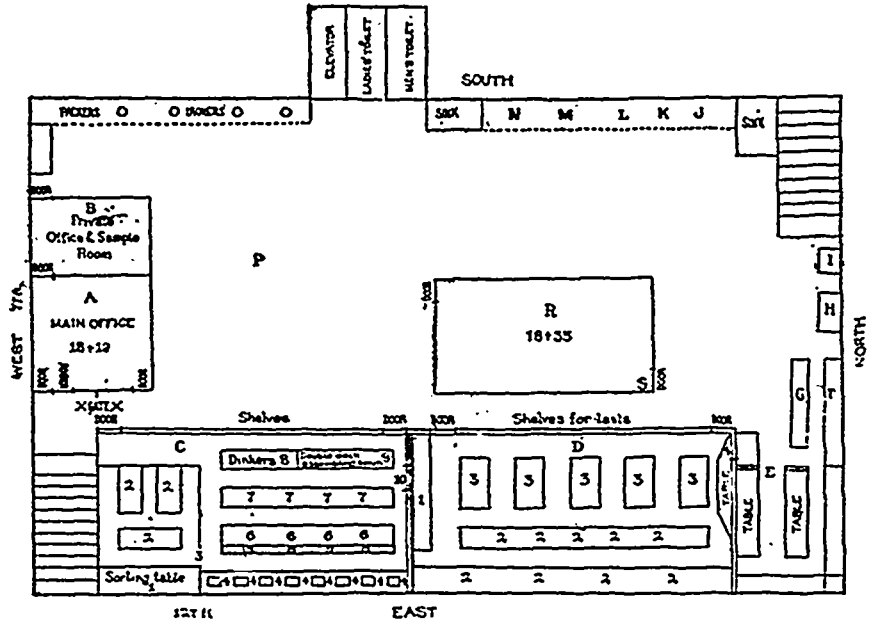
From American Shoemaking.

Above is drawing of lay-out of floor 127 feet for manufacture of Misses' and Children's shoes. Cutting and stitching departments enclosed in double lines. Rooms designated by letters. Principal points in different rooms designated by figures are:

- 1.—Main Office.
- 1. Window at which girl operates, gate — x x — gate.
- 2.—Private Office and Sample Room.
- 3.—Cutting Room.
 - 1. Sorting table.
 - 2. Table with bins underneath for leather.
- 3. Window and swinging door.
- 4. Bench for cutters.
- 5. Shelf one foot wide on which to pile work; under which patterns are kept in boxes.
- 6. Bench for lining and trimming cutters.
- 7. Bench to pile work; underneath which are patterns in boxes.
- 8. Diners.
- 9. Double deck assembling bench.
- 10. Window through which work goes to stitching-room.
- 11.—Stitching-Room.

- 1. Table for sorting work from cutting-room.
- 2. Benches for double line of machinery.
- 3. Work tables.

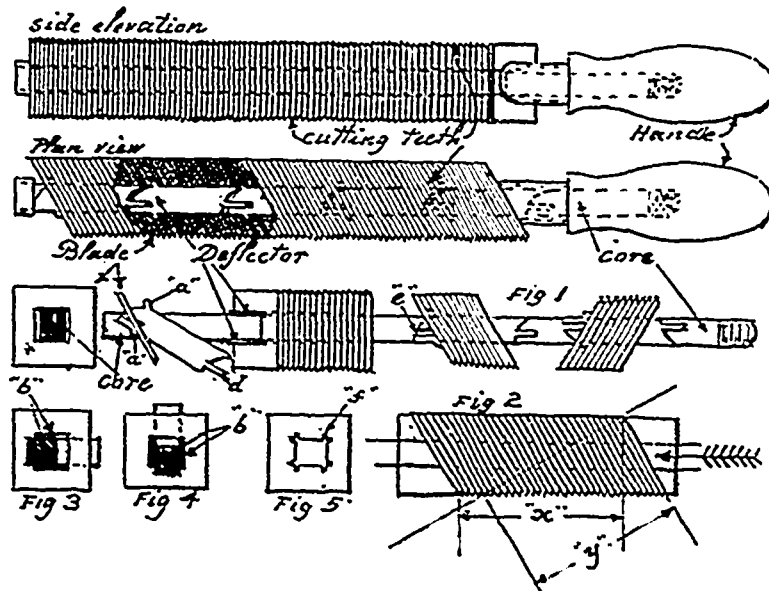
- I.—Beatout Machine.
- J. K. L. M. N.—Heeling, Shaving, Buffing, Trimming, Finishing.
- O.—Ironing, Cleaning and Packing.



- 4. Window through which uppers go to lasting-room.
- E.—Stock Fitting-Room.
- F.—Lasting Machine.
- G.—Pullers-Over.
- H.—McKay Stitching.
- P.—Shipping and Receiving Freight.
- R.—Stock-Room for Heels, Counters and All Parts which Should be Assembled With the Uppers and Given to Laster in Box With Each Lot of Shoes Out of Window.

Composite File.

When the ancient smiths discovered a process of making steel and the art of hardening and tempering it, they began to make cold chisels and the use of these tools must soon have suggested the idea of making files. by inclining them so that the bevel surface of their edge should be in line as shown in Fig. 1 in the above diagram. Several patents with that idea as a basis were taken in Germany and in the United



The annoyance and cost of using dull files that soon become useless must also have suggested, long time ago, the idea of making them of many pieces (blades) that could be sharpened as a single piece with a grindstone. States during the last century, but they were not practical. None of them had any adequate way to resist the tendency of the blades—when pressed together to take a position at right angle to the axis of the

tool, which happens when the distance "x" is greater than "y" (Fig. 2).

This is the reason for having the several pairs of deflectors shown in the drawing. They also fill the two empty spaces "b," when the blades are inclined on the core, shown in Figs. 3 and 4. The projection "d" fits into the recess "e" of another deflector and keeps them truly in line. The two

projections "a" hold the blades properly inclined and lay in the ratchets "f" (Fig. 5) punched out of some of the blades.

The core is cut out of steel bar accurately cold rolled to size. The handle can be made of a cast iron casting.

To manufacture this tool in quantity a special automatic gas furnace can be constructed to harden the blades somewhat after

the fashion of those employed to harden mower blades and other small articles. The blades and deflectors are punched out of sheet steel and are made of different sizes to suit requirements. No particularly skilled machinist is required for the production of this tool. The Canadian rights for this invention are offered for sale by Henry C. Pittsfield, Mass.

Conditions and Prospects of British Trade in Canada.

A Review of Report by Mr. Richard Grigg, Special Commissioner of the British Board of Trade.

FROM THE CHAMBER OF COMMERCE JOURNAL—(Continued from April 3rd issue.)

Following upon the abstracts in our two previous issues we give below our concluding quotation from the valuable report by Mr. Richard Grigg on "British Trade in Canada."

CHINA, EARTHENWARE AND GLASS.

China and Earthenware imports in 1906 were valued at \$1,674,817, of which \$917,823 came from the United Kingdom, which has substantially increased its share of the trade. Various instructive details are given in the report as to prices, on the vexed question of packing, and as to the need for proper representation and a thorough mastery of local conditions. French china tea sets have a considerable sale in the better class lines. Toilet sets are almost exclusively British. German china is cheaper, and in less expensive table-ware is said to be increasing, though it has been checked to some extent by the surtax.

Glass and Glassware.—The total imports of glass and glassware in 1906 were \$2,680,274, of which Belgium sent \$823,927, the United Kingdom \$761,748, and the United States \$678,763. Lamp Chimneys and Globes are almost entirely of American and Canadian manufacture.

DRUGS, CHEMICALS AND MEDICINES.

The imports under a large variety of items for drugs, dyes and chemicals were valued at \$7,425,638 in 1906, of which \$7,874,232 came from the United States, and \$2,682,687 from the United Kingdom. The largest items imported from the United Kingdom were glycerine \$307,378, caustic soda \$148,322, crude brimstone \$141,102, and proprietary medicines \$129,560.

Perfumes, including pomades, toilet preparations, etc., are derived chiefly from the United States and France, the import from the United Kingdom only being \$28,733 out of a total of \$235,874.

Soap.—Although in 1902 the British share in the imports of soap was rather more than half, viz., \$230,131, and that of the United States \$179,604, in 1906 the former's share was only \$45,171, and the latter's rose to \$386,992. The British decline is due in part to the erection in Canada of works by an important British firm which had a considerable hold upon the Canadian trade. A popular toilet soap is French Castile; some of the English toilet soaps have a certain sale, and several Canadian firms manufacture and do good business. Some details of prices are given in the report.

Medical Supplies.—The supply of medical foods, drugs, instruments, bandages, absor-

bent cotton, etc., is almost entirely in the hands of American firms, owing mainly to the energy with which they have cultivated the market. It was suggested to Mr. Grigg that British firms might do more by advertising in medical and nursing journals in Canada.

Paints and Colors.—Of paints and colors the total imports in 1906 were \$1,382,608, of which \$667,940 came from the United States, \$499,004 from the United Kingdom, and \$161,345 from Germany. The Canadian production of paints and varnishes increased by \$1,000,000 in five years. Turpentine and ultramarine blues are obtained from the United States, and English oxides practically control the Canadian market. British varnishes are excellent in quality, but high in price as compared with those from the United States.

Oils.—These come mainly from the United States, the principal item from the United Kingdom being linseed oil. The best lubricating oil for marine and other engines is obtained from the United Kingdom, although the chief imports of such oil are from the United States.

Salt.—The bulk of the trade in salt is in the hands of the United Kingdom, which supplied \$296,487 worth in 1906 out of a total of \$412,045. The Canadian output in 1905 was valued at \$441,725.

LEATHER AND MANUFACTURES THEREOF

Under this heading the total imports in 1906 were \$5,083,293. The imports from the United Kingdom amounted in 1902 to \$257,750, and in 1906 to \$496,460, the principle single item being belting leather of all kinds, which was valued at \$51,967 in the former year, and \$106,326 in 1906. The import of British boots and shoes was \$34,178 in 1902 and \$66,629 in 1906. The imports from the United States were \$1,466,276 in 1902 and \$2,453,276 in 1906; in the latter year the chief item from that country was boots and shoes, which increased in the five years from \$665,915 to \$1,216,003. The Canadian output of leather and leather goods rose from \$30,622,416 in 1900 to \$35,839,338 in 1905.

Bags, Dressing Cases, etc.—Suit cases made in Canada are much lighter than the British, and are covered with basil instead of hide; though they do not wear like the English goods they are lighter and cheaper, and sell.

Harness and Saddlery. In 1906 the total imports were \$91,092, of which the United States supplied \$67,065, the British share being so small that it is not separately indicated. The Canadian production rose from

\$3,427,255 in 1900 to \$4,800,555 in 1906. In carriage and saddlery hardware a portion of British trade is done, which might be increased if the matter were carefully studied in the trade.

FANCY GOODS.

Imports under this heading totalled \$3,367,174 in 1906, by far the largest item being laces, lace collars, and similar goods. The United Kingdom's position in this line is largely due to the item of laces. Except for these our percentage would be comparatively small. Feathers show satisfactory figures but toys and dolls of all kinds, boxes and cases, are divided between Germany and the United States.

GROCERIES.

Jams and Preserves.—A limited quantity of British jam and marmalade is sold in Canada, but the Canadian manufacture of jam is improving in quantity and quality, and a British manufacturer lately established in Ontario is producing a jam equal to the English article.

Cocoa and Chocolate.—In five years the imports of cocoa beans and products thereof from the United States increased by about 110 per cent., as compared with a British increase of about 60 per cent. The imports of manufactured cocoa from the United States increased by about 57 per cent, and from the United Kingdom from \$ 51,571 in 1902 to \$230,641 in 1906.

Pickles and Sauces.—The United Kingdom supplied \$235,834 of a total of \$469,827 in 1906. English sauces are well known throughout Canada and English pickles have a good reputation.

Tea and Coffee.—Of the total imports of tea in 1906, viz.: \$3,666,996, the value received direct from India was \$1,921,575, and from the United Kingdom \$1,010,000. Coffee imports totalled \$843,987, of which \$21,144 came from Brazil, \$143,027 from the United Kingdom and \$122,104 from the United States.

Sugar.—Since 1903 there has been a very substantial rise in the imports of sugar from the British Empire. It is considerable in the case of the United Kingdom itself, but is not marked from the British West Indies and from British Guiana. There has also been considerable progress in the importation from Fiji, and a strikingly sudden importation from British Africa. On the other hand, the imports from foreign countries have declined with extraordinary rapidity.

(To be continued)

... THE ...

CANADIAN MANUFACTURER

and Industrial World

A Semi-Monthly Newspaper devoted to the Manufacturing Interests of
Canada—A Newspaper, Not an Organ.

Established in 1880. Published 1st and 3rd Fridays.

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THANKS TO THE HYDRO-ELECTRIC COMMISSION!

It is unfair to state that the Hydro-Electric Commission of Ontario have accomplished nothing.

They have at least increased greatly the attention that manufacturers are giving to the question of power equipment and power costs. Many owners and managers of Canadian factories and mills had evidently gone on the assumption that one type of power plant was about as satisfactory and efficient as another. As long as the engine and boiler in the power house supplied sufficient power to keep all the machinery in motion at desired speed all the time, no questions were asked. Coal bills were inevitable.

During the last year or two a much more intelligent attitude on this question has been manifested. Manufacturers are asking whether the saving effected by installing a more up-to-date plant would justify replacing the old, worn-out equipment now doing service.

It is also the fact that manufacturers who are about to instal a new plant give more intelligent consideration to the problem than has been the custom. It is not to-day a case of merely pitting one engine salesman against another to get a low quotation. There is the question whether electricity shall be bought from a power company or developed by the manufacturer from a neighboring water power, or by a steam plant, or by a producer gas plant or by gas engine operated by city gas. There is the question whether power shall be transmitted by electricity, by shafting and belts or by rope drive.

If steam power is adopted there is not merely the competition between various engine builders but the buyer must choose between several types of engines which one builder is prepared to offer him.

The Hydro-Electric Commission cannot fairly be credited with all this enhanced interest in and study of the power problem but the publicity which has been given to its proposals and its reports has certainly been a factor in this direction.

To that extent the Commission has been of value to the power users of Canada. Whether it will ever be of greater service than this is yet a problem too deep for us.

MISTAKES WILL OCCUR

In our issue of March 20, in the description of the electric light plant and power station at Saskatoon, we stated that Mr. George H. Brown was resident engineer in charge of construction. This was a typographical error. The correct name was Mr. George H. Power, a member of Mr. Willis Chipman's engineering staff.

In our last issue, April 3, an interesting article on "Use of Tackle for Hoisting and Drugging," by F. W. Brady, was published. This should have been credited to "Power." As we are scrupulous to give full credit for any articles taken from our exchanges, we are quick to make amends to our contemporary for this lapse.

