

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/
Couverture de couleur
- Covers damaged/
Couverture endommagée
- Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- Cover title missing/
Le titre de couverture manque
- Coloured maps/
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- Bound with other material/
Relié avec d'autres documents
- Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

- Coloured pages/
Pages de couleur
- Pages damaged/
Pages endommagées
- Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- Pages detached/
Pages détachées
- Showthrough/
Transparence
- Quality of print varies/
Qualité inégale de l'impression
- Continuous pagination/
Pagination continue
- Includes index(es)/
Comprend un (des) index

Title on header taken from: /
Le titre de l'en-tête provient:

- Title page of issue/
Page de titre de la livraison
- Caption of issue/
Titre de départ de la livraison
- Masthead/
Générique (périodiques) de la livraison

- Additional comments: /
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below /
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
								✓			

THE LURNUID JUNCTION FOUNDRY CO. (LTD.)
 TORONTO JUNCTION, ONTARIO.
 Manufacturers of CYLINDERS, DYNAMOS, ENGINES, PUMPS, and all kinds of FOUNDRY WORK.
 BICYCLE STEEL CASTINGS A SPECIALTY.

CANADIAN MANUFACTURER
 AND INDUSTRIAL WORLD
 DEVOTED TO THE MANUFACTURING INTEREST OF THE DOMINION

VOL. 34.

TORONTO, APRIL 16, 1897.

No. 8.

THE BARBER & ELLIS CO'Y

Selling Agents for
Rolland's Superfine Writing and Ledger Papers.

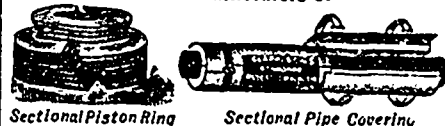
Prices and Samples on Application.

Nos. 43, 45, 47 and 49 BAY ST., TORONTO.

ANILINE LIZARINES
 DOMINION DYEWOOD & CHEMICAL CO.
 TORONTO
 PRODUCTS OF THE FARBENFABRIKEN VORM. F. BAYER & CO.
 DOMINION DYEWOOD & CHEMICAL CO.
 SOLE AGENTS FOR CANADA TORONTO.

HAMILTON ENGINE PACKING CO.

Solo Manufacturers of



Sectional Piston Ring

Sectional Pipe Covering

CLAPPISON'S

IMPROVED RING AND COIL PACKINGS

ALSO CLAPPISON'S

STANDARD ASBESTOS, MAGNESIA, SECTIONAL PIPE AND BOILER COVERINGS

Asbestos Cement, Packing, Paper, and Sheet. Special Covering for Hot Air and Hot Water Pipes—cheaper and better than hair felt.

Rainbow and other sheet packings. Elyse and Smith's Adjustable Gaskets, etc., etc.

58 ALANSON STREET, HAMILTON, ONT.

HAVE YOU TRIED FLEXIFORT? THE BEST BACKING -- YET --

No Stretch. Polished, Hardened and Tempered Steel Wire. Requires no Re-drawing on. Never Grows Hard. Impervious to Oil. Out-wears Leather. Samples and Prices on application.

THE J. C. McLAREN BELTING COMPANY

Factory and Head Office, MONTREAL

Toronto Office, 69 Bay Street

CHARLES F. CLARK Pres. EDW. F. RANDOLPH Treas.
 ESTABLISHED 1849.

THE BRADSTREET MERCANTILE AGENCY

THE BRADSTREET COMPANY - Proprietors
 NEW YORK

Offices in the principal cities of the United States, Canada, the European Continent, Australia, and in London, England.

The Bradstreet Company is the oldest, and financially the strongest organization of its kind working in one interest and under one management—with wider ramifications, with more capital invested in the business, and it expends more money every year for the collection and dissemination of information than any similar institution in the world. Toronto Offices:—

MCKINNON BUILDING, TORONTO

THOS. C. IRVING, Superintendent

THE GUTTA PERCHA & RUBBER CO.
 HO WARREN, OF TORONTO LTD
 BELTING PACKING CLOTHING HOSE
 WAREHOUSE & OFFICE 61 & 63 FRONT ST. W. TORONTO.

THE...
Walkerville Malleable Iron Co., (Limited)

Manufacturers of..

REFINED AIR FURNACE

Malleable Castings

ALSO LIGHT GREY IRON CASTINGS

WALKERVILLE, ONTARIO

RIDOUT & MAYBEE

Foreign members of the... CHARTERED INSTITUTE OF

SOLICITORS of and EXPERTS in PAMPHLET ON PATENTS SENT FREE

Patents

McLAUGHLIN BROS.
TEASELS

Skaneateles Falls
NEW YORK

BUSINESS ESTABLISHED IN 1832

SMITH WOOL-STOCK CO.

219 FRONT ST. EAST, TORONTO

Makers of... **WOOL STOCK, SHODDIES, Etc.**

All lines of Graded Woolen Rags. Carbonizing and Neutralizing. Buyers of Wool Pickings. All lines of Hard and Soft Waste.

F. W. HORE'S SONS

HAMILTON, ONT.

Manufacturers of...

WHEELS. Wheel Materials. Shafts. etc



For IRON FENCING,
BANK and OFFICE RAIL-
INGS and all kinds
of IRONWORK

Address...

Toronto Fence & Ornamental Iron Works
73 Adelaide St. West, Toronto.

Reproductions Made for Eight
Cents per Square Inch



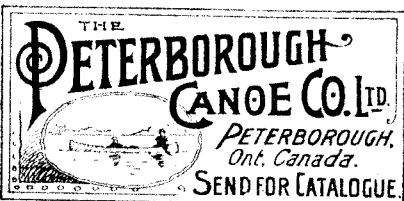
Half Tones Made Direct from
Photos

WM. BARBER & BROS.

GEORGETOWN, ONT.

Manufacturers of

BOOK AND FINE PAPERS



THE
E. B. EDDY
CO'S

TOILET PAPER

FOR OFFICES, HOTELS
AND HOMES

Scientifically Made. Silky Finish

HULL, MONTREAL, TORONTO.

HARVEY HUBBELL

Machinery and Tool Mfr.

Improved Tapping Machines

SCREWS

Machine Screws for electrical purposes.
Sample box free.

BRIDGEPORT, CONN., U.S.A.

METAL
STAMPS

SOAP DIES, AND BRASS SIGN
MANUFACTURERS

PATTERSON & HEWARD

40 WELLINGTON ST. WEST, TORONTO

Leitch & Turnbull

Canada Elevator Works,

Queen and Peter Streets, Hamilton, Ont.

Patent Safety Hydraulic Hand and... **POWER ELEVATORS**

Telephone Connection.



Mfrs. of Set, Cap and Special Screws, Studs, Finished Nuts, &c

BROWN & CO.

Manufacturers of

Square and Hexagon

HOT PRESSED NUTS



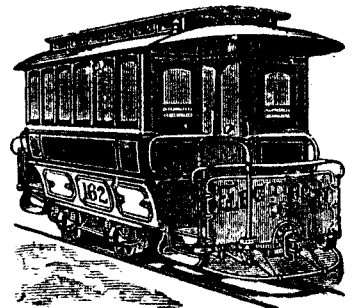
PARIS, - ONT.

PATTERSON & CORBIN

FINE ELECTRIC CARS OUR SPECIALTY

ST. CATHARINES, - ONTARIO

Horse and Trail Cars of Every Description.



CROSBY STEAM GAGE AND VALVE CO.

Sole Proprietors and Manufacturers of

Crosby Pop Safety Valves, for all kinds of Boilers, Water Relief Valves including the Underwriter, which is fully approved by the Associated Factory Mutual Insurance Companies; Crosby Steam Engine Indicators, with Sargent's Electrical Attachment; Crosby Improved Steam Gages, Recording Gages and Patent Gage Testers. Original Single Bell Chime Whistles.

BRANDEN PATENT PUMP VALVES

CLARK'S LINEN FIRE HOSE AND ADJUSTABLE COUPLINGS

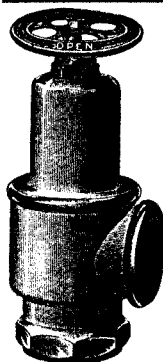
All Kinds of Pressure and Vacuum Gages used in the Various Arts

Gold Medal Paris Exposition, 1889

Ten Highest Awards Columbian Exposition, 1893

Main Office and Works..... BOSTON, MASS., U.S.A.