MOTHERS IN BRITISH COTTON MILLS

Free trade is a delightful theory. When explained by certain economists, whose deductions are based on conditions that should exist in the world, it is a noble theory. Yet the facts will insist on presenting themselves from time to time.

Great Britain is the last refuge of the free trader, but free trade in Great Britain is doomed—not because of the aggressiveness of the tariff reformers, but because of the facts, the ugly, brutal facts. We reproduce an editorial from the Textile Mercury, of March 28, which in a calm judicial manner, discusses one of the facts about the conditions existing in the cotton factories of Lancashire. Read it:

Mr. John Burns's remarks on mothers in Lancashire factories will be strongly resented in manufacturing centres. Having only a week or two ago commented on this subject, we should not now refer to it again, except for the wild statements made by the President of the Local Government Board at the National Conference on Infantile Mortality, held in London on Monday. As regards conditions of labour and wages, mothers in Lancashire cotton mills are much better off than mothers employed in other industries. The worst case cited against Lancashire is that of Burnley. There, according to Mr. Burns, one-third of the mothers go out to work as weavers, and the mortality among children of the women who thus work is said to be twice as high as among the children of women who do not go to the mills. But is the comparison a fair one? To which class of society do the women belong who stay at home? And are we sure that if the working mothers did not work, the children would be properly fed and clothed and sheltered? And why do the women go to the mills? Is it not because the difficulty of men earning a "living wage" is increasing? Why, too, should the working mothers be wholly blamed for heavy infantile mortality, when, in towns like Burnley, there is an increasing physical deterioration among men?

The problem of improving the security of child-life will not be solved by turning the mothers out of the mills. Does Mr. Burns not know that many of these mothers go to the mill to save the children from sufferings that are only too common in homes where husbands are irregularly employed? Of course, he would argue that if you prohibit women from working, men will have a better chance of work. But against that contention is the fact that throughout the country women workers are increasing at a greater rate—a strikingly greater rate—than are men workers. And this provokes the question—How much is this due to unfair competition from abroad, which brings about the necessity here of cheaper labour? It is an easy matter to cry from a public platform—"Turn the mothers out of the mills!" But what after that? Mr. Burns says, "A woman cannot sublet her maternity." The grave question which arises out of that statement is—Why is she compelled to sublet it?

INTERESTING OPINIONS ON POWER REPORT

In our last issue we published the full text of the Hydro-Electric Commission's Report on Producer Gas, and in our editorial columns invited correspondence commending or criticizing the deductions made by the Commissioners' experts.

We have decided to hold this correspondence to our next number, when we will have more space than is available in this issue to devote to this matter. We would like to have for that issue a dozen or more letters

from men who are recognized as authorities on the question of power.

There never was a time when the big power users of Canada were more interested in this question or were more anxious to reach the real facts in regard to it. Never had a correspondent a better opportunity to state his case before a large body of earnest, unprejudiced readers.

If any of our readers desire to ask any question regarding any point brought up in this report, we would endeavor to answer them in the next issue.

The Prevention of Fire Losses.

PERTINENT SUGGESTIONS TO THE MANUFACTURER WHO CONTEMPLATES BUILDING NEW WORKS.

By A. M. LEWIS IN AMERICAN INDUSTRIES.

In this time of modern commerce when men study scientifically the problems of a manufacturing business, every element must be carefully considered, including those sometimes classed as unimportant.

Not many years ago men thought little of the value of sanitary conditions in a manufacturing plant—good light, sufficient heat and a reasonable amount of recreation during the working day—the problem then, as at present, was to produce the greatest quantity of finished articles in one day with the least possible investment and expenditure.

Conditions have changed. Men have learned that the best interests of the employer are served in looking after the interests of the employees, and that labor reaches its highest efficient state when working under the most favorable conditions. Is it not reasonable to assume (as a fact it is self-evident) that a man, woman or child working in a modern, sanitary, well constructed and arranged plant produce better results both in quantity and quality than when working under opposite conditions? Therefore, when considering the erection of a plant or building, requirements should first be studied, then the building planned to meet them.

The value of a manufacturing business is always based on its producing value when in operation, for the great majority of manufacturing plants dismantled and sold return less than twenty-five per cent. of their original cost, whereas when in continuous operation the daily output carries the original investment and returns a profit. Therefore a manufacturer must keep his plant in continuous operation to secure the greatest return.

In every business, and especially in manufacturing, there is an element commonly known as good-will, which really consists of an established trade secured usually after years of effort and the expenditure of large amounts for advertising. This element forms an asset not shown on books, but of great value to any business.

In establishing a business the first great problem is that of securing a market for the product. How necessary it is after securing that market to properly protect the business so as to be in a position to meet the customers' demands at all times and under any con-

ditions. The writer's personal experience in placing orders has shown the advisability of dealing with concerns who are in a position to make deliveries as well as to quote proper prices.

These facts clearly bring to the attention of manufacturers the necessity of providing against an interruption to their business, either temporary or continuous. We have now reached the real subject we are considering, fire prevention—fire protection.

In recent issues of this paper have appeared several splendid articles on fire prevention, all showing the enormous losses annually in this country due to neglect, first, in erecting buildings, and second, in properly protecting them after erection. It has been shown that the first cost of fire-resisting buildings as compared with non-fire-resisting is only slightly higher, and when the life of the building is considered and its many advantages, the excess cost disappears. It seems almost incredible that American business men should have permitted a fire loss of \$550,000,000 in the last three years because of neglect, when fully ninety per cent of this loss could have been prevented by fire protection devices, this not to mention the loss of life and the great loss due to the interruption of business.

The following table, prepared in 1902, prior to the great losses in Baltimore and San Francisco, will show some pertinent facts of interest to all business men:

Fire loss for ten years...	\$1,465,523,652.00
Commercial failures.....	1,664,005,316.00
Net earnings of steam rail-ways.....	4,062,316,745.00
Interest paid by steam rail-ways.....	2,439,285,190.00
Dividends paid by steam rail-ways.....	1,107,189,433.00
United States gold produc-tion.....	605,870,100.00
United States silver pro-duction.....	718,202,001.00
Exports including special.	11,203,417,531.00
Imports including special.	7,687,434,035.00
United States customs re-ceipts.....	1,906,063,898.00
Internal revenue.....	2,061,099,074.00
United States revenue, all sources.....	4,290,007,252.00

Expenditures War Depart-ment.....	969,291,785.00
Expenditure Navy Depart-ment.....	459,373,725.00
Expenditure Pension De-partment.....	1,427,951,033.00
Interest on public debt....	338,353,305.00
Total ordinary.....	4,342,686,190.00

Since this table was compiled, the fire losses have been steadily increasing. During January, 1908, in the United States and Canada, as compiled from the careful kept records of the Journal of Commerce and Commercial Bulletin, the fire losses aggregated \$29,582,600. This is by far the worst January on record from a fire-loss point of view. The following table affords a comparison with the same month in 1906 and 1907 and gives the losses by months during the remainder of those years:

	1906	1907	1908
Jan....	\$17,723,800	\$24,064,900	\$29,582,600
Feb....	18,249,350	19,876,600	
Mar....	18,727,750	20,559,700	
April...	292,501,150	21,925,900	
May....	16,512,850	16,286,300	
June....	13,950,650	14,765,000	
July....	12,428,050	18,240,150	
Aug....	9,641,600	20,248,150	
Sep....	10,852,550	11,449,400	
Oct....	13,872,450	13,350,250	
Nov....	16,248,350	19,122,200	
Dec....	19,001,450	15,783,750	

Total \$459,710,000 \$215,671,250

During January there were no less than 462 fires where the loss in each instance reached or exceeded \$10,000. This is the greatest number of such fires ever recorded in one month. The big fires during January that contributed largely to the immense total were these:

New York City, 12-story business block.....	\$2,430,000
New York City, iron works and other.....	380,000
Toronto, Ont., storage warehouse	550,000
Kenora, Ont., flour mill and elevator.....	1,000,000
Chicago, Ill., wholesale grocery...	400,000
Baltimore, Md., Masonic temple..	250,000
Janesville, Wis., tobacco warehouse	256,000
Portland, Me., city hall building..	500,000
Portland, Me., wholesale dry-goods store and other.....	500,000
Chicago, Ill., hotel and business block ..	300,000
Chicago, Ill., wallpaper store and other ..	1,120,000
Indianapolis, Ind., storage ware-house.....	730,000

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

The month just closed has been the most costly January the fire underwriters have ever experienced, and it is in addition the worst month they have ever had in which no large conflagration has occurred. The year has opened very discouragingly for the insurance interest, and it is very clear that many companies have done their January business at a heavy trade loss.

The fire losses of this country exceed the dividends paid by the steam railways, United States gold and silver productions, expenditures of War and Navy Departments, Pension Department and interest on public debt. Our fire waste equals

- 85 per cent of commercial failures.
- 36 per cent of net earnings.
- 60 per cent of interest paid.
- 132 per cent of dividends.
- 25 per cent of gold production.
- 204 per cent of silver production.
- 13 per cent of exports.
- 19 per cent of imports.
- 71 per cent of customs receipts.
- 70 per cent of internal revenue
- 34 per cent of revenue, all sources.
- 151 per cent of expenditures War Dept.
- 319 per cent of expenditures Navy Dept.
- 133 per cent of expenditures Pension Dept.
- 433 per cent of public debt.
- 34 per cent of total ordinary expenditures.

This loss is absolute, for fire is the most destructive element encountered in this day and age much flaunted progress.

Now consider how it is possible to prevent this loss. The records of all insurance companies show many so-called preferred risks, meaning those which offer the greatest resistance to fire from without or within, and these risks are carried at very low rates. They are usually offered on buildings of high fire-resisting qualities, or manufacturing plants fully protected by fire extinguishing apparatus. The low rates allowed permit the property owners to carry full insurance and to pay for the extra expense in building and providing fire protection within five to ten years. It is a fact that the insurance companies pay for fire protection by allowing a low insurance rate.

ADVANTAGE OF THE SPRINKLER SYSTEM.

The most advanced form of fire protection that is provided by an automatic sprinkler system consisting of a series of pipe lines running parallel and hung from the ceiling of any building. Sprinklers are attached along these lengths of pipes at distances of eight to ten feet, thus to every eight to ten square feet of area (sixty-four to one hundred square feet) is an automatic sprinkler. This system has two or three sources of water supply, city main, tank on building, fire hydrant or connection for city steamers, providing at least one positive source of supply. When the air about any sprinkler, by reason of combustion, reaches a given temperature, usually 165 degrees Fahrenheit, the glass link in the sprinkler melts and parts, the valve cap which closes the outlet is released and the water then pours through this opening against the distributor and is spread over the ceiling and floor, thus extinguishing the fire. The system is automatic, always on alert and requires no human assistance to start its operation. It can be used in buildings which are not heated as well as heated, for when used in unheated buildings air flows through the pipes and not water. When a sprinkler opens, the air escapes and releases

a valve controlling the water supply, thus permitting the water to flow so that almost instantly it is being thrown on the fire. Such systems have been in use for thirty years, and are not experimental.

The records of one company insuring only properties equipped with automatic sprinkler systems show that in four years the fire loss has been only \$335.00, although the premium income of this company is nearly sixty thousand dollars yearly.

One of the most prominent insurance companies, writing only on risks equipped with automatic sprinklers, presented at its annual meeting in February, 1907, the following report which shows that over ninety per cent of the fire loss can be prevented if proper protection is installed. This company's business is confined almost entirely to manufacturing properties.

STATEMENT, JANUARY 1, 1907

Amount at risk December 31, 1906	\$233,734,710.00
Dividend, January 1, 1907	91 per cent.
Average dividend, 12 months to Jan. 1, 1907	90.01 per cent
Risks written, January 1, 1899, to Jan. 1, 1907—ten years	1,724,112,501.00
Fire losses incurred during this period (partly estimated for December, 1906)	659,956.98

Average loss per hundred dollars of risk written	0.382 cents
Average dividend, January 1, 1897, to January 1, 1907—ten years	90.22 per cent.
Annual cost of insurance on policies terminated in this period per hundred dollars, average	0.741 cents
Average dividend from date of organization in 1850 to January 1, 1907	79.69 per cent
Annual cost of insurance from date of organization in 1850 to January 1, 1907, average	.1623 cents

LOSSES.

The total number of claims for losses reported during the past year was	380
The total amount of fire loss was, 303 claims	\$66,478.56
Largest claim	10,943.84
Smallest claim	1.60
Average loss per claim	219.40
Sprinkler leakage or damage, 77 claims	7,096.60
Largest claim	1,356.40
Smallest claim	1.26
Average per claim	92.16

Compare this record with the facts, which show that the average loss in unequipped risks is \$7,291.00, and it is apparent that the enormous fire loss can be prevented.

Saskatchewan Telephone Proposals.

The report of Francis Dagger, the expert appointed by the Saskatchewan Legislature to outline a new telephone system in that province, was read in the House a few days ago.

The document, says the Regina Standard, is quite massive, containing many pages of typewritten manuscript and an exhaustive appendix giving figures relative to telephone systems in various countries of the world. In the recommendations the report deals with three classes of telephones, the local systems, the long distance systems and the rural systems. In regard to the local systems, Mr. Dagger states quite plainly that he will not recommend government ownership, although he thinks control is a good thing. He advises the government to have nothing to do with operating local exchanges, but to leave that to the towns and cities through their councils. In regard to the long distance system, he outlines a comprehensive scheme for government extensions, covering some two thousand miles, and extending along the principal railway lines of the province. The rural telephone system he considers the most important, and he recommends that the rural councils be empowered to construct these lines or to grant charters to incorporated companies to do so, the government supervising the work and if necessary assisting in financing to the extent of guaranteeing the bonds.

THE PRESENT SITUATION.

The report states that there are at present in Saskatchewan approximately 3,250 telephones, which, taking the population at 300,000, is an average of one telephone to every 92 inhabitants, as compared with one telephone to less than 20 inhabitants in the United States. These telephones in Saskatchewan are divided as follows:

	Exchanges	'phones
Bell Telephone Co.	13	1,698
Saskatchewan Telephone Co.	5	727
Northwestern Telephone Co., (Saskatoon)	1	225
Yorkton and Northwest Electrical Co.	1	220
Wapella Telephone and Light Co.	1	40
Alberta Government Lloydminster	1	30
Rural Telephones		310
	22	3,250

There are only 22 telephone systems as compared with 121 incorporated towns and cities, and the lack of long distance systems is particularly noted. There are only two long distance systems, the Bell Company and the Saskatchewan Company. The Bell Company has 166 miles of pole and the Saskatchewan company has 254 miles of pole for long distance lines. This is totally inadequate and out of proportion to the needs of the province.

PROPOSALS IN BRIEF,

The proposals include the following main points:

LOCAL SYSTEM—Municipalities to own and operate local exchange systems and government to exercise policy of supervision.

LONG DISTANCE—Government ownership of long distance lines, with scheme for construction covering over 2,000 miles of country.

RURAL SYSTEMS—Construction to be by rural councils with Government assistance in the way of guarantee of bonds.

LONG DISTANCE LINES.

The report recommends the construction of the following long distance lines:

	Miles
Regina to Prince Albert, along the C.N.R.....	250
Prince Albert to Westgate, along the C.N.R.....	185
Warman to Lloydminster, along the C.N.R.....	167
Warman to Togo, along the C.N.R.....	225
Saskatoon to Marchwell, along the C.P.R.	250
Saskatoon to Asquith, along the C.P.R.	30
Lannigan to Weyburn, along the C.P.R.	220
Lumsden to Earl Grey, along the C.P.R.	25
Regina to Antler, along the C.P.R.....	160
Stoughton to Weyburn, along the C.P.R.	40
Estevan to Gainsboro, along the C.P.R.	70
Carlyle to Alameda, along the C.P.R.	100
Wolseley to Mayfield, along the C.P.R.	100
Mortlack to Walsh along the C.P.R.	205
Manor to Bredenber, via Wewota, Wapella and Esterhazy	100

2,057

The total mileage thus provided for is 2,057, and the average estimated cost is placed at from \$250 to \$300 a mile, according to the class of construction required. The estimated expenditure, therefore, is from \$514,250 to \$719,950. This is for one copper circuit between all the points named. Mr. Dagger considers the estimate a conservative

one, and making due allowance for unforeseen expenditures and contingencies. He states that the labor market is affected by so many conditions that it is impossible to tell what the item would amount to, and therefore recommends that the labor and teaming be done by contract rather than by day work. It will be impossible, he says, to carry out the whole of the work this year or within the next two years, and so arrangements should be made for building such lines as will give the greatest good to the greatest number. During the coming year, the report says, 500 miles of work should be undertaken, and the lines suggested are between Regina and Antler, and between Regina and Prince Albert and Battleford.

PURCHASING EXISTING SYSTEMS.

In regard to the advisability of purchasing the existing systems of telephones in the province the report does not express any opinion, the expert making it clear that he does not desire to do so. He says, however, that he cannot impress too strongly his opinion that it would be well for the government to deal only in long distance lines. Should it be decided to purchase the existing systems, he suggests that a commission consisting of one member appointed by the government, one appointed by the private interests, and a competent telephone engineer be authorized first to make a thorough appraisal of the value of the plants to be purchased.

says the last belt he got did not give him satisfaction, but if you will take a look around you will no doubt find your machines are all in a zigzag shape. Again, when a machine fails to do the work represented by the maker, the first thing to do is to make a thorough investigation of the machine. If it is all intact and nothing broken or out of place, you will no doubt find your trouble in the tempering of your clay.

It is a good policy to see that all dry lumps of clay and other rubbish are thoroughly cleaned up before closing down at night. This takes very little time and the cost is money well spent. On closing down at the end of the season each machine should be taken apart as far as possible and thoroughly cleaned. All grinding knives and other exposed parts of machinery, not painted, should be coated with a mixture of white lead, tallow and machine oil, applied with a small paint brush. All belting, whether rubber or leather, should be rolled up and put in a cool dry place. The engine should be treated in the same manner as the machinery. The boiler, which usually receives the least attention, is probably the most important. In all cases the boiler should be thoroughly cleaned and the man-hole and hand-hole plates should be left open.

The furnace and back door should be left open so as to allow a circulation of air to pass through in order to keep the boiler and brick work dry, which will prevent rusting. It is a good policy to examine all stays and bolts on the inside of the boiler, to see that they are not broken or loose. This may save serious trouble at some future time.

Another important point in the handling of machinery is the ordering of repairs when you see any part of the machine wearing. Do not wait until it breaks, but order the piece and have it on hand. In nearly all yards there are more or less repairs required in the spring when starting up the year. The proper time to make a list of these repairs is in the fall when you close down as you have everything fresh in your memory. If you do not wish to order at once, file the list away so that you can lay your hand on it any time. As an illustration of how it pays to have machinery in good order I have in mind a company of brickmakers who have turned out from 4,000,000 to 6,000,000 brick every year for the past four seasons. One of the brothers told me that it is his duty to be in the yard one hour before starting. He does all the oiling, examines every part that may work loose, and if anything is wrong it is repaired. The result is they have not had a serious break in years, and have not shut down until noon or night.

AN UP-TO-DATE BRICK PLANT.

W. E. Hamilton & Co., Montreal, representing Martin Brick Machine Manufacturing Co., will install a complete set of machinery, including a very large dryer, for the Crown Pressed Brick Co., at Ormstown, Ont.

It is claimed that when the new machinery is installed, this will be the most up-to-date brick-making plant in Canada.

P. G. Drost, Vancouver, B.C., has prepared plans for the erection of a carriage manufacturing plant.

Western Ontario Brick Makers' Association.

On February 19th The Western Ontario Brick Makers' Association held their fourth annual convention in the town hall, Blenheim, Ont.

In the morning, after T. B. Shillington, Mayor of Blenheim, had welcomed the delegates, and a vote of thanks for the use of the hall had been passed, the following officers were elected.

President—Adolphus Wehlann, Rodney, Ont.
1st vice-President—J. E. Minor, Kingsville, Ont.

2nd vice-President—A. W. Hill, Essex, Ont.
Secretary-Treasurer—Alfred Wehlann, Cairo, Ont.

After luncheon, general business was first given attention, then papers were read by Mr. James Willson, representing H. C. Baird & Son, Parkhill, Ont., and by R. W. Stewart, of the Stewart Patent Kiln Co., Findlay, Ohio, while Messrs John Hitch, of Ridgetown, Ont., and Jules Robinette, of Sandwich, Ont., gave practical talks on the handling of brick.

The delegates in attendance were as below:
Benj. Broadwell and B. Broadwell, Jr., Kingsville, Ont.

N. Currie, Glencoe, Ont.
Geo. Healey, Wheatley, Ont.
A. W. Hill, Essex, Ont.
H. D. Hitch, Ridgetown, Ont.
Warren Leatherdale, Dresden, Ont.
John E. Minor, Kingsville, Ont.
Jules Robinette, Sandwich, Ont.
J. H. Sipprell, Wilkesport, Ont.
Alex. Smith, Cowal, Ont.
R. H. Stewart, Findlay, Ohio.
John Wardell, Blenheim, Ont.
Adolphus Wehlann, Rodney, Ont.
Alfred Wehlann, Cairo, Ont.

Aug. Wehlann, Aldboro, Ont.
James Willson, Parkhill, Ont.

The paper read by Mr. Willson was as follows:

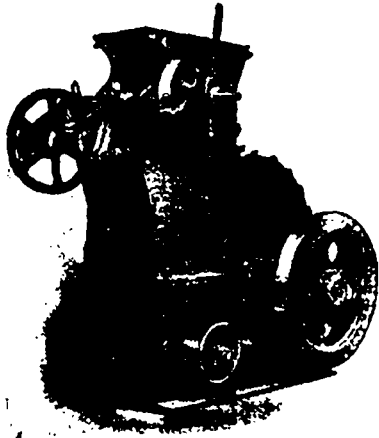
THE CARE AND HANDLING OF MACHINERY.

When I was asked to give you a paper on the care and handling of machinery at your convention, I gladly accepted, from the fact that I was anxious to meet the Western Ontario Brick and Tile makers whom I did not see at the annual convention at Ottawa in December last. Now this question of how to handle machinery may seem simple, but just to say the right thing in the right place, requires considerable thought.

In the first place, it is important that the man or company who is handling machinery should be interested in it. The machinery should be properly installed, that is, set on solid foundations made either of brick, stone or concrete; probably concrete is the best and cheapest, as any rough gravel will do when mixed with the proper proportion of cement.

Machines should be set perfectly level and securely fastened down; the line should be drawn from the engine shaft to the line shaft, and from the line shaft to the machine; all pulleys should be perfectly true, and any pulley running over 100 r.p.m. should be in perfect balance, to insure smooth and steady running. When this is properly done, belts will transmit from 10 to 25 per cent. more power than they will if running round a curve as it were. When such is the case, belts will stretch on one side and eventually get in such shape that they will not track on the pulley and in a short time the belt is useless and the brickmaker naturally

JEFFREY SWING HAMMER Pulverizer



Equipped with Automatic Feed, Worm Gear and Screw Lowering Device. Fully described in Catalog No. 31, Mailed Free.

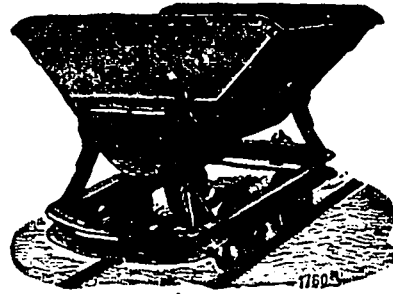
Also Makers of

Elevating, Conveying, Screening, Mining, Drilling Machinery.

The Jeffrey Man'g. Company,
COLUMBUS, OHIO, U.S.A.

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THIS CAR



No. 1760

Is only one of the hundreds of types which we build.

We also design, manufacture and install Complete

Industrial and Portable Railway Systems

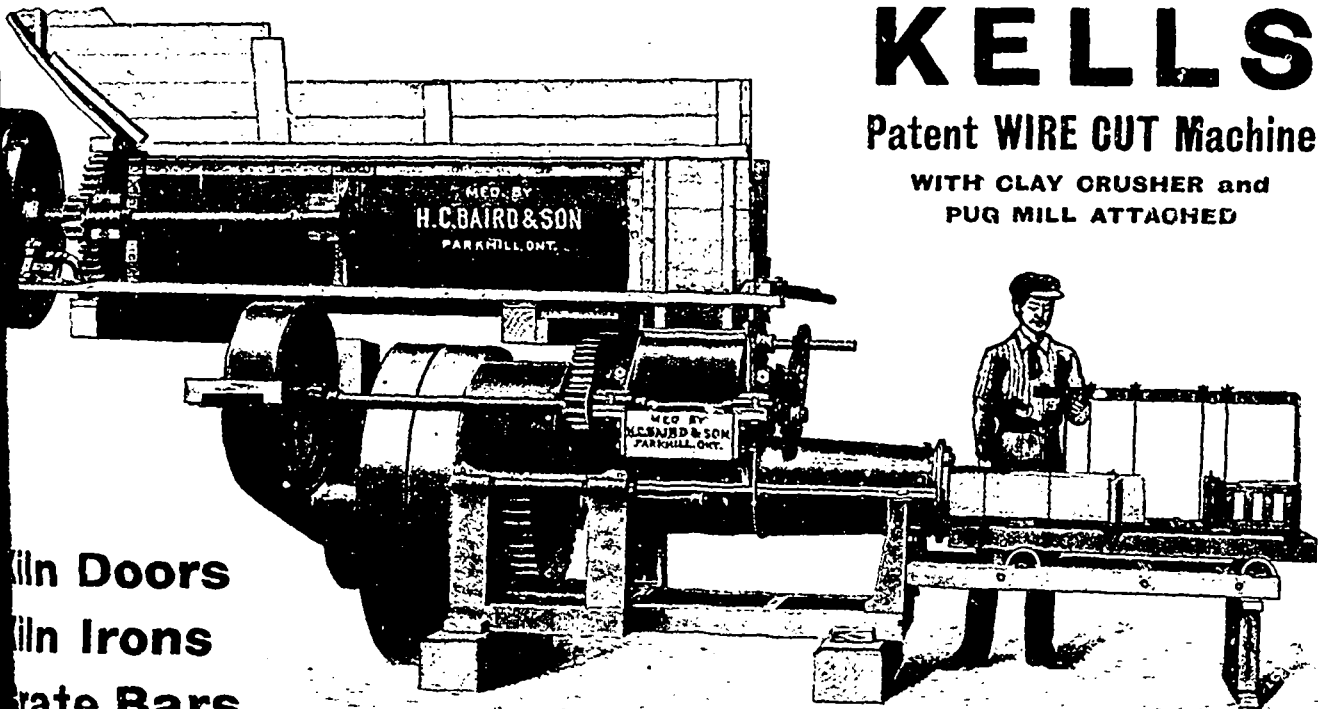
WRITE FOR ILLUSTRATED CATALOG D31

ARTHUR KOPPEL COMPANY

146 Morris Bldg. New York, N.Y.

LARGE STOCKYARDS IN

NEW YORK KOPPEL CHICAGO SAN FRANCISCO, TC.



KELLS

Patent WIRE CUT Machine

WITH CLAY CRUSHER and
PUG MILL ATTACHED

Kiln Doors
Kiln Irons
Grate Bars

FULL LINE OF BRICK AND TILE MAKING MACHINERY AND YARD SUPPLIES OF ALL KINDS

C. BAIRD, SON & CO., Limited, Parkhill, Ont.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

The Builders Show at Montreal.

In all lines of industrial activity great advances have been made in the last ten years but in none has the progress been greater or more radical than in the building trades.

For this reason manufacturers will find almost as much of interest and value to them as will the builder, the contractor or the architect in exhibits of modern equipment for factories, mills, warehouses, office buildings, residences, etc.

There will be, therefore, a large attendance at the second annual Contractors' and Builders' Exhibition, at the Coliseum, Montreal, from April 20 to 25.

As the Coliseum rink, at the corner of Dorchester street west, and Guy Street, Montreal, is much larger than the Victoria rink, where the first exhibition was held, there is a great deal more space for exhibitors as well as for the novel attractions which have been arranged for. Several firms will display a full line of machinery for builders' requirements, while one contractor will, as part of his exhibit, show a contractors' plant in full operation.

There can be no doubt now but that the builders' and contractors' exhibition of 1908 will be a success from every point of view, and the management are looking for a record attendance of visitors.

As in the first one, this year's exhibition will be held under the active auspices of the Builders' Exchange. The Architects' Association of Canada too, are giving not only its countenance, but also practical aid to the Exhibition while the Master Painters' Association are actively associated with the show and will supervise the exhibits connected with their trade, as will the Master Plumbers' Association all displays in their department. A feature that will make this year's exhibition of particular interest for exhibitors that during the show week the annual convention of the National Builders' Association will be held in this city to which many who are interested in the Exhibition will be drawn to the material interest particularly of the supply and manufacturing firms exhibiting.

BECHTELS NEW CATALOGUE.

Bechtels Limited, Waterloo, Ont., are to be complimented on the excellent catalogue devoted to "Clay Working Machinery" which they have just published. This publication, 72 pages in size, is printed on coated paper, which brings out to splendid advantage the many illustrations of brick machines, automatic cutters, granulators, pug mills in short the full line of brick machinery which this firm are now making. There are also given several illustrations of brick plants throughout Canada in which Bechtels Limited have installed machinery.

Drain Pipes: Cement vs. Clay.