Branch Offices at New York, Chicago, and London, Eng.

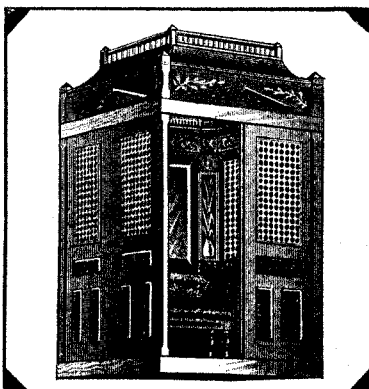


Underwriter

ELEVATORS

FENSOM ELEVATOR WORKS
52-54-56 DUKE ST
TORONTO.

ELECTRIC HYDRAULIC
STEAM & HAND-POWER
PASSENGER & GOODS
ELEVATORS. DUMB WAITERS



CORRUGATED IRON
 ROOFING & SIDING.
FIREPROOF
 WRITE FOR CATALOGUE
THE PEPLAR METAL ROOFING CO.
 OSWAGA, ONT.

The Pulsometer
STEAM PUMP

OFTEN IMITATED BUT NEVER EQUALED . . .

The handiest simplest and most efficient steam pump for general Mining, Quarrying and Contractors' purposes.

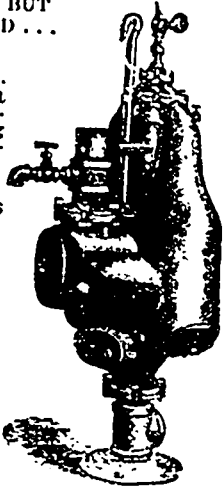
Muddy or Gritty Liquids Handled without wear.

Descriptive Catalogue with prices, furnished on application.

PULSOMETER
 Steam Pump Co.
 New York, U.S.A.

A. R. Williams Machinery Co.

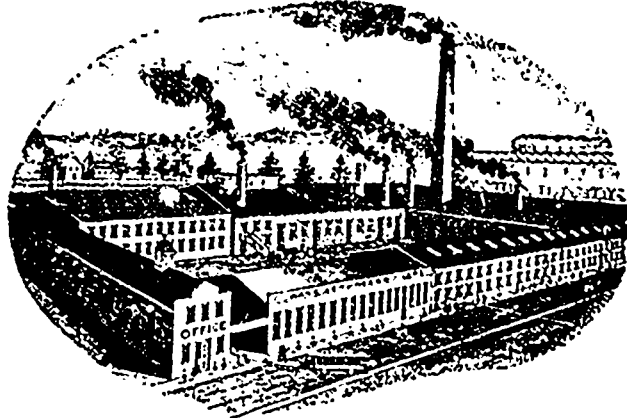
Toronto and Montreal,
 Selling Agent for Canada.



COWAN & CO., GALT, ONTARIO

Manufacturers of

Woodworking Machinery



Corliss and Slide Valve
 ENGINES
 BOILERS
 MOFFAT'S Patent Heaters
 SAW MILLS

Old Wood Tools, Engines and Boilers taken as part pay on new. We have on hand a number of . . .

Rebuilt Wood Tools Engines and Boilers

which we offer at low prices and most favorable terms.
 WRITE FOR TERMS, PRICES AND CATALOGUE

TORONTO WAREHOUSE:

Toronto Machinery Supply Co., 14 King Street West



HAMILTON, CAN.

Catalogue on Application.

THE STURTEVANT SYSTEM

OF

Heating and Ventilating

APPLICABLE TO ALL CLASSES OF BUILDINGS

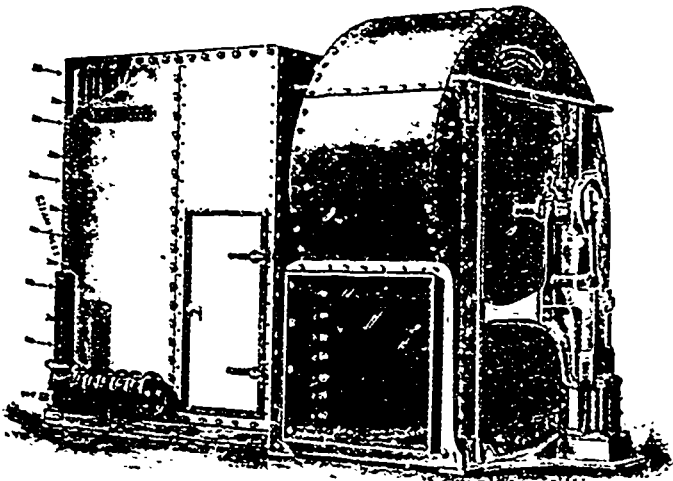
Has had a THOROUGH TEST in the Dominion AND THE Northern Portion of the United States.

Over 200 Plants in Successful Operation in this Cold Climate.

Send for Catalogue No. 67, Describing this System and No. 73, Showing 500 Representative Buildings Heated and Ventilated

B. F. STURTEVANT CO.

BOSTON, MASS., U.S.A.



The Sturtevant Steam Heating and Drying Apparatus

For . . . Drying

This Apparatus is unexcelled for Lumber, Cotton, Wool, Hair, Brick, Pottery, Glue, Soap, Cloth and all Textile Goods.

A. R. WILLIAMS MACHINERY CO., Ltd.

General Canadian Agents

Toronto, Brantford, Montreal

DOMINION BRIDGE CO.

(LIMITED).

MONTREAL AND LACHINE LOCKS, P.Q.

Steel Bridges for Railways and Highways,
Steel Piers and Trestles, Steel
Water Towers and Tanks, Steel
Roofs, Girders, Beams, Columns,
for Buildings.

A. Large Stock of....

ROLLED STEEL BEAMS, JOISTS, GIRDERS
CHANNELS, ANGLES, TIES, Z BARS
AND PLATES ALWAYS ON HAND

IN LENGTHS TO THIRTY-FIVE FEET

Tables, giving Sizes and Strength of Rolled Beams
on application.

Post Office Address, - - MONTREAL.

J. H. McGREGOR, Agent, Canada Life Building
TORONTO, ONT.

THE

CANADIAN MANUFACTURERS' ASSOCIATION

ALBERT E. KEMP, President.

J. J. CASSIDY, Secretary.

GEORGE BOOTH, Treasurer

Secretary's Office. **McKinnon Building**

Cor. Jordan and Malinda Streets, Toronto

Tel. 1774.

THE OBJECTS OF THIS ASSOCIATION ARE:

To secure by all legitimate means the aid of both Public Opinion and Governmental Policy in favor of the development of home industry and the promotion of Canadian manufacturing enterprises.

To enable those in all branches of manufacturing enterprises to act in concert, as a united body, whenever action in behalf of any particular industry, or of the whole body, is necessary.

To maintain Canada for Canadians.

Any person directly interested in any Canadian manufacturing industry is eligible for membership.

Manufacturers desiring to hold meetings for the promotion of their business are invited to avail themselves of the Board Room of the Association for the purpose, which is offered to them free of charge.

J. J. CASSIDY, Secretary

LAW BROS. & CO....



Caledonia Foundry and Machine Shops.

HYDRANTS, VALVES, WATER WORKS
SUPPLIES, SPECIALS, SHAFTHING
and MILL MACHINERY.

Also Castings of Every Description.

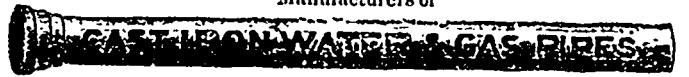
OTTAWA ONT.

The Attention OF WOOLEN MANUFACTURERS IS CALLED TO

The Torrance Patent Self-Acting Baling Machine and positive Creel feed for Wool cards. The latest, best and only feed on the market that will make yarn positively even. These machines are built by The Torrance Mfg. Co., Harrison, (East Newark), N.J., U.S.A., for the States, and by The St. Hyacinthe Mfg. Co., St. Hyacinthe, Que., Canada for the Canadian market.

DRUMMOND-McCALL PIPE FOUNDRY CO. (Ltd.)

Manufacturers of



"Specials," Hydrants, Valves, Etc.

Offices: **Canada Life Building, MONTREAL**

WORKS: LACHINE, QUEBEC.