From Canadian Cement and Concrete Review

In the Norwegian Parliament some time ago the chief of the Water and Sewage Department in Christiania is reported to have said that investigations and tests had shown cement pipes to be good in all respects, and on a level with those made of clay. According to "Engineering Times," the cement pipes stood far heavier loads passing over

them, and the fear of their being attacked by acids had now been dispelled. These statements, and also the alleged impervious nature of the cement pipes, are controverted by Mr. C. Salicath, engineer, Christiania, who objects that, while the bodies of the pipes were tested for crushing, no such tests were made on their sockets, which are their weakest part, and are too slender. In his own experience more than 90 per cent. of the breakages of pipes are due to damaged sockets, in consequence of the pipes having been so badly laid that they rest on their sockets. Porosity was tested by standing the pipes upright with the bottom end closed, filling them with clean water, and noting

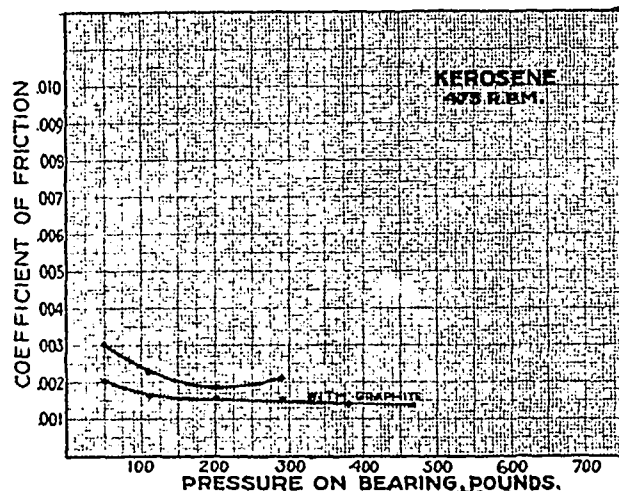
how much it sank in thirty-six days. But this is no criterion for sewage; and any moisture oozing through the walls of the drain-pipes would do no harm, having been thoroughly filtered by the percolation. When investigating the manufacture of cement in Germany, Mr. Salicath has never heard of porosity tests; but when pipes, which had lain in the ground for a length of time were taken up and examined it was found that those made of cement had been attacked by grease, acids and warm water where clay pipes had remained sound. Hence it had been stipulated that waste water from factories must not contain more than 2 per cent. acid, and must not be hotter than 39 degrees C. or 102 degrees F., and similar stipulations had been introduced into Norway.

Tests of Graphite on Ball Bearings.

from "Graphite."

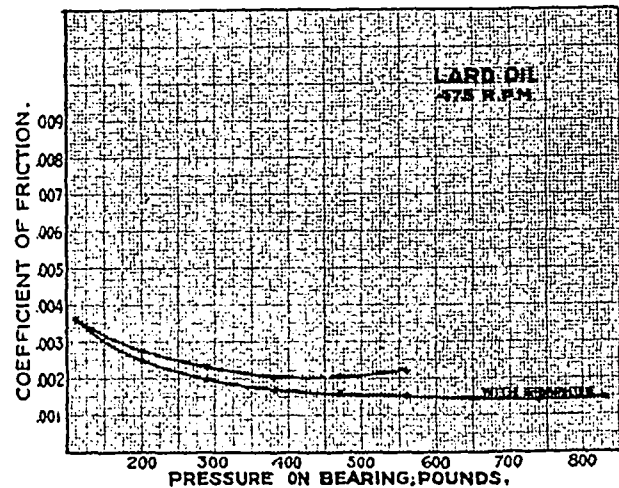
There have from time to time appeared articles in the various trade papers condemning the use of graphite as a lubricant for ball bearings. The

friction losses were very much reduced and the bearings made to carry a heavier load when Dixon's Ticonderoga Flake Graphite was used.



reason these articles have appeared, we presume, is because some users have had unpleasant experiences with inferior grades of graphite. Professor Goss has made some extensive tests with Dixon's

The following are extracts from Professor Goss' report. The test ball bearing has the form of a grooved ball-thrust bearing and was made by the Standard Rolling Bearing



Ticonderoga Flake Graphite as a lubricant for ball bearings, combined with kerosene oil, lard oil and vaseline, and

Company of Philadelphia, Pa. It consists of two hardened steel rings, each having a groove or race to receive the

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WHAT'S IN A NAME?

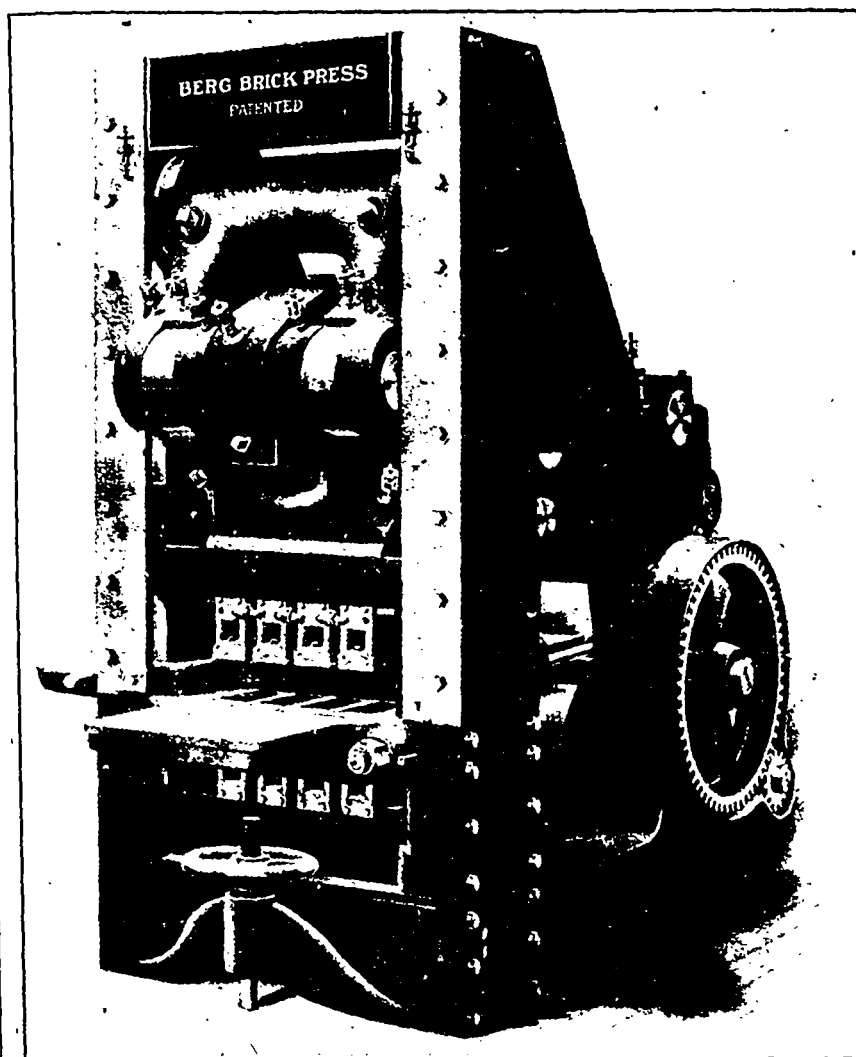
B SIMPLICITY
STRENGTH
DURABILITY

E ACCESS
TO ALL
PARTS

R GREATEST
PRESSURE

C BEST
PRODUCT

The "Berg Press" is The Highest Development in the Art of Brick-making Machinery, so Pronounced by the U.S. Government.



THE BERG PRESS EXCELS
for
Shale Pressed Brick.
Clay Pressed Brick.
Sand-Lime Pressed Brick.
Sand-Cement Pressed Brick.
Fire Brick.

THE BERG PRESS
Gives THREE Distinct PRESSURES :
Result is,
No Granulated Centers.

THE BERG PRESS
HAS ALL WORKING PARTS ABOVE
Clay Line.

THE BERG PRESS
is fitted with "THE BERG PATENTED
MOLD BOX"—the DELIGHT of brick
makers, and which many OTHERS
have tried to IMITATE.

All Sizes and Shapes
Can be Made.
Molds Can be Changed in a
Few Minutes,
Owing to the
SIMPLE
MECHANICAL
CONSTRUCTION.

Improved Berg Brick Press.

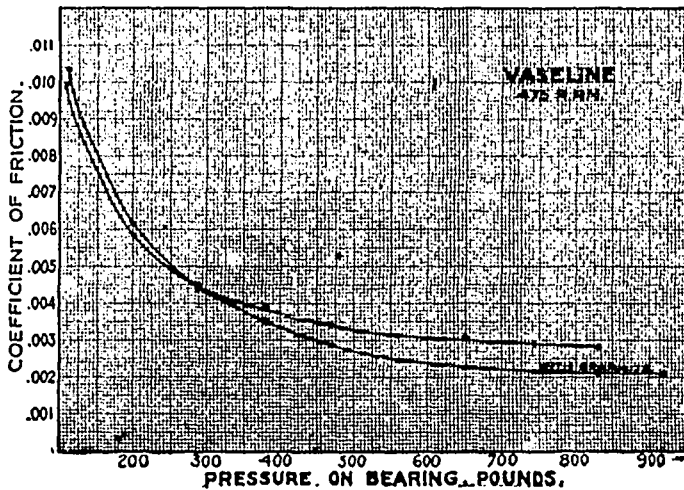
Cut Gearing, and many other steps forward in Improvements, and built of the Highest Grade of Material and Workmanship. Fully Guaranteed as to its Success.

Manufactured by its inventor in Toronto, Canada, exclusively. Also all equipments for Pressed Brick Plants to make Sand-Lime Brick, Sand-Cement Brick, Shale Brick, Clay Brick and Fire Brick. Correspondence solicited.

A. BERG & SONS, Manning Chambers
TORONTO, CANADA

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

balls. The bearing fits a $1\frac{1}{8}$ inch shaft and contains 23 $\frac{7}{16}$ inch balls. The lower race is caused to revolve through oil alone will do and which at the same time will give a lower frictional resistance of the bearing and permit a



the action of the machine, while the upper one is fixed in position. The entire bearing is enclosed in a cup. The cup is held in place by a wire which serves to oppose its tendency to turn, and also to receive the tensional stresses due to the normal loading of the bearing.

The pressure imposed upon the balls is regulated by means of weights applied to a lever arm, which is of such length that each ten pounds applied to the weight-pan gives a reaction of 90 pounds along the line of the spindle through the bearing, and thence to the test ball bearing.

It has been shown by previous experimentation that graphite can be efficiently applied as a lubricant when mixed in small quantities with oil or grease. Following this practise, six series of tests were run; the lubricant employed upon the test ball bearing being, respectively, kerosene, a mixture by weight of 96% kerosene and 4% graphite; lard oil, a mixture by weight of 96% lard oil and 4% graphite; vaseline, a mixture by weight of 96% vaseline and 4% graphite; the graphite in all cases was Dixon's Ticonderoga Flake Graphite. Figures 1, 2 and 3 show graphically the results obtained. Where the curves are not labelled, the results are without graphite.

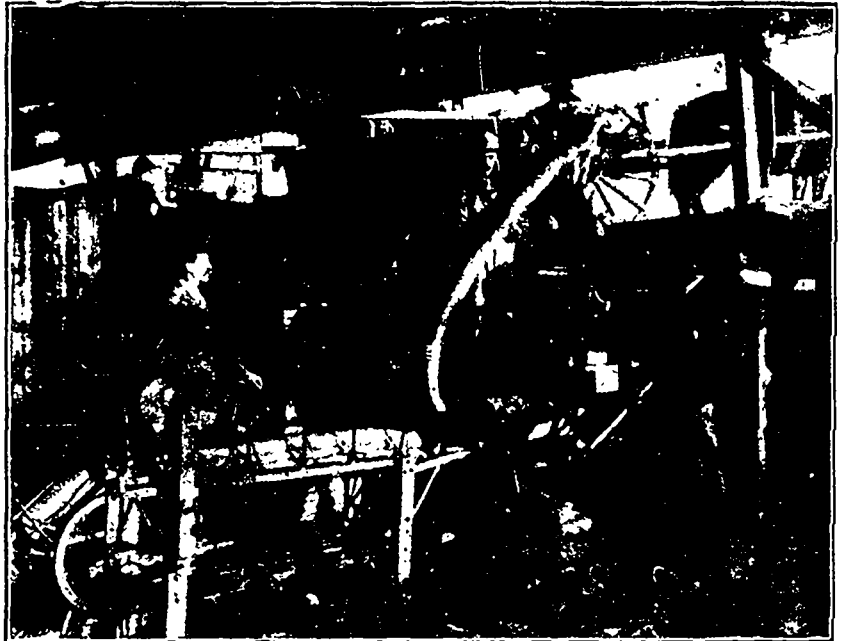
As the result of these tests Professor Goss says in part that the following general conclusions may be drawn:—

"A combination of graphite and lard oil makes up a lubricating mixture which, when applied to ball bearings, will accomplish everything which lard

oil alone will do and which at the same time will give a lower frictional resistance of the bearing and permit a

large increase in the load which it may be made to carry. "An oil as light as kerosene, when intermixed with graphite, will be converted into an effective lubricant for ball bearings when operated under light or medium heavy pressure.

"Even so viscous a lubricant as vase-



BRICK PLANT AT ST. THOMAS

WESTERN CANADA OPPORTUNITY

100 pages of statistical facts, figures and illustrations free, compilation authorized by sixteen business organizations of Winnipeg. Appeals to manufacturer, financier, commercial men and others seeking genuine opportunities—write

CHAS. F. ROLAND, Commissioner
WINNIPEG, CANADA.

line will better perform a given service in the lubrication of ball bearings when supplemented by small amounts of graphite. The bearing to which the mixture is applied will work with less frictional resistance and will carry a heavier load than when vaseline alone is used.

"The admixture of graphite with either a liquid or a viscous lubricant serves both to reduce the friction and to increase the possible load which a bearing thus lubricated can be made to carry."

B. Simon & Co., Montreal, will build a considerable extension to their factory, 109 and 111 St. Urbain St., Montreal.

Ponsford Brick Works at St. Thomas.

The accompanying cut gives an unique interior view of Mr. A. E. Ponsford's brick plant at St. Thomas, Ont. There are three kilns, two of the round down-draft type, 26 by 15 feet in diameter, and one an up-draft permanent rectangular kiln, 55x26x15 feet. Wood is used for watersmoking and burning, about 30 cords being required for the round down-draft kilns and 115 cords for the square kiln. Each round down-draft kiln has six flues, constructed to concur with the operation of the firehole on the opposite side. The arches in the square kiln have two stoke-holes and the top of the kiln is platted with earth when firing.

The power equipment consists of a 35 h.p. engine and a 40 h.p. boiler which carries 80 lbs. steam pressure. The stack is of steel and is 60 feet high. The plant was established in 1902, though a yard was operating on the same site 20 years ago, but was abandoned after 10 or 12 years' operation. The working season occupies six months of the year.

It will be seen from the photograph that the clay is of unusual quality. The clay bank is worked by undermining and falling with pick and shovel and placed into dump carts close at hand. The tempering is done

in a pugmill, from which the material proceeds through rolls to a No. 2 Kells brick machine equipped with two dies, made by H. C. Baird & Son, Parkhill, Ont.

When the clay enters the pugmill, sand and water are added to it to give it the desired consistency. The pugmill is horizontal and square-g geared, supplied by Bechtel's Limited, Waterloo, Ont. The same firm also furnished the automatic cut-off tables for tile and brick. The brick are end-cut and seven men attend the machine.

The Bechtel system of transfer barrows and open drying sheds is also employed. There are seven sheds, each 200 feet long and each containing 30,000 brick, also a swing back of the same length for tile drying.

THE CANADIAN MANUFACTURER is the one paper in Canada which goes directly into the hands of owners, managers and superintendents of manufacturing firms of all kinds and in all parts of Canada. That's why its advertisers agree that it is an exceptionally efficient advertising medium. That's why the amount of advertising carried this year is 30 per cent. larger than was carried a year ago. Note the number of new advertisers in this issue.

Brick Manufacturers

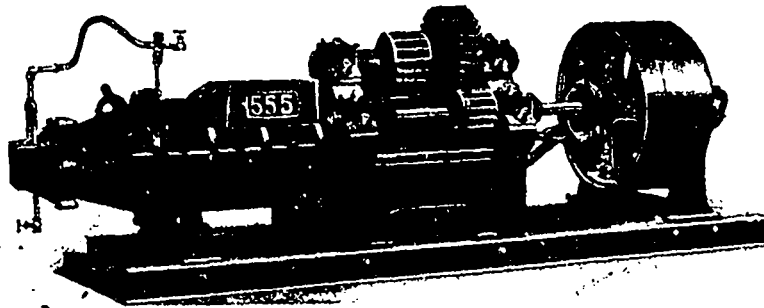
When you are in the market for any size or style of

WOODEN BRICK PALLETS

Write us for prices. We have made a specialty of this line for years, and have got the cost of production to a point that enables us to give quality AND PROMPT DELIVERY at prices which cannot be rivalled.

BARCHARD & CO.,
Limited

135-151 Duke Street, = TORONTO

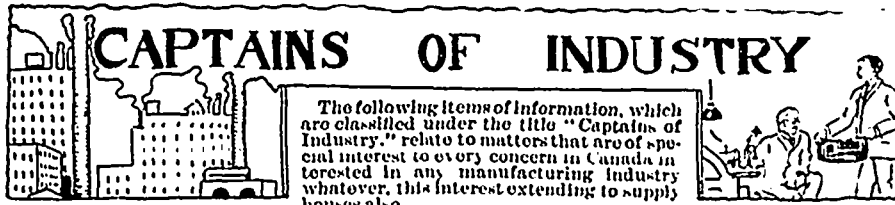


No. 555 BRICK MACHINE

This machine embodies the best ideas in the construction of Brick Machinery. Its capacity is large, only a question of the power you put behind. Without doubt this is the *STRONGEST* and *MOST SERVICEABLE BRICK MACHINE BUILT IN THE DOMINION*. It is also adapted to the manufacture of tile, fire proofing, conduits, and hollow blocks.

We install COMPLETE CLAY WORKING PLANTS. Let us send you our NEW CATALOGUE

BECHTELS, LIMITED, Waterloo, Ont., Can.



The following items of information, which are classified under the title "Captains of Industry" relate to matters that are of special interest to every concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses also.

The Palmer Piano Co., manufacturers of pianos, have removed from Toronto to Uxbridge, Ont.

The Firstbrook Box Co., Limited, manufacturers packing boxes, Toronto and Penetanguishene, Ont., have suffered loss by fire at Penetanguishene; insured.

The Traders Bank has secured judgment against the North Bay Brick & Tile Co., Limited, for \$19,230.

The finance committee of the Windsor, Ont., council have decided to recommend exemptions for the Mississippi Pearl Button Co., and the Brabant Brass Works.

On May 4 Oshawa, Ont., ratepayers will vote on a by-law to grant a bonus of \$3,000 to Matthew Guy, vehicle manufacturer, Toronto, if he removes his factory to Oshawa. Mr. Guy employs from 25 to 30 hands.

The Tin Plate Co. have a large gang of men now engaged at their works, and by the early part of the week will have the entire structure roofed in, which means that work will soon be resumed there in the manufacture of tin plate. The orders for their product have been coming in rapidly of late.—Mornisburg Leader, April 9.

The Bridgen mill of the Hayne Milling Co., Limited, millers, Bridgen and Marmora, Ont., has been destroyed by fire.

The application for order to wind up the W. J. Gardiner Co., Limited, Toronto, has been dismissed.

Thos. A. Ivey & Sons, Port Dover, Ont., have been incorporated with a capital of \$40,000, to manufacture flower pots, baskets, vases, etc. The provisional directors include T. J. Ivey, W. J. T. Ivey and J. Lamb, Brantford, Ont.

The Sovereign Metal Ware Co., Toronto, have been incorporated with a capital of \$1,500, to manufacture metal ware, household utensils, etc. The provisional directors include J. H. Bramley, P. G. Bramley and S. F. Hayes, Toronto.

Pennsylvania Lumber & Mineral Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture lumber, timber, minerals, etc. The provisional directors include J. F. Ancona, T. C. Ancona and C. J. Peters, Reading, Pa.

The Building Stone & Brick Mfg. Co., Ottawa, have been incorporated with a capital of \$60,000, to manufacture cement, brick, stone, etc. The provisional directors include A. Tracy, R. M. Nesbitt and A. H. Edwards, Ottawa.

The Maynooth Mfg. Co., Maynooth, Ont., have been incorporated with a capital of \$40,000 to manufacture lumber, timber etc. The provisional directors include G. F. Weaver, G. Flynn and D. Smith, Maynooth, Ont.

Reeder Electrical Mfg. Co., Toronto, have been incorporated with a capital of \$60,000 to manufacture electric and gas fixtures, copper, brass, hardware, etc. The provis-

ional directors include A. W. Reeder, A. E. Bowen and E. H. Wilson, Toronto.

The Queen City Motor & Dynamo Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture generators, motors, dynamos, machinery, etc. The provisional directors include J. M. Fernley, F. Marsh and W. Leslie, Toronto.

Nipissing Reduction Co., Toronto, have been incorporated with a capital of \$150,000, to carry on a mining, milling and reduction business. The provisional directors include J. L. Galloway, J. F. Boland and F. Watts, Toronto.

The Wright Piano Co., Strathroy, Ont., have been incorporated with a capital of \$40,000, to manufacture organs, pianos, sewing machines, furniture, etc. The provisional directors include E. J. Wright, J. Wright and W. P. Dynond, Strathroy, Ont.

At the annual meeting of the Belleville Board of Trade, Belleville, Ont., the following officers were elected. President, R. J. Graham; vice-president, C. M. Read; treasurer, Ald. Blackburn; secretary, F. S. Deacon; auditor, Walter Alford, council, H. Sneyd, F. E. O'Flynn, J. W. Johnson, J. Elliott, G. A. Bennett, W. N. Ponton, P. Wills, C. Scantlebury, D. V. Sinclair, H. F. Ketchison and Ald. Deacon.

The Bemis Bag Co. have decided not to erect their proposed factory in Welland, Ont., until the spring of 1909, owing to the financial stringency.

The estate of the Manson Mfg. Co., Limited, Thorold, Ont., in liquidation, has been bought up by the McSloy Bros., of St. Catharines, Ont., who took it over last week, and are now running it under the name of The Contractors' & Pulp Mill Machinery Co. George J. Manson is in charge as manager, and F. W. Manson as accountant.

The Superior Portland Cement Co., Orangeville, Ont., started their furnaces on April 10, and expect to have their plant running night and day.

Steele & Co., Smiths' Falls, Ont., have commenced to rebuild their factory, which was destroyed by fire recently.

H. W. Richardson, Kingston, Ont., is considering the erection of a six story office block.

At the annual meeting of the Lake Superior Corporation, Sault Ste. Marie, Ont., held in New Jersey, N.J., on April 6, the following directors were elected: D. Warren, president; B. Reeves, first vice-president; J. Drummond, second vice-president; and J. T. Terry, secretary and treasurer.

It is expected that the smelter of the Montreal Reduction & Smelting Co., at North Bay, Ont., will be in operation by May 1. The directorate has recently been strengthened and is now composed of the following gentlemen: J. E. E. Leonard, M.P., president, J. H. Brown, M.E., vice-president and general manager, Rodolphe Forget

(President of the Montreal Stock Exchange), Louis Payette (Mayor of Montreal), W. J. Turpin (vice-president of the Montreal Stock Exchange), and Pierre Tetrault, mining expert, directors.

The Defiance Handle & Turning Co., Holstein, Ont., have been incorporated with a capital of \$40,000, to manufacture handles, turned goods of wood, etc. The provisional directors include A. J. Buller, N. G. Brobner and G. T. Calder, Holstein, Ont.

The plans for a new post office to be erected at Welland, Ont., this year are in the hands of the post office authorities at Ottawa. The building will be built of brick and will contain three stories. The cost will be about \$5,000.

The Grand Trunk Railway Co. propose to build a line from Kingston, Ont., to Ottawa, Ont. This will give the company a direct route from Toronto to Ottawa, and incidentally cut 100 miles off the present route.

The Sandstone Brick Co., Peterboro, Ont., purpose reopening their factory in the very near future. Their output will be about 25,000 per day.

The King George Mining Co., Ottawa have been incorporated with a capital of \$750,000 to carry on a mining, milling and reduction business. The provisional directors include R. E. G. Burroughs, Smith's Falls, Ont., R. K. Farrow, and G. T. Brown, Ottawa.

An addition will be erected to Loyola Convent, Stratford, Ont., at a cost of about \$15,000.

The Dominion Government will erect a new armoury at Durham, Ont., this year at a cost of about \$8,000.

A Catholic school will be built at Verdun, Ont., at a cost of about \$50,000.

An Infants' Home, to be under the control of the House of Providence, Toronto, is to be built this year at a cost of \$40,000.

The Inland Navigation Co., Hamilton, Ont., have been incorporated with a capital of \$2,000,000, to manufacture steamboats, boats, barges, and to carry on a general navigation business. The provisional directors include G. L. Staunton, F. Morison, and J. G. Gauld, Hamilton, Ont.

W. H. Wood, Brockville, Ont., has been awarded the contract for the erection of an addition 200x60 feet to the plant of the L. Smart Mfg. Co., Brockville.

The premises of the Hobbs Plate & Stained Glass Mfg. Co. and a portion of the plant of the Canada Furniture Co., and the Western Wire and Nail Works, London, Ont. was destroyed by fire April 2. Loss about \$300,000.

The York Construction Co., Toronto have been incorporated with a capital of \$100,000 to carry on a general contracting and erecting business. The provisional directors include W. B. Russell, C. W. Talbot and S. Johnston, Toronto.

The Canadian Pacific Railway expect to open their new cut-off line from Sarnia, Ont., some time in June. This will give a more direct service from Windsor to Toronto and will, it is expected, take between eight and ten hours from the present schedule.

The new wing being erected to the St. Joseph's Hospital, Peterboro, Ont., has been completed. The cost was about \$20,000.

The Canadian Colored Cotton Co., Peterboro, Ont., have closed their

U.S. BATTLESHIP "NEBRASKA"



THIS BATTLESHIP IS LINED WITH SYRACUSE SMELTING WKS. "BABBITT"
IT IS POSITIVELY THE BEST SYRACUSE SMELTING WORKS

Is adapted to all purposes. Has a tensile strength of 10,000 pounds to the square inch. Has no fear of high speed and heavy pressure. One pound of the MANGANESE Brand will cover as much space as one and one-half pounds of any other metal at the same price. Will not chill in the ladle. Will cast true to the mould,

IMPROVEMENT OF THE AGE

U. S. BATTLESHIP "NEBRASKA" is lined throughout with

SYRACUSE SMELTING WORKS' BABBITT METALS

MANGANESE ANTI-FRICTION BABBITT METAL—"The Best by Test"
Because of its Malleability, Ductility, Toughness, Hardness, Plasticity, Fusibility and Fluidity

free of pinholes. Will not cut or rip the journals. Saves oil. Is an assurance against breakdowns or unnecessary delays. SAVES TIME, MONEY, LABOR. Is sold under a written guarantee. SPECIAL INDUCEMENTS TO JOBBERS.

SYRACUSE SMELTING WORKS, - Montreal, Que.

Albert Manufacturing Co.

MANUFACTURERS OF THE WELL-KNOWN

"Hammer Brand" **Calcined Plaster** AND **PATENT ROCK WALL PLASTER.**

HILLSBOROUGH, N.B., CANADA.



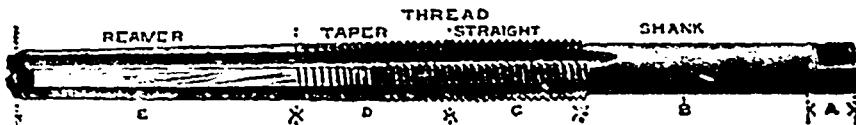
FULL MOUNTED DERBY SCREW PLATE NO. 119.
1/4 5/16 3/8 7/16 1/2 5/8 3/4 7/8 1"
WITH ONE No.9 AND ONE No.11 TAP WRENCH



WE MANUFACTURE

STAY BOLT TAPS, all diameters and lengths up to 94 inches. SPINDLE STAY BOLT TAPS and TAPS for Screw Machines, and TAPS for all uses. Regular and Full Mounted Reece and Derby Plates, Bicycle and Machinists' Plates, etc., etc.

BUTTERFIELD & CO.,
Rock Island, Que.



NORTHERN ALUMINUM CO., Limited

Shawinigan Falls, P.Q. Business Office Pittsburgh, Pa.

ALUMINUM

INGOTS - SHEETS - TUBING, ETC.

Aluminum Stamped, Cast, Spun Articles of any Description to Order.

ALUMINUM WIRE and CABLES for ELECTRICAL CONDUCTORS

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

purpose of installing a complete set of electrical machinery.

The Niagara Paper Box Co., Niagara Falls, Ont., have been incorporated with a capital of \$20,000, to manufacture boxes, etc. The provisional directors include W. L. Doran, C. J. Doran and A. Fraser, Niagara Falls, Ont.

The Public School Board, Hamilton, Ont., have decided to expend \$250,000 on the erection of new schools and the remodelling of others within the next three years.

The congregation of Sherman Avenue Presbyterian Church, Hamilton, Ont., will erect a new edifice at a cost of about \$15,000.

Hamilton, Ont., are considering the erection of a smallpox hospital.

Wm. Croft & Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture goods, wares, and merchandise. The provisional directors include J. J. Follett, N. Higbee and E. A. Scott, Toronto.

The Ontario Bridge & Pipe Co., of Yale, Mich., have decided to establish a branch factory in London, Ont., and have secured a building on Bathurst Street.

A survey has been made for a basin at the waterworks, Guelph, Ont. Plans and specifications for engines, stand pipe and basin will be prepared and tenders called for this spring.