R. C. Jamieson.

A. T. Higginson.

R. C. JAMIESON & CO.

Manufacturers of

VARNISHES AND JAPANS | Importers of Oils, Paints, Colors, Turpentine, METHYLATED SPIRITS, Shellacs, Rosins, Glues, Gold Leaf, Bronze, etc.

Office—13 ST. JOHN STREET

Factory and Warehouse—23 to 29 ST. THOMAS ST. | MONTREAL



W.A. FLEMING.

575 TRS. XAVIER ST. (24 FRONT ST. E.) VICTORIA CHAMBERS.
MONTREAL (TORONTO) OTTAWA

The Royal Electric Co'y

MONTREAL, QUE.

Western Office.... TORONTO, ONT.

S.K.C. Two-Phase Alternators

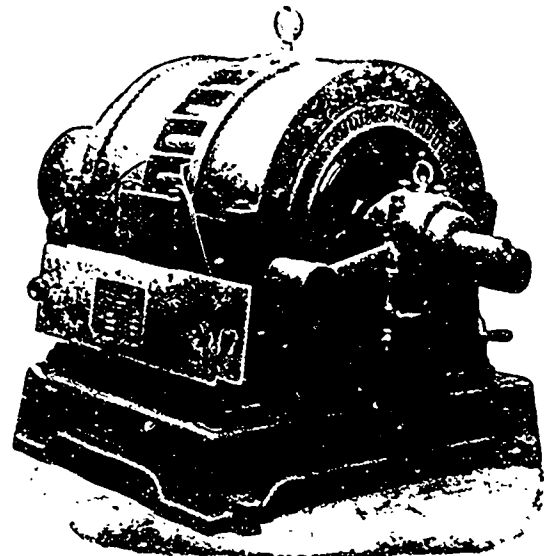
Incandescent Light, Arc Light and Power from same Dynamo and Circuit.

Highest Efficiency

Best Regulation

Slow Speed

Least Attention



No Collector

No Moving Wire

No Exposed Parts

No Compounding

S.K.C. 50 Kilowatt Two-Phase Generator

The Polson Iron Works, TORONTO CANADA.

THE BEST EQUIPPED BOILER AND ENGINE WORKS IN CANADA.

We Manufacture—

STEEL BOILERS

The BROWN AUTOMATIC ENGINE, MARINE ENGINES (SINGLE, COMPOUND AND TRIPLE), Hoisting and Mining Engines

STEAM YACHTS AND LAUNCHES

OF EVERY DESCRIPTION.

GET OUR PRICES BEFORE ORDERING.

ESPLANADE EAST, Foot of Sherbourne St., - - Toronto, Canada

KAY Electric Manufacturing Co.

255 James St.N., Hamilton, Ont.

Makers of.....
ELECTRIC MOTORS

Transformers

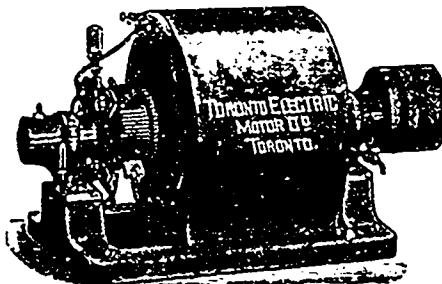
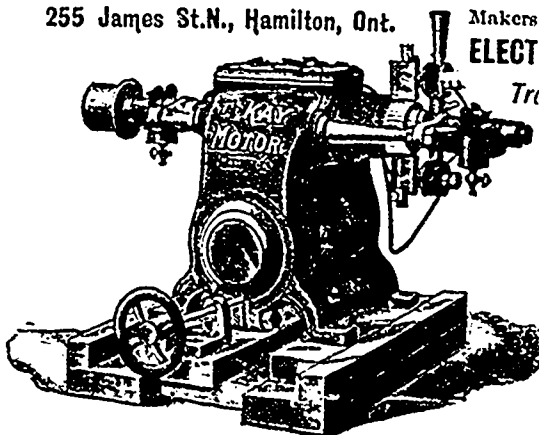
DYNAMOS

PLATING

MACHINES

ETC.

Please let us know your requirements. Write for latest prices and testimonials.



OUR NEW 4-Pole Motor

In sizes down to 6 h.p. and speed down to 125 revolutions per minute.

At this speed it is especially adapted for direct connection. We have over 300 motors running in Toronto.

Our Sales in Toronto for the past three years exceed the combined sales of all others.

Apply to

TORONTO ELECTRIC MOTOR CO.

103 105, 107, 109 Adelaide Street West, Toronto, or to

R. E. T. PRINGLE, Room 57, Imperial Building, Montreal, Que.

"WHEN YOU GET A GOOD THING PUSH IT ALONG."



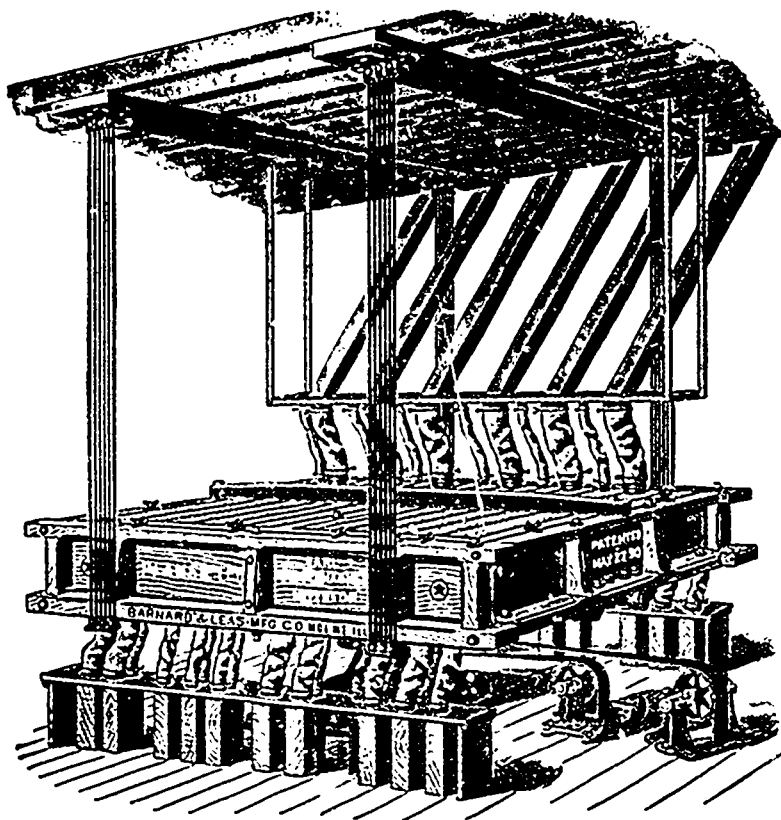
THE PLANSIFTER

This Machine Leads ; Others try to Follow!

Read Users' Experience of the PLANSIFTER

Opposite

THEN HAD YOU BETTER NOT ACT AND TRY THE MACHINE YOURSELF ?



The "Plansifter" in a 30-Bbl. Mill.

HOIT, February 28, 1897.

MESSRS. WM. & J. G. GREEY, Toronto, Ont.
 GENTLEMEN:—As I have now quite a little opportunity for observing the work of the "Plansifter" which you supplied to me, it being now nearly three months since it was started, I have pleasure in saying that it is everything that you represented it to be, and it comes fully up to my expectations. I find that the machine is very light on power, that is, compared to other Roller Mills using Reel systems, which I have seen before: deciding to adopt the "Plansifter." The machine is easily controlled and regulated in its operation, produces very satisfactory results in regard to the quality of flour made and the cleanness of the separations of the different stocks. The machine does not cause any vibration or oscillation to the building that is appreciable. So far as I have been able to observe, I believe it is the best bolting system, more especially for small mills. I am only using in connection with it one Centrifugal and one Bran Duster.
 In conclusion, I am thoroughly satisfied with the machine and its operations in all respects, and have no cause to regret having adopted it when remodeling my mill. Yours sincerely,
 ROBT. SUGDEN.

The "Plansifter" in a 250-Bbl. Mill.

Three No. 2 Plansifters and 2 No. 5 Little Wonders did all the bolting.

PETERBORO, February 20, 1897.

MESSRS. WM. & J. G. GREEY, Toronto, Ont.
 GENTLEMEN:—In reply to your enquiry as to how we liked the work of "Plansifters," would say that after running three of them between one and two months continuously, we are very much pleased with their work.
 They run with little power, make perfect separations, and give no trouble whatever in their operations.
 The different separations can be seen very readily, and a miller is not at any loss to tell just what the machines are doing, while the separations are under perfect control.
 We had no difficulty whatever in making 250 bbls. per 24 hours, the flour being A 1, and our yield running below 1 bushels, 15 pounds.
 The sieves can be readily changed and repaired if necessary. They run very steadily, causing no undue vibration in the building, and were we now purchasing new scalping and bolting machinery, the "Plansifter" would be again our choice.
 Yours very truly,
 THE CONSOLIDATED MILLING CO.
 P. M. Clark, Manager.

The three Plansifters in the above mill were placed side by side in the fifth (top) storey of a not overly strong frame building. The top storey was formed with a mansard roof built in the usual light style with 2" joist. The machines were suspended from light timbers run along under the roof. When standing on the floor beside the Plansifters when in motion, at full capacity, one could not detect any vibration to the building. It was considered a severe test and proved conclusively how steadily the Plansifters run, and how accurately and easily they are kept in perfect balance.

ITS ADVANTAGES ARE

- | | | |
|--------------------------|-----------------------|----------------------------|
| It Saves Space | Makes Better Clean-up | No Dust |
| It Saves Power | Makes Closer Finish | Easily Controlled |
| It Saves Cloth | Makes Larger Yield | Insures Uniform High Grade |
| Makes Better Separations | Makes Milling Easier | Increases Capacity |
| Makes Purer Stock | No Vibration | Must Come into General Use |
| Makes Better Flour | No Noise | |

Big Mills Cannot Afford to do Without them, and they do Charming Work in the Smallest Mills

SOLE LICENSEES AND MANUFACTURERS FOR CANADA

WM. & J. G. GREEY, 2 Church St., TORONTO

**ALBERT
MANUFACTURING CO.**

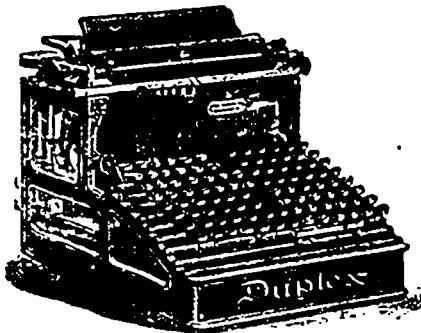
Manufacturers of the
well known

"HAMMER BRAND"
Calcined
PLASTER
—AND—

Patent Rock Wall Plaster

HILLSBOROUGH, N.B.,
CANADA.

We Are Manufacturers



Of the Fastest Typewriter in the World.

Direct Dictation Made Possible
Will not Double Print in Rapid Work
Both Hands Always at Work
Two Sets of Wearing Parts—Double
Durability
Lightest Running Carriage
Your Time is Your Money—Save it

The "1897" TYPEWRITER

Enables an Operator to do Double the
work with less labor. Prints two letters of a
word while any other prints one.

Greelman Bros. Typewriter Co.

19 Adelaide St. E., Toronto.
Factory, Georgetown, Ont.

Welland Vale Manufacturing Co.

LOCK No. 2, ST. CATHARINES, ONT.
Manufacturers of.....

**AXES, SCYTHES, FORKS, HOES
RAKES and EDGED TOOLS**

W. H. STOREY & SON

ACTON, - - ONT.

Manufacturers of . . .

Fine Gloves and Mitts

In Every Variety and Style.

MOCCASINS

Ripans Tabules cure bad breath.
Ripans Tabules cure biliousness.
Ripans Tabules: one gives relief.
Ripans Tabules cure indigestion.

Yes! FREE

OUR CATALOGUE

ON THE

Webster System of Steam Heating

CONTAINS VALUABLE INFORMATION
THAT SHOULD INTEREST

EVERY STEAM USER AND ENGINEER

IF YOU WILL KINDLY SEND US YOUR NAME AND
ADDRESS WE WILL SEND YOU A COPY.

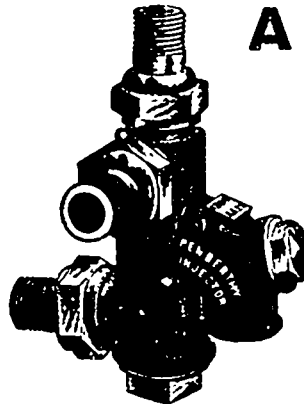
DARLING BROS., Queen and Ottawa Sts., MONTREAL

A CRANK PIN OILER

Which can be relied upon.

THE

PENBERTHY



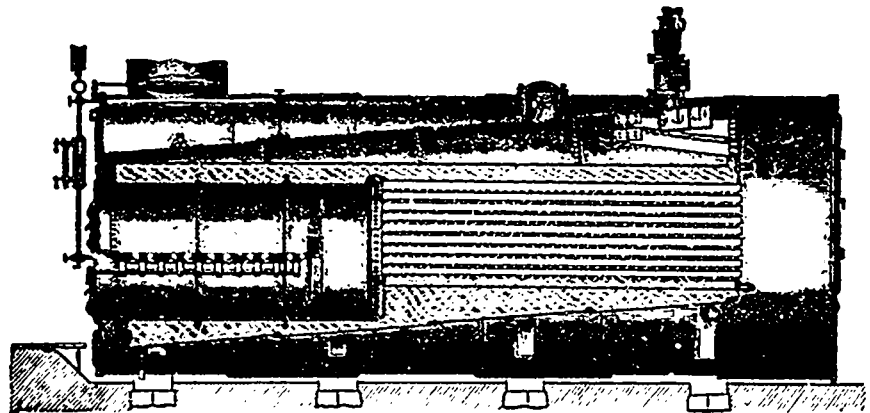
SAFETY Automatic Double Feed Crank Pin Oiler Does not Waste Oil

....Descriptive Circular on application....

Penberthy Injector Co.,

132 Seventh Street
Detroit Mich.
Branch Factory—
Windsor Ont.

Largest Injector Manufacturers in the World.



The Monarch Economic Boiler

Is Portable

Has an outer casing and requires
no brickwork. Leaves our Shop mounted
on skids ready for use.

Saves Fuel

Some tests show a saving of 30 per cent.
over a common brick-set boiler. We
guarantee at least 10 per cent.

ROBB ENGINEERING CO., Ltd., AMHERST, N.S.

WILLIAM MCKAY, Seaforth, Ont., Traveller

BRUNNER, MOND & CO., (LTD.), Northwich, Eng.

MANUFACTURERS OF

PURE ALKALI

GUARANTEED 68 DEGREES

The Strongest and Cheapest Form of SODA ASH for the Manufacture of . .

SOAP, GLASS, PAPER, WOOD PULP AND COLORS

Also for Printers and Bleachers



BLEACHING POWDER AND CAUSTIC SODA, 70% 74%, & 76%

Winn & Holland, Montreal

SOLE AGENTS FOR THE DOMINION OF CANADA.

WM. J. MATHESON & CO., Ltd.

NEW YORK

BOSTON

PHILADELPHIA

PROVIDENCE

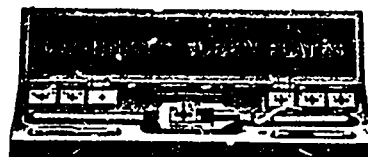
CHARLOTTE, N.C.

MONTREAL, CANADA

DYE . . . STUFFS

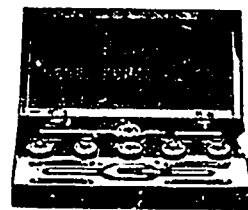
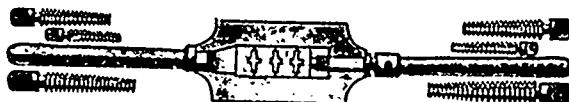
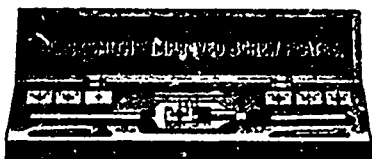


Bicycle Plates in all the most desirable sizes and threads. Taps and Dies of Every Variety



BUTTERFIELD & CO.

ROCK ISLAND, P.Q.