The waterworks department, Brantford, Ont., invite tenders up to April 21 for the following: (a) The construction of a storage reservoir. (b) The furnishing and laying of about 850 feet of 24-inch cast-iron suction pipe. (c) The furnishing and laying of about 1,150 feet of 15-inch, 18-inch, and 24-inch sewer conduit pipe.

Canada Glass Moulds & Tiles Limited Toronto, have been incorporated with a capital of \$150,000 to manufacture glass, mantels, tiles, grates, etc. The provisional directors include E. P. Seon, H. T. Hunter and J. I. Grover, Toronto.

The Department of Marine and Fisheries, Ottawa, invite tenders up to April 20 for the construction of a steel twin-screw lighthouse tender and buoy steamer for the Georgian Bay service, to be delivered at Prescott, Ont., of the following leading dimensions, namely, length over all, 194 feet; breadth, moulded, 35 feet, and depth mould, 17.6 feet.

Otto Lake Mining Co., London, Ont., have been incorporated with a capital of \$500,000, to carry on a mining, milling, and reduction business. The provisional directors include C. S. Tamlin, T. W. McFarland, and R. J. Webster, London, Ont.

The waterworks department, Guelph, Ont., invite tenders up to April 20, for 21,000 lineal feet of 24 inch sewer pipe.

The Canadian Pacific Railway will build a branch line into Sarnia, Ont.

Godenoh, Ont., invite tenders up to April 20, for covered reinforced concrete sedimentation basin; also, cast-iron pipe.

McFall, Limited, Toronto, Ont., have been incorporated with a capital of \$100,000, to manufacture lumber, timber, etc. and to generate electric power. The provisional directors include J. McEwen and F. F. Treleaven, Toronto.

Toronto Junction, Ont., invite tenders for the supply of a new steam roller.

Osnabruok Centre, Ont. invite tenders up to June 1, for the construction of the Grantley Creek drain in the north-west part of the township of Osnabruok and north-east part of the township of Williamsburg (about six miles from Chesterville, on Canadian Pacific Railway); \$14,106.77 is engineer's estimate.

Robt. Weddell, Trenton, Ont., has been awarded the contract for the construction of the new western entrance to Toronto Harbor, the contract price being \$195,000.

The Board of Trade, Owen Sound, Ont., have adopted the recommendation of the railway committee for the town to construct and operate a line between Owen Sound and Meaford, Ont.

The E. C. Atkins Saw Co., who purchased the Hoefner Works, Hamilton, Ont., have remodelled the building and expect to start operations shortly.

The congregation of North Parkdale Methodist Church, Toronto, purpose erecting a new edifice.

The Rideau Curling Club, Ottawa, will erect a new curling rink at a cost of about \$20,000.

The Mississippi Pearl Button Co. have been organized in Windsor, Ont. A new building is being erected and operations will commence at the earliest possible moment.

Glover's basket factory at Burlington Junction, Ont., was destroyed by fire April 7. Loss about \$8,000.

The Metropolitan Bank have opened a branch at Stouffville, Ont.

The Bank of Nova Scotia are opening a branch in Woodstock, Ont.

The School Board, Kingston, Ont., have decided to equip all the city schools with fire escapes, involving an expenditure of about \$4,000.

The elevator at Goderich, Ont., is being enlarged to 1,000,000 bushel capacity.

Messrs. Ingle & Mills, Ingersoll, Ont., have been awarded the contract for erecting the extra story to the armory in that town, at a cost of about \$40,000.

The new factory being erected for Fox Bros., mantle manufacturers, Walkerville, Ont., has been completed. It cost about \$40,000.

The Dominion Bank, Walkerville, Ont., will erect a new building at a cost of about \$30,000.

The Standard Implement Co., Port Stanley, Ont., recently organized with a capital of \$75,000, purpose erecting a factory immediately. They intend to manufacture and sell farm implements, more particularly disc plows for horse power and engines.

The Dominion Bank will erect a new building in Hamilton, Ont., at a cost of about \$40,000.

The Brantford Hosiery Co., Brantford, Ont., have decided to remove their plant to Hamilton, Ont.

The Detroit United Tower Light Co., Detroit, Mich., have started a Canadian branch at Chatham, Ont., to be known as the A. H. Terrington Tower Light & Steel Construction Co., of Canada.

The congregation of St. Andrew's Church, Chatham, Ont., will erect a Sunday School building this spring at a cost of about \$6,000.

The Brown Boggs Co., Hamilton, Ont., will erect a building in connection with their foundry and machine shop at a cost of about \$2,500.

The School Board, Dundas, Ont., are considering the erection of a new school at a cost of about \$16,000.

The Kingdon-Smith Co., Hamilton, Ont., have been awarded the contract to erect a complete system of fire escapes on the Queen Victoria and Hess streets schools at a cost of about \$2,700.

The Royal Distillery Co., Hamilton, Ont., purpose erecting a new five story structure.

The Imperial Storage Warehouse Co., Toronto, will erect a new building 125x40 feet.

The Bell Telephone Co. purpose erecting a new block in St. Thomas, Ont.

Messrs. Ingram & Davey, St. Thomas, Ont., will erect a new business block.

The ratepayers of Orillia, Ont., will vote on a bylaw to raise \$75,000 for the construction of sewers.

Drummond McCall & Co., Montreal, have been awarded the contract of the steel piles for the Guelph Street Railway, Guelph, Ont.

Messrs. Thompson & Griffiths, have established a factory at Parry Sound, Ont., for the manufacture of lumber, timber, sash, doors, canvas boats, gasoline launches, etc.

The Standard Mackintosh Co., London, Ont., have been incorporated with a capital of \$40,000, to manufacture clothing, dry goods, etc. The provisional directors include P. D. Ivey, F. W. Cooper and S. Croker Toronto.

An agreement has been reached between Port Arthur and Fort William, Ont., for the purchase of the municipal street railway system operating in the two towns. Fort William gets that portion of the system running in that city at a price to be agreed upon by arbitration. Port Arthur is to furnish the power for the present system for five years, providing power cannot be purchased elsewhere cheaper. If one city deals the tracks the other must do the same.

The Iron Range Railroad Development Co., Fort William, Ont., are seeking incorporation for the purpose of building a telephone system.

The Arcade Printing Co., Toronto, have been incorporated with a capital of \$100,000 to carry on a printing and publishing business. The provisional directors include H. E. Livingstone, J. C. Lee and C. E. Adams, Toronto.

The Petrie Mfg. Co., Hamilton, Ont., will erect a warehouse at Regina, Sask., at a cost of about \$5,000.

The Vipond Mining Co., Haileybury, Ont., have been incorporated with a capital of \$1,000,000 to carry on a mining, milling and reduction business. The provisional directors include H. D. Graham, E. A. Wright and W. R. Strong, Haileybury, Ont.

A branch of the Bank of Montreal has been opened at Grimsby, Ont.

The Inwood Coal & Lumber Co., Inwood, Ont., have been incorporated with a capital of \$40,000, to manufacture lumber, timber, etc., and to deal in cement, iron, steel, coal, etc. The provisional directors include

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The electric light plant, Leamington, Ont., will be enlarged.

The West Shore Electric Railway Co will build a line from Grand Bend to London Ont., and other points.

F. U. Smith, Quebec, has purchased the plant of the Perrin Plow Co., Smith's Falls, Ont., the price paid being \$80,000.

The Municipal Contracting Co., Montreal, have been incorporated with a capital of \$100,000, to carry on a general contracting and constructing business. The charter members include V. Morin, A. H. Desloges and T. Sutton, Montreal.

Special Machinery Mfg. Co., Montreal, have been incorporated with a capital of \$49,000, to manufacture engines, boilers, motors, etc. The charter members include L. Engelhorn, J. Vanderstee and J. Tees, Montreal.

The Natural History Society, of Montreal, will erect the first story of what will eventually be an \$80,000 building, during the summer months.

The Booth Copper Co. are moving their Montreal branch to 15-17 Queen St., Montreal.

The Montreal branch of the Hamilton Facing Mill Co. will remove to 21 Queen St.

The Canada Machinery Agency, Montreal, have taken over the Brush estate, including plant and machinery of the Eagle Foundry Co. The buildings will be used for warehouse purposes, and the machinery is being offered for sale.

The Canadian Converters Co., Limited, Montreal, are rearranging the work of their various plants. All of the laundry work will be done in the Standard Shirt Mfg. Co. plant, Delorimer Ave. The A. H. Sims Co., Limited factory, Latour and Genevieve streets is being renovated, and will be equipped with electric light and power.

It is reported that a new armory will be built for the Prince of Wales Fusiliers on Rachel Street, Montreal, at a cost of \$90,000. MacVicar & Heriot are the architects.

The Rolla L. Crain Co., Ottawa, and Copeland-Chatterton Co., of Toronto and Brantford, Ont., have amalgamated with a capital of \$1,000,000. The amalgamated concern, for which it is proposed to secure a federal charter, will devote itself to office systems, job printing, lithography and different branches of those works and will operate in Ottawa, Toronto and Brantford. The head business office will be in Toronto.

The Edward Partington Pulp & Paper Co., St. John, N.B., will erect a new warehouse 90x30 feet.

The Bank of New Brunswick will erect a new building 62x35 feet in St. John, N.B.

The School Board, Moncton, N.B., will erect a new school in the west end.

F. W. Bird & Son, Hamilton, Ont., have opened a branch office in St. John, N.B.

The Transcontinental Railway Co. have awarded contracts for the construction of 365 miles of railway in New Brunswick.

The large sawmill of the Bathurst Lumber Co., Bathurst, N.B., was destroyed by fire April 1. Loss about \$75,000.

The ratepayers of Glace Bay, N.S., will be asked to authorize the expenditure of \$30,000 for water works extension.

The M. E. Keefe Construction Co., Halifax, N.S., have been awarded the contract for the erection of the new technical school in that city, also for the alterations to the Halifax Post office.

In Amherst, N.S., a new company are being formed to be known as the Amherst Woodworking Co., with a capital of \$100,000, who will take over the interests of the Silliker Co., Limited. The company will carry on a business similar to that carried on for years in Amherst by the Silliker Co., but on a much larger scale.

The Marine & General Engineering Co., Sydney, C.B., have recently been organized with a capital of \$20,300. The directors include M. B. Dickenson, J. V. Calver and F. L. Dixon, Sydney.

The plans for the proposed depot for the Canadian Northern Railway Co. at Brandon, Man., have been prepared. When completed the structure will cost about \$50,000.

The Manitoba Rolling Mills, Winnipeg, Man., started melting and manufacturing bar iron on March 30. During the winter enormous quantities of old iron have been collected from all over Western Canada. New buildings will be erected and more machinery added almost immediately.

The judicial district of which Brandon, Man., is the central point, will build a new court house, costing about \$100,000, this year.

The Canadian Northern Railway Co. will construct a subway at Water Street, Winnipeg, Man.

The Imperial Theatre Co. have been organized in Portage la Prairie, Man., and will erect a new theatre.

The ratepayers of Portage la Prairie, Man., will be asked shortly to vote on a by-law to raise \$50,000 for the installation of an auxiliary system in connection with the waterworks.

In Winnipeg, Man., during March there were 64 building permits issued, covering 72 buildings to be erected at a total cost of \$92,225. In the corresponding month last year there were 225 permits for 264 buildings, costing \$703,350. To date this year the cost of buildings for which permits have been issued totals \$113,355, as against \$967,150 for the first three months of 1907.

The School Board, Winnipeg, Man., have decided to erect another school building this year.

John Mattson, Winnipeg, Man., will erect a sash and door factory on Notre Dame Avenue, at a cost of about \$10,000.

The Canadian Steel & Wire Co., Hamilton, Ont., have secured premises and will establish a branch in Winnipeg, Man.

The Bank of Nova Scotia have awarded the contract for the erection of their new building in Winnipeg, Man.

The ratepayers of Yorkton, Sask., will vote on a by-law to issue \$45,000 debentures for the purpose of constructing a waterworks system.

The city council, Saskatoon, Sask., have passed a by-law to issue \$130,000 debentures part of which will be spent to complete the waterworks and sewerage systems.

A new fire hall will be erected at Saskatoon, Sask., at a cost of about \$12,000.

Estimates have been submitted to the Estevan, Sask., town council for a system of waterworks and fire protection.

Smith Bros. & Wilson, Regina, Sask., have been awarded the contract for the construction of the new court house at Moose Jaw, Sask. The court house will be a three-story building, 90x60 feet, and will cost about \$57,000.

The National Mfg. Co., manufacturers of stoves, scales, etc., Pembroke, Ont., are considering the establishment of a branch plant at Regina or Saskatoon, Sask.

The new depot and freight sheds which are being constructed by the Canadian Pacific Railway Co. at Saskatoon, Sask., are nearing completion. The total cost of the station will be about \$35,000, and of the freight sheds, \$14,000.

The Canadian Pacific Railway Co. have awarded the contract to Jans & Macdonald of Maple Creek, Sask., for the construction of thirty-six miles of new road between Lethbridge and MeLeod, Alta. The contract price was \$15,000 per mile.

The new City Hotel being erected in Saskatoon, Sask., has been completed.

The electric light system installed in Battleford, Sask., by the James Stuart Co. of Winnipeg, Man., is now in full operation.

The Canadian Northern Railway are preparing to extend their main line west of Edmonton, Alta., to the Pacific coast with all possible speed.

The town council, Pincher Creek, Alta., are considering the advisability of installing a municipal lighting plant.

The newly formed Saskatchewan Power Co., Saskatoon, Sask., capitalized at \$1,000,000, are now laying in incorporation to develop power on the Saskatchewan river.

The city council, Prince Albert, Sask., have received a report from C. H. Mitchell, C.E., Toronto, upon the proposed development of power on the Saskatchewan river, and it is practically certain that the project will be carried through. The cost of developing 10,000 h.p. would be \$350,000.

The following figures have been prepared by City Engineer Keeley, of Edmonton, Alta., in connection with the proposed electric light plant for that city. One 700 kilowatt engine and producer generating unit, \$92,350; one exciter unit, \$6,500; switches and wiring, piping, oiling system, etc., \$16,970; building 75 by 112 feet of brick and concrete, \$16,970; incidentals, \$7,210; total cost of plant, \$140,000.

A branch of the Bank of Winnipeg will shortly be opened at Indian Head, Sask.

The Morse Lumber Co. have established a plant in Moose Jaw, Sask.

The Imperial Bank will shortly erect a office building in Saskatoon, Sask.

A new normal school will be erected at Fairview, B.C. this spring at a cost of about \$80,000.

The Fernie, B.C. branch of the United Mine Workers of America have started excavation for their new hall and operating stores, which will be erected at a cost of about \$30,000.



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The city of Calgary, Alta., have accepted the offer of Mr. Andrew Carnegie of \$50,000 for the erection of a public library, and a site will be secured at once.

The following buildings will be erected in Calgary, Alta., this year: Court house, \$225,000; Canadian Pacific Railway depot, \$225,000; city hall, \$150,000; new hospital, \$145,000, normal school, \$110,000, registry office, \$120,000, Y.M.C.A. building, \$99,000, and high school \$85,000, making a total of \$1,168,000.

The Department of Public Works, Ottawa, invite tenders up to April 29, for the construction of a heating system for the post office building at Edmonton, Alta.

The Canadian Pacific Railway have bonded for \$500,000 the large waterfront at Hardy Bay, B.C. The company are planning the construction of a second line across British Columbia, which would lessen the trip to Japan several hundred miles.

The British Columbia Electric Railway Co. will commence early work on the construction of the line of track that is to connect the present terminus of the E. and N. with the new freight shed on Store Street, Victoria, B.C.

The Canadian Pacific Railway Co. will erect four new bridges in British Columbia; one between Cowichan and Duncan, B.C., one between Cobble Hill and Shawinigan, B.C., a steel bridge across the Chemainus River, and one across the Nanaimo River.

During the coming season the Canadian Pacific Railway will expend \$250,000 on its navigation department in the Kootenays, B.C. At the shipyards they are preparing to build a tug and a barge and other additions to the fleet are in contemplation.

A new bridge is being erected over Beaver Creek at Fruitvale, B.C. The bridge will be about 160 feet long.

W. B. Robinson, Montreal, has been awarded the contract for the supply of 112,500 feet of piping required for the new distribution system for the waterworks at Victoria, B.C.

The Victoria Terminal Co., Victoria, B.C., have entered into arrangements for the building of a large transfer barge to connect between some point on the mainland and Sidney. The barge will be capable of carrying nine loaded cars. It will be 172 feet long, 30 foot beam, and 10 feet deep. The contract has been awarded to Sloan Bros., of Seattle, Wash.

Brolley & Martin, Vancouver, B.C., have been awarded the contract for the erection of the new court house at Kamloops, B.C., the contract price being \$56,000.

E. E. Swift and Louis Swift, Chicago, Ill., Peter Jensen, Nebraska, and Col. A. Davidson, of Toronto, have purchased the Fraser River Sawmills, New Westminster, B.C., and large improvements will be made to the plant.

The Chilliwack Mfg. Co., Chilliwack, B.C. have been organized to manufacture fruit boxes, etc. The directors include D B. Hall and A. J. Robertson.

Smiley, Cohen & Groker, are being organized in Coverdale, B.C., and will erect a lumber mill.

The Chicago Lumber & Coal Co., of St. Louis, Miss., have opened a branch in Vancouver, B.C.

H. Windebank, Mission City, B.C., will develop power at Silver Creek for an electric lighting system.

A recommendation has been submitted to the city council of Victoria, B.C., by the fire wardens, calling for the installation of two electric pumps of 100,000 gallons capacity.

The Taylor Mill Co., Victoria, B.C., have ordered from Allis-Chalmers-Bullock, Limited, Vancouver, a 40 h.p., 2,200 volt 530 r.p.m. 3-phase 60 cycle induction motor.

H. W. Petrie, Limited, Toronto, have established a branch in Vancouver, B.C.

Work will shortly commence at Nelson, B.C., on the extension of the municipal power plant at Bonnington Falls.

The Boston-Premier Gold Co., near Lillooet, B.C., on the Fraser river, have placed an order with the Vancouver branch of Allis-Chalmers-Bullock, Limited, for a considerable amount of concentrating machinery.

The Canadian Pacific Railway have under contemplation a second transcontinental line with a terminus at Hard Bay, B.C. It will be a shorter route.

The Vancouver, New Westminster and Yukon Railway from Vancouver to New Westminster, B.C., has been formally handed over to the Great Northern Railway. The wharves and terminals on False Creek, Vancouver, will be erected shortly at a cost of about \$7,000,000.

The congregation of the Wesley Methodist Church, Vancouver, B.C., will erect a new edifice at a cost of about \$100,000.

The British Columbia Agricultural Association, Victoria, B.C., will erect a building at a cost of about \$12,000.

The ratepayers of Victoria, B.C., will vote on by-laws to raise \$70,000 for the high water pressure system and \$50,000 for sewerage extensions.

The John B. Lacy System, formerly of Scranton, Pa., have located in Vancouver, B.C., and are manufacturing an improved refrigerator. A large factory will probably be erected shortly.

The Bank of Commerce have opened another branch in Vancouver, B.C.

The Imperial Bank of Canada are erecting a new building in Cranbrook, B.C.

A public elevator will be constructed at Vancouver, B.C.

HAVE TESTED THE EMPIRE LIGHT.

In the February 21 issue of THE CANADIAN MANUFACTURER an interesting article on "Incandescent Petroleum Lighting" was published. The value of this article is enhanced by the fact that the "Empire Light," which was referred to, can be obtained in Canada—a fact not mentioned in the article.

The Empire Light Co., Packard Building, Montreal, are the Canadian agents for this unique light, and are making good progress in introducing it on the Canadian market.

A representative of this paper recently had the opportunity of seeing the lamp in operation at Montreal and was greatly impressed with its effectiveness and economy. Several concerns have given the lamp a complete test and have given warm testimonials to its value. The Empire Light Co. are giving information about the lamp in an ad-

vertisement on another page and would be glad to send catalogue containing greater detail; also testimonials to any reader of this paper who may be interested in the question of cheap artificial light.

Publications Worth Reading.

Any Manufacturer or Dealer in Supplies for this Column is invited to send Books on Business Topics for Review or Booklets, Pamphlets, etc., for Reference.

THE B. I. HANDBOOK.—A handsome handbook published by the British Insulated & Helsby Cables, Limited, of Prescott, Lancashire, England, has been received from Mr. Lawford Grant, Canadian manager, Montreal. About two hundred pages of this book are devoted to the products of the publishers, covering a wide range of electrical equipment and supplies. The following hundred and fifty pages contain general information likely to be of use to electrical engineers, some of which, as stated in the preface, is already public property, while much technical information is here published for the first time. Both sections are conveniently indexed. The book is well printed on high class paper, gilt edged, bound in leather, a very compact, attractive and useful volume.

5,000 FACTS ABOUT CANADA. The 1908 edition of this publication, which gives in compact form, a wealth of information about the manufacturing, mining, fishery, lumbering and agricultural development of Canada and about the commercial, financial and industrial conditions existing; also statistics re area, railways, canals, etc., in fact everything about Canada, in tabloid form. Published by the Canadian Facts Pub. Co., Spadina Ave., Toronto.

THE REMINGTON BILLING TYPEWRITER. A 40-page booklet showing the suitability and effectiveness of the Remington Billing Typewriter for billing in offices of manufacturing and wholesale concerns. The Remington Typewriter Co., Toronto, Montreal, etc.

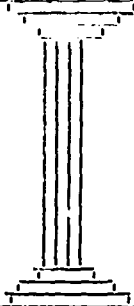
WESTINGHOUSE GAS PRODUCERS. A 24-page booklet giving detailed illustrated descriptions of the gas producers made by the Westinghouse Machine Co., Pittsburgh, and supplied by the Canadian Westinghouse Co., Hamilton.

"NORCA" AND "ECONOMY" DRILLS AND CHUCKS.—Catalogue No. 67 describing the line of "Economy" high speed flat drill and chuck for use with it and also the "Norca" high speed twist drills and chucks made by the Whitman & Barnes Mfg. Co., St. Catharines, Ont. As these are two new lines this catalogue should be in the hands of every tool user. Full details of sizes, prices, etc., are given.

INGERSOLL-SERGEANT ROCK DRILLS.—A 32-page booklet describing with ample illustrations the Ingersoll-Sergeant rock drills and mountings for minings, tunneling, quarrying and general rock excavation. The Ingersoll-Sergeant Co., of Canada, Montreal.

RUBBER TRADE DIRECTORY. The 1908 directory of concerns in the U.S. and Canada engaged in the rubber trade. The book should be invaluable to any firm desiring to keep in touch with the quality as to be a credit to the publisher, the India Rubber World, 395 Broadway, New York.

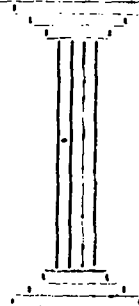
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The Real Factors in Gas Power Development.

From Power.

Gas power enthusiasts—in whose ranks we count ourselves—are prone to lay much stress on the old, old story of superior thermal efficiency, the gas engine's claim to which nobody ever dreams of disputing. Occasionally a less parrot advocate adds the point of smokeless operation, which, also, everybody concedes. It reminds us of the time when the incandescent electric lamp was young and its partisans bored everyone else by reiterating the hackneyed claim of freedom from noxious products of combustion, but refrained from a discussion of cost, life, and other vital features. Of course, the internal combustion engine inherently has a much better thermal efficiency than any other heat motor, and operates smokelessly; these facts have been known for twenty-five years or more. But when a steam plant is properly designed and operated it also operates smokelessly, and when the coal bill is something like two or three per cent. of the total running expenses, what does thermal efficiency signify?

The characteristics necessary to put gas power where it belongs in this country are reliability of operation, simplicity of design and moderate cost of maintenance. Fuel economy is of less importance than any of these, and smokeless operation, while important in some localities, is not a determining factor in the general problem. Realization of the truth and importance of these propositions is taking root rapidly, we are glad to note. Don't let's waste any more time and breath on platitudes; relegate the fuel-economy parrot to the limbo of "innocuous desuetude."

Belts in Flour Mills.

By W. D. Olmsted, in The American Miller.

In the January number I notice an article on "Caring for Belts," by "L." It is to be hoped that this brother's secret will not get into other trade journals, as we millers like to keep all such good things to ourselves. There are, however, different opinions in regard to the care of belts, as well as a lack of knowledge on the part of a great many as regards the ingredients used in most belt "dopes."

I used this rosin and cylinder oil mixture on balky belts years ago, when I was still oiling and sweeping, but it would only relieve the trouble for the time being. In that same mill they bought rosin by the barrel, and threw it on the roll belts by the handful; and I must say there was more trouble in that mill in twenty-four hours with slipping belts and belts breaking, caused from keeping them too tight, and hot tighteners and

boxes, than most mills have in the same number of days or weeks. It kept the oilers and sweepers busy a good deal of the time cleaning up chokes that were caused by these same belt troubles.

Mineral oil dries into the belt and deadens it, and as soon as the life of the belt is gone it cracks and soon breaks. Ever have one break between the laps? Well, once in a great while it may come from a flaw in the belt, but it usually comes from lack of proper care and the use of dopes.

Now, I take the stand that using belt dressing is not caring for belts. Leather belts I am writing about in particular, as rubber belting really has but little business around a flour mill. Then, the belt dope factories usually print on their various cans the fact that, "This dressing is free from mineral oil and rosin," which is in nearly every case false, as any miller who knows what rosin is can ascertain for himself by smelling of the stuff, and also by the feeling. In some of these dopes the rosin will settle to the bottom of the can after standing awhile, and when one gets rosin in such a concrete form there is no mistaking it.

After using these dressings on belts they become coated with a mixture of dust and belt dope until they will slip continually unless they are kept sticky with dope. In the mill where the writer has recently located are two heavy belts that were new a few months ago and are now badly peeled on the surface by the use of dope. The surface of these belts is in worse condition than it ought to be after several years' wear.

Lack of knowledge of the proper care of belts on the part of the operative miller is always expensive for the firm employing him. New belts can be made to do their work as it ought to be done and enjoy a long life, if they are properly taken care of from the beginning, but it is a hard matter to get good service out of a belt after it has once become glazed over with dope.

Iron-Clad Concrete Foundations.

By Calvin B. Ross in Power.

In the building of concrete foundations consideration should be given to both neatness and durability; and especially attention should be given to the former in cases where foundations are above the floor level. How few there are, who, in the construction of foundations, consider this matter of neatness, the stress being usually laid upon the strength, regardless of what may happen to the surface of such foundation in the future.

The usual method of erection is to provide an outside cribbing of wood, in case the foundation is to be solid, or two, one inside and one outside, should it be of hollow form. Into this is

packed the concrete mixture, and, after a certain length of time, the cribbing is removed, leaving the surface of the foundation exposed and, in most instances very susceptible to being cracked off or defaced. Not only does such a state of affairs detract from the general appearance of the work, but this crumbling away, which is almost certain to follow, may be a cause of weakening the foundation.

I have in mind a much more permanent method of erection which furnishes the support with a permanent surface protection. A wrought iron or steel shell is used, being made in the shape of the periphery of the foundation. The thickness of metal used depends upon conditions; the joint being neatly and securely made by inside butt strap, with rivets countersunk in the outside, as desired.

This shell is put into place, and the foundation is to be made. Now, a cribbing of wood may be constructed upon the inside. The concrete or grout is then packed in and when solid the wooden cribbing may be torn away, leaving the metal one in place. This latter not only strengthens and protects the foundation, but in addition gives it a very neat appearance. There is no possible chance of its rusting away upon the inside, while the exterior may be made as attractive as desired by one or more coats of paint.

Such construction has, as will readily be seen, many advantages over the usual method; in fact, this permanent method will usually be found cheaper, even in cost of installation, without touching upon its other good qualities.

Hydro-Extractors.

From the Textile Mercury.

The removal of surplus liquid from textiles to facilitate the subsequent drying operation is a matter that has received much attention. Pressure-bearing squeezing rollers are not in all instances sufficiently efficient, and with some classes of cloths are positively disadvantageous, effecting the destruction of character modifications that had been previously obtained at the expense of some trouble. Where simple squeezing is inefficient or out of the question, this occurs frequently in the case of many sorts of woollen materials. The centrifugal working hydro extractor comes into use; also, latterly, what are termed suction drying machines. The latter contrivance is now securing some favor, a fact which prompts the German Wollen Gewerbe to enter into a discussion of the respective merits of the centrifugal and the suction form.

CENTRIFUGAL.

It is, of course, important that as much as possible of the liquid be carried by woollen materials after treatment in

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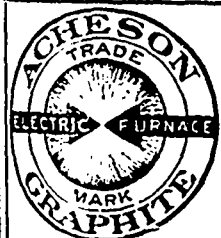
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the course of dyeing and other operations should be taken away before actually drying. And it is equally important that this first step should bring about no bad effect in the appearance of the goods. In this respect the centrifugal method has some drawbacks. Chief of these lies in the necessity for packing the material in the cage of the machine, and thus laying the way open for the production of crease-marks, and possibly disturbing the nap. Creases are especially objectionable in light cloths and in worsted generally. The specially-produced nap on ordinary woollen cloths may, if it has suffered any alteration, be put right to some extent by a supplementary operation of brushing, but this cannot be much relied upon.

Cloths of the best qualities can never be made quite right. The knowledge of the possible occurrence of this fault would at once suggest as a likely remedy the use of a much larger centrifugal hydro-extractor, so as to carry the colled-down cloth at full width. But even this would only partly remove the risks of damage, for the mechanical action of the escaping water on the nap of the fabric has still to be contended with. So far, when dealing with such qualities of materials as warrant the expense, it has been the custom to dispense altogether with centrifuging, and, after allowing the liquid held to drip by hanging for a time, to proceed at once with the drying.