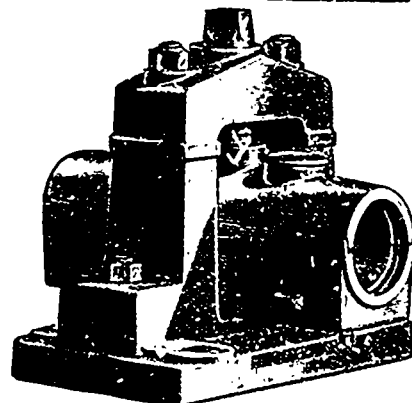


HANGERS...SHAFTING...PULLEYS

We carry a full line of Power Transmission Machinery, including High-Grade Turned Steel Shafting, any length, any diameter.

HANGERS of all kinds, in new designs, with plain and self-oiling bearings. FRICTION CLUTCH PULLEYS AND COUPLINGS.

SEND FOR CATALOGUE



DODGE WOOD SPLIT PULLEY COMPANY

WORKS—TORONTO JUNCTION.

Office . . . 74 YORK STREET, TORONTO

JOHN INGLIS & SONS

Manufacturers of

Corliss Engines, High Speed Engines, Water Works Machinery,
Marine Engines, Condensers,
Ice and Refrigerating Machines, Flour Mill Machinery,
MINING MACHINERY

Boilers and Tank Work of all kinds.

Telephone 5333

HEAVY CASTINGS A SPECIALTY
TORONTO, ONT.

THE IMPERIAL OIL COMPANY, LTD.

HIGHEST AWARDS AT THE WORLD'S FAIR, CHICAGO, UPON

Lubricating, W. W. Illuminating Oils, Paraffine Wax, etc.

WE MANUFACTURE ALL GRADES OF OILS, GREASES, SOAP STOCKS, CANDLES, WOOL STOCKS, LEATHER AND TANNERS' OILS, FUEL GAS, MACHINERY, CYLINDER OILS, Etc.,

And Solicit opportunity to compete against any Oil on the Market.

Write for Prices and Samples.

THE IMPERIAL OIL COMPANY, (Ltd.), Head Office, - PETROLEA, CAN.

....BRANCHES....

HALIFAX, N.S. HAMILTON, ONT. QUEBEC, QUE. LONDON, ONT. TORONTO, ONT. WINNIPEG, MAN. ST. JOHN, N.B.
GUELPH, ONT. MONTREAL, QUE. CHATHAM, ONT. PETERBORO, ONT. VANCOUVER, B.C. MONCTON, N.B.
STRATFORD, ONT. KINGSTON, ONT. WINDSOR, ONT.

JOHN BERTRAM & SONS

DUNDAS, ONTARIO

Our New Pattern Engine Lathes are a Decided Success.

Note what are said about them.

Unsolicited Testimonials.

Albion Iron Works Co., Victoria, B.C.
18 Inch Lathe.

Your New Tool Lathe is first class in every respect, and has fully exceeded our expectations, and is a credit to your firm.

Gendron Mfg. Co.,
Toronto, Ont.
16x18 Inch Lathes.

We have received the Engine Lathes purchased by us, and are pleased to state that out of the large number of lathes we have in our factory, yours is certainly superior to them.

Goold Bicycle Co., Brantford, Ont.
16 Inch Lathes.

We have examined your New Lathes pretty closely and think them first-class in every respect.

Nova Scotia Steel Co.,
New Glasgow, N.S.
20 Inch Lathe.

We are pleased to say that the Lathe we received from you gives us very good satisfaction indeed, our machine shop foreman says that it is a very nice working tool, and he is very much pleased with it.

We will be pleased to send Cuts of New Pattern Tools to those interested.

The Wm. Hamilton Mfg. Co.
Vancouver, B.C. Sales Agents for B.C.

Montreal Store,
321 St. James Street,

NORTHEY MFG. CO. LTD.

TORONTO, - ONTARIO

Steam and Power

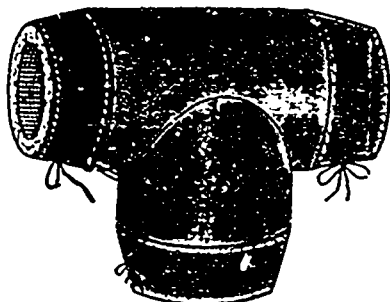
Pumps

& HYDRAULIC
MACHINERY

FOR
ALL
DUTIES

MICA BOILER AND STEAM PIPE COVERING

THE CHEAPEST IN THE MARKET. DURABLE, FLEXIBLE, AND A MAGNIFICENT NON-CONDUCTOR OF HEAT



TEE

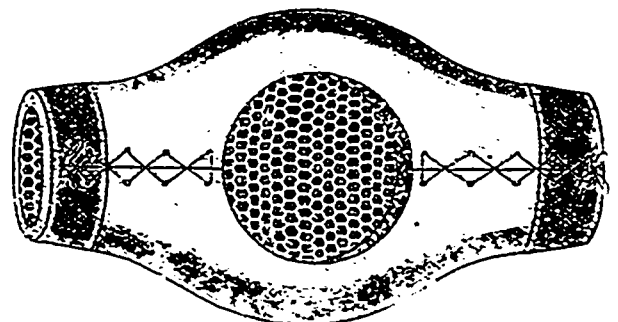
Made in Sections to fit all sizes of Pipes, and can be removed and replaced as often as desired.

Adjustable Mica Coverings for all kinds of fittings.

Mica Covering cannot be affected by vibration, and will not shift or sag.



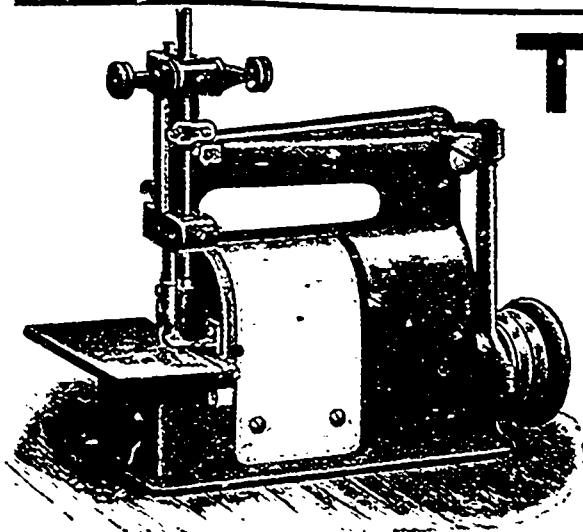
Write for reports of trials, testimonials, etc., to



GLOBE VALVE.

THE MICA BOILER COVERING COMPANY, Limited

9 JORDAN STREET, TORONTO.



The Merrow

High Speed Crochet
and Scallop Machines

For finishing the raw edges of Knit Goods, Horse Blankets, Bed Blankets, Crochet or Marseilles Quilts, Comforters, and in fact any Fabrics.

Over thirty styles of Machines especially for edge finishing.

Machines and Finishes Patented in the United States and Foreign Countries.

FOR CATALOGUE AND SAMPLES, ADDRESS—

The Merrow Machine Co.
HARTFORD, CONN.

Branch Offices

Cohoes, N.Y., AND
Philadelphia, Pa.



ESTABLISHED IN 1880.

PUBLISHED ON THE FIRST AND THIRD FRIDAYS OF EACH MONTH

J. J. CASSIDY, - - - - - Editor.

Subscription, - \$1.00 Per Year.

ADVERTISING RATES:

\$12.00 Per Column inch per year; Thirty inches to Page.

The Canadian Manufacturer Publishing Company, Ltd.

McKinnon Building, Cor. Melinda and Jordan Sts., Toronto.

J. J. CASSIDY, - - President and Treasurer.

J. C. GARDNER, - - Manager and Secretary.

OFFICERS OF

THE CANADIAN MANUFACTURERS' ASSOCIATION

President,	- - - - -	A. E. KRMP.
First Vice-President,	- - - - -	D. W. KARN.
Second Vice-President,	- - - - -	J. F. ELLIS.
Treasurer,	- - - - -	GEORGE BOOTH.
Chairman Executive Committee,	- - - - -	R. W. ELLIOT.
Chairman Tariff Committee,	- - - - -	W. K. McNAUGHT.
Secretary,	- - - - -	J. J. CASSIDY.

SECRETARY'S OFFICE: McKinnon Building, Cor. Melinda & Jordan Sts., Toronto.

CANADIAN INDUSTRIAL LEAGUE.

President,	- - - - -	JAS. KENDRY, M.P.
Secretary,	- - - - -	J. J. CASSIDY.

WOOLEN MANUFACTURERS' ASSOCIATION

President,	- - - - -	B. ROSAMOND, M.P.
Vice-President	- - - - -	JAS. KENDRY, M.P.
Secretary,	- - - - -	J. J. CASSIDY.

KNIT GOODS MANUFACTURERS' ASSOCIATION

President,	- - - - -	JOHN FINNAN.
Vice-President,	- - - - -	J. HEWTON.
Secretary	- - - - -	J. J. CASSIDY.

CARPET MANUFACTURERS' ASSOCIATION

President,	- - - - -	JAMES P. MURRAY
Vice-President,	- - - - -	ROBERT DODDS.
Secretary,	- - - - -	J. J. CASSIDY.

CLOVE MANUFACTURERS' ASSOCIATION

President,	- - - - -	W. H. STOREY.
Vice-President,	- - - - -	A. R. CLARKE.
Secretary,	- - - - -	J. J. CASSIDY.

REPRESENTATIVES TO

TORONTO INDUSTRIAL EXHIBITION ASSOCIATION

R. W. ELLIOT.	GEORGE BOOTH.
W. K. McNAUGHT.	SAMUEL MAY.
J. J. CASSIDY.	

OUR TARIFF EDITION.

Since the announcement in our last issue and in other ways that a Special Edition of THE CANADIAN MANUFACTURER would be published in which would be presented authentic duplications of the forthcoming new Canadian Tariff, the new United States Tariff, and also the British Tariff and the British Merchandise Marks Act, we have received many kind

notices, both through the columns of our contemporaries and also by letter from manufacturers and business men commending our enterprise. In our announcement it was stated that our Special Edition would be published just as soon as the tariffs of Canada and the United States became laws, and this we will do. Since that announcement, the Canadian Minister of Finance has stated that he would bring down and present to the House of Commons his new tariff bill on April 22nd, instant; and as is well known, that bill goes into effect instant. There will probably be more or less discussion of the bill, and before its final passage it may receive some modifications, but if any changes are made in it they will not materially affect it. The tariff as it will be presented in our Special Edition will be reproduced from the bill as it will be finally passed and ratified.

The United States Tariff has already been passed by the House of Representatives at Washington, and is now under consideration in the Senate; the desire of the Government being to have it become law at the very earliest possible day.

The importance and value to all manufacturers and business men of having the Tariffs of these three great countries—Canada, United States and Great Britain—published in full within one cover cannot be too highly appreciated. The Special Edition of THE CANADIAN MANUFACTURER containing them will be printed on heavy paper, and provided with loop for hanging in any convenient place.

This Special Edition will possess unique and exceedingly valuable advantages as an advertising medium to all those who desire to have their business brought to the attention of the managers of thousands of cotton and woolen mills, pulp and paper mills, flour and lumber mills, coal and gold mines, engine and boiler shops, machine shops, electric lighting and street railway stations, bicycle factories, etc., in Canada and elsewhere.

Terms for advertising in this Special Edition are announced in a card to be found on page 308.

THE NOVA SCOTIA STEEL COMPANY.

"Whether the iron and steel consumed in Canada shall be made in Canada or in the United States" is a question that is now pressing itself upon the attention of the Dominion Government, and which must be answered.

At the sances of the Tariff Commission that were held at Halifax in January the Nova Scotia Steel Company presented a statement concerning their industry which is an argument that covers, we think, the whole ground, and is conclusive in answering the above question in the affirmative.

The abstract presented to the Commission shows that the works now in the possession of this company were started in 1872 with a cash capital of \$4,000, and employed eight to ten men. In 1896 the cash capital had increased to \$1,564,116, and the number of hands employed to over eight hundred. The wages paid were \$277,669.59.

That during 1896, 101,159 tons of coal were consumed, which gave employment to two hundred and twenty additional men in connection with the coal mines.

That the total amount paid Canadian railways in 1896 for railway freights was \$132,663.47, of which \$90,000 was earned by the Intercolonial Railway.

That the average freight paid on pig iron amounts to more than the present duty.

That the deepening of the St. Lawrence canals to fourteen feet would materially assist in overcoming the disadvantage due to the long rail haul, and would be of advantage to the shipping interests of Montreal.

That the average price received for pig iron sold by this Company during the year 1896 was \$12.20 per ton of 2,240 pounds.

That the price of Scotch Warrants, on January 11, 1897, was equal to \$11.80, and of American Warrants \$7 per ton. That the quotations for steel billets at Pittsburg, at the close of 1896, was \$15, and in Great Britain \$22 per ton.

It is also shown that during the past six years the average prices of manufactured steel have fallen \$14.29 per ton, or equal to over 28 per cent.

That the Province of Ontario pays a bounty of \$1 per ton on pig iron; while the Province of Nova Scotia receives over \$10,000 annually as royalties on the coal and ores used by this Company, and pays no bounty on pig iron.

That the duty on scrap should be as high as the present duty on steel billets.

That the duty on pig iron alone is not sufficient to encourage the making of it in the country.

The labor employed mining coal and limestone should be considered as well as the labor employed in mining ore, when the bounty on pig iron is being fixed.

That a reduction in prices of \$1 per ton will be a clear loss of over \$17,000 on the manufactured goods on hand, and will mean a continued loss of \$25,000 per annum to this Company, or a large reduction in wages.

Either the duty on steel billets should be \$7 per ton, or the duty \$5 and the bounty of \$2 should be paid on steel billets or ingots, even if made from a portion of imported materials.

The business now carried on by the Nova Scotia Steel Company had its inception in 1872, when the Nova Scotia Forge Company (a private concern) with a capital of \$4,000 and less than a dozen workmen, began the manufacture of railway and marine forgings in the town of New Glasgow. The raw material used for the first ten years was wholly wrought scrap iron. During this time, however, mild steel began to largely replace wrought iron for car axle and general forge work, which suggested the making in Canada of steel from imported scrap steel and pig iron, and after mature consideration it was decided to engage in the manufacture of steel, and the Nova Scotia Steel Company was organized in April, 1882, with a capital of \$160,000, for the purpose of manufacturing steel by the Siemens-Martin open hearth process. Upwards of a year was spent in the construction of the works, and the first steel ingots were cast in August, 1883.

The Forge Company became large buyers of steel ingots and billets from the Steel Company, who in turn were dependent on the former Company for their repairs, machine work and rolls; in view of which, and for other reasons, it became desirable to amalgamate the two Companies, which was done dur-

ing 1889—the amalgamated Company being known as the Nova Scotia Steel and Forge Company.

It soon became apparent to the management that the Company should not depend on imported scrap steel and pig iron for their raw material, and that a successful and permanent business could only be established by substituting pig iron for scrap steel, as the basis of the raw material, and to provide the pig iron a blast furnace was a necessity. But an important section of the directorate would not undertake the construction of a furnace, calling as it did for an expenditure of \$500,000, exclusive of mining properties, and a Company known as the New Glasgow Iron, Coal and Railway Company, with an authorized capital of \$1,000,000 was organized. This Company, after acquiring by purchase and lease iron ore properties of sufficient extent to warrant the establishment of a modern blast furnace plant, proceeded in 1891 to construct a railway connecting the ore and lime deposits with the furnace site and Intercolonial Railway at Ferrona (a point about six miles south of New Glasgow) together with a blast furnace, coal washing and coking plant, with all other plant necessary for a modern blast furnace, all of which were completed and put in blast in August, 1892, and were continuously operated by the said Company until December, 1894, when owing to the fact that the Nova Scotia Steel and Forge Company were large users of the pig iron made by the Furnace Company, it was deemed desirable to consolidate the two interests, which was done January 1, 1895, by the purchase outright of the entire interests of both companies by a corporation created for the purpose under the title of the Nova Scotia Steel Company. Further additions and improvements of considerable importance were made to the plant by the new Company, who continue to operate the entire works.