Suction.

The defects and disadvantages of centrifuging have paved the way for the introduction of other means of removing the surplus liquid before drying. These means are provided by the use of so-called suction machines, which are now coming largely into favor. Essentially they consist of a suitable exhausting pump, a way of removing the liquid sucked out by it, a slotted plate over which the goods pass (the water being sucked out through the slots), and an automatic arrangement for regulating the speed at which the goods pass over this plate. The method of operating consists in causing the cloth wound in a roll to pass slowly over the slotted plate (of course, at full width to avoid creases); it travels then to the drying room or to any place for supplementary treatment, such as wet raising before drying.

In practice it is found that the nap of the cloth is practically unaffected by this manner of hydro-extracting. Furthermore, the removal of the water from the material is carried out uniformly—a point of more than passing importance, for it enables the subsequent drying to be conducted at a relatively lower temperature. Obviously the goods must pass over the slotted plate with the back of the cloth engaging the plate.

It has been shown that suction machines are as effective as centrifugal machines in removing water; in fact, in many cases they are more effective. A speed over the plate of about six yards each minute with a good vacuum gives results far surpassing any that have been given by the centrifugal machines. Both the speed and the power of the vacuum are, of course, factors which require regulation and adjustment, according to the particular character of

the material being treated. Loose-textured goods, on account of the air contained in their interstices, may require a slower speed and a better vacuum than finer woven goods. The structure of the slotted plate requires some attention, for it is important that the cloth should come in close contact with it over its whole width. If these conditions are not complied with, air will be drawn under the cloth and the liquid will, for the most part, remain in the fabric. The best method of securing this necessary close contact seems to be the provision of one or more free revolving rollers over the plate. As the cloth must of necessity pass between the rollers and the plate, it is no difficult matter to have them of the proper length and to adjust them so that the goods are closely pressed on to the surface of the plate as they travel. In the more modern suction-working machines special means for getting rid of the extracted water are provided.

Effect of Cement on Refractory Linings.

From Kuhlow's German Trade Review.

Some particularly interesting experiments have recently been made by Dr. Loeser, of Halle, with a view to ascertaining the best material for lining cement kilns and enabling them to resist the corrosive action of the cement clinker.

The first experiments were made with a kaolin of great purity and of a composition corresponding to the best samples of china clay, in which all the silica was combined with the alumina so as to give a material which, theoretically, was perfect in refractory power. The result of using this material was most disappointing, and even when the quantity of alumina in the mixture was increased to 45 per cent. on the fired clay (the highest proportion of alumina which can theoretically combine with the silica) the results were no better. Consequently it would appear that a high alumina content is not, in itself, sufficient to produce a refractory material which can successfully resist the action of hot cement clinker.

When the refractory material was coated with a thin covering of an artificially prepared alumina ("Diamantin") completely satisfactory results were obtained, and a prolonged heating (extending over many hours) of the cement in contact with this diamantin proved to have no effect upon it whilst the unprotected portions of the kiln lining were completely eaten through.

It therefore appears probable that a comparatively small proportion of silica in the refractory lining of cement furnaces is a serious disadvantage to the life of the latter, and that cement manufacturers would find it more economical to use a thin lining of diamantin or other fairly pure alumina as a protection to the ordinary refractory clay blocks now used.

Dr. Loeser is continuing his experiments in order to ascertain what proportions of clay and alumina can be used in order to obtain a satisfactory material with great heat and corrosion resistances at a reasonable price, artificially prepared alumina being somewhat too costly for general use.

The particular form of alumina he used

is not at all well known in England, but it appears to be highly probable that corundum, which is being imported in large quantities from the United States, or even blocks or thin slabs made of bauxite, would be equally satisfactory, though at the present moment we have no detailed information on this matter.

Magistrates Severely Criticized

For Injustice to a Chatham Manufacturer.

A case which has aroused wide attention was tried at Chatham before Justice Riddell, a few days ago. It was an action by Robert Martin, of Martin & Son, carriage manufacturers of Chatham, against Clark & Co., composed of Charles Clark and his wife, who do a general merchandise business in Harrow Ont.

In 1906 Martin & Son had an agent named Pastorius, in Harrow, who had received some cutters for sale. Martin & Son changed agents, and appointed Bailey agent for Harrow, but left some of the cutters in the possession of Pastorius, who afterwards gave one of them to Clark & Co. to pay a store bill due by himself to the above firm. Pastorius claimed to own the cutter. The plaintiff Robert Martin, on Dec. 19, 1907, was in Harrow and saw one of his cutters on the street in front of Clark & Co.'s store, and for sale by them. Martin took possession of the cutter and moved it to his warehouse, where Bailey locked it up. Martin then told Clark & Co. where the cutter was and that it belonged to Martin & Son under a lien agreement. Clark then, after consulting Delos Davis, a solicitor, and Charles Bell clerk of the division court, went to R. H. T. Memire and swore out a warrant for Martin's arrest and Martin was brought before Justices Tofflemire and J. R. Birch and committed for trial for theft of the cutter. The trial took place on Jan. 16, 1908, before Judge McHugh in Windsor, and Martin was acquitted.

Martin then immediately brought this action against Clark & Co. for malicious criminal prosecutions, and after hearing all of the evidence, the jury found that Clark & Co. acted maliciously in the matter and had no grounds for saying that Martin stole the cutter, and that Clark himself did not bonafidely believe that Martin had committed any theft.

Justice Riddell commented severely on the conduct of the magistrate in allowing the criminal law to be made use of in such a case whereby a respectable and honorable citizen might be arrested. The judge said that he would report both justices to the attorney-general and recommend that their commissions be cancelled. The jury awarded a verdict of \$200 in favor of the plaintiff in damages, and the judge certified that the defendants pay the full high court costs. Matthew Wilson, K.C., and S. B. Arnold for the plaintiffs, and J. H. Rodd, Windsor, for defendants.

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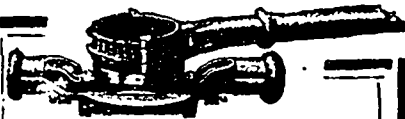
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Piecowork or Weekly Pay?

By GEORGE H. BOHLER, IN THE OPEN SHOP.

One of the most important, and at the present time quite unsettled, questions, is the valuation of work to the satisfaction of both employer and employe.

In the following, I shall endeavor to throw some light on this subject, with special regard to the pay system hitherto used by manufacturing concerns.

Every employe commands a certain working power and ability, which is daily used up for payment. Formerly, both parties agreed on a certain sum, figured according to the real and practical training of the employe, and which was paid mostly weekly, in some instances daily, or at even shorter intervals. This system had evidently the advantage of giving the employer a nearly constant factor in his calculations, while the employe was stimulated by the prospect of getting himself a fixed and reasonable pay. A constant amount of finished work was hereby guaranteed, the necessary supervision being assumed. A steady progress on the work once begun, depending evidently on the individuality of the employe, was gained. Moreover, a certain confidence in the performance of the work was assured.

Until within a few decades, this way of estimating and paying answered the demands perfectly, as the work in almost all concerns was much more uniform, and the number of hands more constant.

In the course of years, however, the demands were greatly increased, and a considerably larger amount of finished work, or raw products, was asked for, while the terms of delivery were greatly shortened. To meet these conditions, the next step was to increase the working force, but this could not always be done so as to comply with the terms of the customer.

The latter, therefore, asked for a delivery contract, which provided for high fees, should the work not be delivered in due time. The concern was then obliged to increase its production accordingly, and in order to meet the competition, had to "bring up" the output of every hand, and every machine.

This brought forth the "piecowork system." With the guarantee of higher wages to any workman who would accomplish a fixed amount of work, in less time than hitherto required, the employer tried to incite him to work quicker, and more intensively. In some factories where all requirements for this greater output were thoroughly fulfilled, indeed, good results were obtained. But in others, where less care had been given to these indispensable conditions, not only the increase expected was not gained, but a decrease resulted.

A most careful calculation of the minute details of the work to be done is one of these conditions. Moreover, the preparatory work must be kept in readiness, so as not to keep the second hand waiting, no matter whether the same piece goes from a machine tool to the machinist or from hand to hand.

Suppose a machinist has a certain amount of piecowork, and after having the first part is obliged to wait for the second (a fact which happens not infrequently); then the employer, as well as the employe, is liable to considerable loss. In this case the employer

pays the man for the time in which he seems to be active, but in fact does not do any useful work, while the employe loses the percentage he would have earned had the part been ready for him.

This man will instinctively endeavor to make up for the time lost, but this can be done only at the expense of the exactness and appearance of the next part, for it is a fact that accuracy always requires its share of time.

In many cases, the piecowork figured too low induces a man to work superficially, which is a great disadvantage. Parts liable to be inspected will be finished "first-rate" but others not to be seen, but often more important, will be done more or less carelessly. Piecowork figured too low always brings forth inaccuracy, which will soon come to light in a very disagreeable way, and requires much time to straighten out.

In my opinion, the piecowork on machines should be discontinued, and experienced men should be called upon to run these machines. The preparatory work would then be turned out in a satisfactory condition, and would facilitate the assembling, as very little or no time at all would be required for adjustment.

The increase in cost following the above suggestion will be amply compensated by the resulting acceleration in the progress of the parts. Furthermore, utmost care should be taken that all "standard parts," as bolts, nuts, pins, etc., have their "exact size" whenever put in stock. How much time is often lost at the expense of the employer when, for instance, the thread of a stud has to be chased, because a part of a machine has not been tapped accurately, or the stud itself was not true standard.

Hours are sometimes spent in fitting together planed or milled pieces which the young fellow on the milling machine thought "near enough." It often happens, too, that a workman desirous of getting a piece done at the fixed time uses more strength than required. Then what results? A deformity, or a fracture. The cost of this mis-happening or whatever the man may call it, goes to the expense of the employer, and should the piece be a valuable, or much labored one, a considerable part of the profit is lost. The piecowork figured too low brings forth the following:

Suppose one piece goes through five hands. The first hand endeavoring to keep the fixed time permits an unexactness; we will then often find that the error will not be adjusted but rather increased by the successive hands. The assembler will then have the worst of it, and will not be able to finish his work in time, as "the parts won't fit."

In testing the engine all the small mistakes will come to light, and will leave their stamp on the machine or engine if it be made to run, and this just because it had to be shipped the next day.

How are we going to find out the exact time and price for each piece? To answer that question, I should say that the estimate should be made by practical men, and not by young persons who seldom have had any previous experience in the work. On the

other hand, it is certainly of great advantage to refer to an honest foreman, or to the superintendent as to his opinion, and have him make an estimate, thus ensuring good adjustment to both parties.

Consequently, the calculation will be exact, and the shop will turn out good work in due time.

To resume all previously said about the piecowork system, I should say:

Do the preparatory work with the most care, make a true valuation, and fix the price so that a man working honestly can easily make a living.

Now to the "weekly payment system," much more used in the old country than in America. This mode of payment will not insure satisfactory results unless the proper attention is given to the individuality of each workman.

Much depends on the foreman. If he knows his men thoroughly, he will certainly select just the right kind of work for each. Hereby, a double object is reached; for the workman will work with confidence, because the job fits his abilities; on the other hand, the employer can rely on the exactness and quality of the work turned out.

With this system it is possible to calculate the time and expenses even more accurately than by the piecowork method, and the intelligent supervision, added to a friendly and determined demeanor of the foreman, will favor a steady progress of the work. Moreover, it is clear that a salaried man will be more devoted to the interest of the concern, because he acts with more discrimination, and develops more activity in urgent cases, without losing sight of the ideal of perfection, which ought to be the soul of every workman, and a step to his promotion. Now this very important question comes up: "When and to what amount should the wages of a workman be increased?" It is a custom in many concerns to raise the wages of a man once a year by a fixed amount until a maximum is reached. This system has, in my opinion, the disadvantage of not inducing a man to do better, for he may well say to himself: "I will get my raise anyway, why, therefore, work more than necessary?"

The wages of a man should be raised when it is obvious that he has improved that is, when he produces more or better work. Then he should be "raised" accordingly, as otherwise he may be dissatisfied or quit the work. To let a man go just because he asked for a raise is an every-day occurrence but nevertheless it is a great mistake, for it is a fact that the expenses occasioned by the breaking in of the newcomer will more than equal the increase asked for by the old hand.

The aforesaid refers not only to the shop, but also to the office and the drafting-room. Whatever the ability of the new man, it will take quite a while before he is acquainted with the methods and regulation of the firm, and this at the expense of others' time.

In summing up all that has been said about weekly payment I should come to the conclusion:

"Let every man, from the general manager to the errand boy, work to the best of his ability, not more, not less, and pay him what he honestly deserves, regardless of age, nationality or influence." Then both parties, employer and employe, will be satisfied, and strikes will be a thing of the past.

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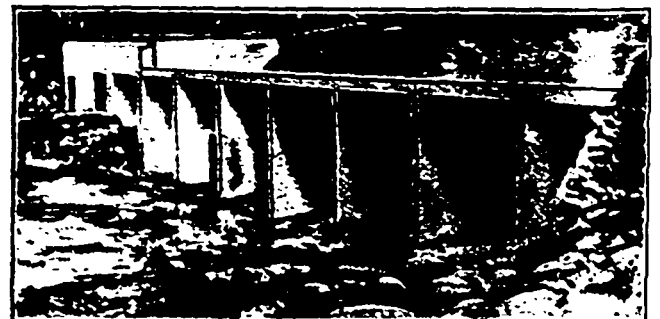
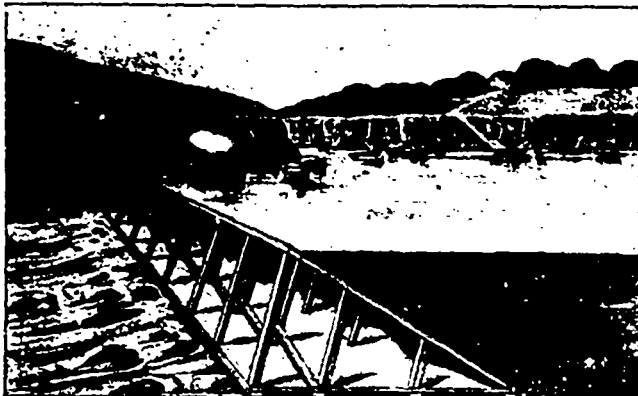
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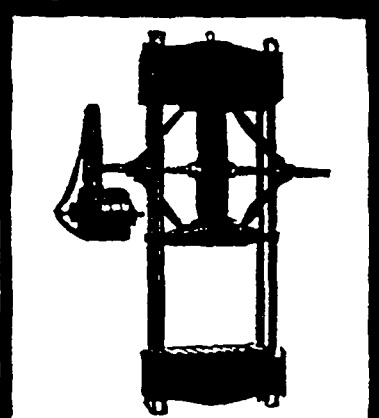
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