The Company own in fee simple, or control by leases, deposits of hematite, specular and spathic iron ore in the Counties of Pictou, Guysboro, Antigonish, Colchester, and Hants, the principal deposits so far worked being at Bridgeville, Pictou County, which, with the lime deposits are connected with the blast furnace site and the Intercolonial Railway by a standard gauge railway, thirteen miles in length, with full complement of rolling stock, all owned and operated by the Company.

The blast furnace at Ferrona is of modern design, and fitted with the most approved appliances.

A coal washing plant was put into successful operation in May, 1892, and is the first of its kind erected in America.

A coking plant is situated near the coal washer, and contains fifty-four retort coke ovens, capable of producing every twenty-four hours between 115 and 120 tons of first-class coke, which is all used in the blast furnace of the Company.

The steel works at New Glasgow comprise three Siemens open hearth melting furnaces; two of these have a capacity of twenty tons each, and the other a capacity of thirty tons; together with the mills, forges and other plant necessary for working up the product of these furnaces.

A general idea of the extent of these works will be given when it is stated that they cover an area of twenty-five acres, of which 238,880 square feet, or say five and a half acres, are actually covered by the buildings necessary for the accommodation of the plant. The railway tracks in and about the works aggregate over five and half miles in length.

It may be pointed out that the cash now employed in the undertaking is \$1,564,116. The amount expended in "new

plant" each year since the beginning of operations (that of last year amounting to \$159,097) is in evidence as to the necessity of constantly keeping up with the changes and improvements required in the business, and shows the need that exists for large and strong corporations undertaking the work of iron and steel development, and the ruin that will be wrought if stability and encouragement is not given by tariff legislation.

The quantity of raw material of all kinds used during the past year was 181,778 tons of the cash value of \$345,580, while the wages paid amount to \$277,669.59, to which, if the sum paid in wages for coal and ores be added, will total not less than \$430,000. This amount, it will be noticed, is paid direct to the work people, and does not include, except in the case of coal and ores, wages paid for any materials purchased.

The value of the manufacture of pig iron and steel to the country is apparent, when it is known that the average railway freights now being paid by the Company on pig iron sent into the provinces of Ontario and Quebec is at the rate of \$4.58 per ton; while on steel the rates are twenty per cent. higher. The proportion earned by the Intercolonial Railway would average about sixty per cent. If no pig iron and steel were shipped, the loss of traffic to the Intercolonial could not be made up from any other source, and the cars would have to be hauled west empty. In addition to the value to the railways of the carriage of finished product, there is the revenue received for the coal, passengers and general supplies, which form a large and very profitable business. In this connection, it might not be amiss to call attention to a letter written by the Company in reply to an enquiry from the Deputy Minister of Trade and Commerce, under date September 8, 1896, giving full details of the business of the company for the year ending June 30, 1896: a copy of which is herewith given. The importance of this traffic to the railways of Canada is more fully brought out by reference to the total freight paid by this Company. In 1896, the railway freight paid by the Company was \$132,663.47, of which the Intercolonial received about \$90,000.

To many points in Ontario, the freight on pig iron is more than the duty imposed on imported pig iron. For instance, to Toronto the freight is \$4.54 per ton; while the freight from the principal competing United States points is \$1 per ton. The duty is \$4.48 per long ton; and adding the United States freight to the duty, there is only a net protection on iron shipped to Toronto of ninety-four cents per ton. To many points west of Toronto, the freight from Nova Scotia comes to more than the freight from the United States and the duty combined.

The question of water-borne iron and steel is one of first importance to this Company; and especially is this the case at the present time, as the Intercolonial Railway and its connections have, within a few months, increased their rates, the increases amounting in December last to \$1,563 on a total shipment of 1,575 tons of iron and steel to points west of Levis, Que. With fourteen feet navigation between Montreal and Toronto, the rates of freight from Nova Scotia to lake ports could be reduced one half, and the larger portion of the Company's products be sent by water. In view of the low rates of freight from the United States to points in Ontario available to the United States manufacturers, enabling them to keenly compete for the Canadian business,

it is apparent that deepening of the St. Lawrence canals would materially assist in overcoming the disadvantage due to the long rail haul now existing.

In answer to the statement that has been made that the present duties are seriously impairing the shipping interests of the port of Montreal, the Company point out that in the case of iron and steel, if the duties on these articles were entirely removed, the shipping interests of Montreal would not be benefited; because, owing to the much lower prices prevailing in the United States, Canada would import from the United States and not from Great Britain, and that the maintenance of the present duties and the deepening of the St. Lawrence canals, by which Nova Scotia iron and steel could be forwarded through Montreal to Ontario points, are the only means by which Montreal shipping interests connected with the transport of iron and steel can be benefited.

Objection is made by manufacturers using pig iron and steel that the cost of their finished goods is unduly increased by the encouragement given by the tariff to the manufacture of pig iron and steel. As an evidence that the Company are not charging consumers unduly, they say that the average cash price received by it for Ferrona pig iron at the furnace during 1896 was \$12.20 per gross ton. The average selling price of Summerlee pig iron in Scotland during the same period was equal to \$12.30, and this price, of course, does not include any commission or other charges of any kind.

As showing the comparative prices of Scotch and American pig iron and steel billets, the Company point out that reference to the Official Daily Market Report of the New York Metal Exchange of January 11, 1897, will show that the price of American pig warrants on that date was \$7.00 per ton. The price of Scotch warrants by the same authority was equal to \$11.80 per ton. The price of American steel billets by the same authority was, on December 26, 1896, \$15.00 per ton. The price of British steel billets, as quoted by the Iron Age was equal to \$21.90. These quotations show that Great Britain is not in a position to supply in competition with the United States the iron and steel required by Canada, and that no tariff change short of discriminating duties in favor of Great Britain can enable that country to do so. It therefore remains that either Canada or the United States will manufacture for this country, and it is every way desirable that Canada should do so.

The following table shows the production and the prices at which the finished steel manufactured by this Company has been sold during the past six years:

Year.	Tons.	Average Price per ton.
1890.....	8,811	\$50 38
1891.....	8,274	44 83
1892.....	10,614	45 78
1893.....	11,258	43 12
1894.....	10,219	37 95
1895.....	13,451	37 04
1896.....	12,781	35 00

These figures show a drop during these few years of \$14.29 per ton, equal to over 28 per cent., and show conclusively that had not the Company by a liberal and intelligent expenditure of capital in new plant kept pace with the improved methods adopted abroad, they could not have been able to retain their position in view of the great decline in values of finished steel. Further extensions and improvements can not be undertaken unless investors can depend on the permanency of the present tariff.

Attention is called to the laws at present in force in the Provinces of Ontario and Nova Scotia, relating to coal and iron ore. In the Province of Ontario a bounty equal to \$1 per ton on pig iron is payable to the owner of any mine in the Province for every ton of iron ore raised by him and smelted. This acts as a direct bonus to the iron makers in that Province, as they are able to buy their ore fifty cents per ton cheaper than were this bonus not paid by the Province of Ontario. In the Province of Nova Scotia the lowest royalty paid on coal is ten cents per ton to the Province, and a royalty of five cents per ton is paid on all iron ore smelted, taken from lands not granted previous to 1811, which include the bulk of the mineral lands of the Province. The direct tax upon this Company from these two sources amounts to over \$10,000 per year. No bounty whatever is paid by the Province of Nova Scotia.

So far, the question of pig iron has alone been considered, but attention is requested to the larger one of its relation to the manufacture of steel, and the Company point out :

1st. Pig iron being the base of steel, it is self-evident that any tariff which does not treat both in a fair and equitable manner will fail of its purpose, and so a sufficiently high duty on pig iron and steel in all the various stages of manufacture is a necessity. A duty on pig iron alone will not secure its successful manufacture in Canada, nor a duty on steel alone its successful manufacture, because the one is dependent on the other. For instance, a high duty on pig iron might give the Canadian market to the maker of foundry iron, such as used in the making of stoves, engines and the general class of castings, but would give him no market for the proportion of hard iron, which is totally unfit for ordinary foundry purposes, but which no furnace man has as yet discovered a means of preventing his furnace from making while running on foundry iron, and which often amounts to twenty-five per cent. of the total output of the furnace. This hard iron must be used in the puddling or melting furnace. If on the other hand, high duties were placed upon finished steel, and none upon pig iron, the pig iron necessary for its manufacture could not be made in Canada, because the market for finished iron and steel is not large enough to enable the furnace at present in blast in Canada to run steadily upon pig suitable for their manufacture. From the above it will readily be seen that to successfully make pig iron in Canada, the market not only for it, but also for the finished products, iron and steel made from pig iron, must be conserved to the Canadian manufacturer.

2nd. A sufficiently high rate of duty should be maintained on scrap steel to make it more profitable for the manufacturer of steel bars, who has not gone to the expenditure necessary to make steel from pig iron, to use billets instead of scrap. It would not tend to promote the making of pig iron in Canada, nor would it improve the trade of the country generally to permit scrap iron or scrap steel to be imported at a less rate of duty than that of a less finished article; namely, puddled bars or steel billets.

3rd. The duty on puddled bars and steel billets ought to be relatively higher than that on pig iron, because of the additional labor expended upon them, and should not be so high as on bars, sheets, etc., because a less amount of labor has been put on them. If the duty be not high enough, the maker of bars, sheets, etc., from puddled bars and billets will import them, because a very much larger amount of capital is

required to make bars and sheets from pig iron than is required to make the same goods from billets or puddled bars.

4th. The duty on the finished steel products—such as shafting, bars, angles, sheets, etc., ought to be relatively higher than on puddled bars and billets, because of the extra labor expended upon them.

The foregoing are a few among the many reasons that might be urged in support of the principle of the encouragement of the iron and steel industries in Canada, and embody the leading features of the tariff now in force.

Attention is asked to the manner in which the Act providing for the payment of bounties on pig iron and steel billets works, and to the amendments which it is suggested should be made. The Act provides that no bounty should be paid on foreign ores used in the manufacture of pig iron, but makes no provision respecting fuel, and therefore a foreign fuel may be used and the full bounty paid. It requires more Canadian labor and a larger expenditure of capital to obtain the fuel and flux to make pig iron than it does to procure the ore, and consequently the manufacturer who uses Canadian fuel and flux and foreign ore is as much entitled to the bounty as the manufacturer who uses Canadian ore and flux and foreign fuel. It is, therefore, suggested by the Company that the Act be amended so as to allow the payment of the bounty to the manufacturer who uses wholly either Canadian ore and flux or Canadian fuel and flux. The working of the Act as respects steel billets has proved unfair to the manufacturer; though it was incidentally intended, if possible, to stimulate the making of them from Canadian pig iron made from Canadian ores, and the bounty was given more especially to make up for the reduction in the duties on billets and finished steel. The Act seems to have been hurriedly drafted, and it is found that its strict interpretation deprives the manufacturer of the bounty on a large portion of the billets made. In practice, it is found that billets are not the proper article on which bounty should be paid. In the opinion of the Company it should be paid on ingots. The reasons for this briefly stated are: That ingots bear to steel the same relation that pig iron bears to iron ore, being the first stage in manufacture; that many ingots are made that are never put into billets, but are used in making heavy forgings; that much less difficulty would be found in locating the material entitled to bounty where large stocks are carried, and that consequently the claim for bounty would be much more easily verified. It is, therefore, suggested that the Act be amended so as to authorize the payment of the bounty on steel ingots made from fifty per cent. of pig iron made in Canada.

That there may be no misunderstanding as to the necessity of these bounties from a labor standpoint the company point to a few facts in connection with them. Previous to the erection of the blast furnace at Ferrona, they used foreign pig iron in large quantities. Soon after the furnace went into operation, their own pig iron went into use and they have continued to use it almost exclusively, with the exception of a few thousand tons made by them from iron ore imported from Bilbao. They found that it was, at reasonable cost, impossible to get native ores with the necessary chemical composition to make the high grades of steel required by some customers, and so they were led to import the ore from Spain and make the iron themselves in preference to importing it. The cost of converting a ton of pig iron and other necessary

ingredients into steel billets is in the practice of this Company \$10.68 per net ton. Of this amount the fuel costs \$1.66, the labor \$4.49; the waste \$2.51, and repairs, stores, and general expenses, the balance, \$2.02. In this connection attention is called to the item of fire brick, which are not made in Canada, and the cost of importing them from Britain or the United States is as much as the first cost; and as evidence of the importance of this item in the manufacture of billets, the Company say that the cost to them has averaged \$8,000 per year for repairs alone during the last five years. The necessary plant is also a very large item, requiring an expenditure in this case of not less than \$240,000 to furnish the furnaces, gas producers, cranes, mills, boilers, engines, shears, etc., to convert pig iron into steel billets alone. From these figures it will be apparent that the process is not a simple and inexpensive one, but the very opposite. It is a most complicated and difficult process, and one upon whose development and present condition of advancement more money has been expended, more scientific research given, and more labor spent than upon any single branch of manufacture. It will readily be seen from the above that the cost of converting pig iron into steel billets is as great as that of making pig iron from ore, and requires as much capital.

The Company call special attention to the quantity and value of the stock of manufactured and partly manufactured goods they are compelled to carry. When it is known that they make no less than 630 different sizes and shapes of steel bars, angles, plates, etc., it will be readily apparent that to fill orders promptly very large stocks must always be carried on hand. The trade has very much changed in this respect within recent years; the manufacturer now largely taking the place of the wholesale merchant of former years. The stock of material carried on hand scarcely ever falls below 15,000 tons; in June last it was 17,000 tons, the cost value being \$369,471, consequently a reduction in price of \$1 per ton on iron and steel would mean an immediate loss of \$17,000, and in like proportion for any further reduction. From the Company's balance sheet as at June 30, 1896, it will be seen that the total net profits for the year were under \$40,000. The total sales of the Company for the same period were 23,059 tons. The net profits were, therefore, only \$1.75 per ton. A reduction of this amount would be sufficient to completely wipe out the profits of the Company for last year. Any further reduction would only be met by a reduction in wages; and as it would be impossible to reduce the wages sufficiently, it would involve the works being closed down.

Following is a copy of the letter above alluded to, which explains itself:—

NEW GLASGOW, September 8, 1896.

W. G. Parmelee, Esq.,
Deputy Minister Trade and Commerce,
Ottawa, Ontario.

DEAR SIR,—In reply to your request of the 28th ult., to furnish you with a list of the articles manufactured by this Company, together with the quantity and value of each, produced in 1895, we enclose you our printed catalogue, which gives a fairly complete list of the principal articles manufactured by us.

The quantities and values manufactured by us during our fiscal year, ended June 30th, 1896, are as follows:

Pig Iron, 22,976 tons of 2,000 pounds;
of which . . . 14,796 tons of Foundry Iron, value, \$162,759.52
were sold,
and 9,378 tons of Hematite Iron, with other material, were used by ourselves in the manufacture of

14,867 tons of Steel Ingots, value \$314,971.23
16,575 Steel Ingots were used in the manufacture
of and produced 15,063 tons of Steel Billets, value 361,13: 2
and 1,182 tons of Scrap Steel, value 16,551.00

\$577,686.92

13,780 tons Finished Steel, consisting of:

Bars, Sheets, Fish Plates, Bolts, Nails, Spikes,
Springs, Implement Special Sections, etc., value \$510,954.00
and 1,247 tons of Forgings, value 65,410.00
were sold.

In the manufacture of the above 94,522 tons of coal, costing \$121,221.33 were used.

In the assembling of the materials and distributing of the goods produced, \$149,827.75 were paid for railway freight.

In order that you may be in possession of the result of the year's operations, we enclose a copy of our balance sheet for the period above referred to.

We regret that we are unable to give you the total production in Canada of the above articles.

We have the honor to be, Sir,

Your obedient servants,

NOVA SCOTIA STEEL COMPANY (Limited.)

THE CENTRIPETAL DIRECTION OF TRADE.

The warfare that is being waged in many parts of the country against departmental stores is of similar character to that against such enterprises as the Sugar Trust and the pooling arrangements of the railroads in the United States; the fight against the departmental stores being to prevent the carrying on under one roof and by one concern the great varieties of trade that have come to characterize them, and which, it is claimed, has proven so disastrous to the smaller concerns engaged in these various trades; while the fight against the pools is to prevent capital from absorbing all or the greater part of concerns all engaged in the same line of business, and which were competitors against each other in disposing of their products, and, by the absorption of and bringing the many under one head and management, lessen or entirely destroy, the previous competition, making it possible to realize larger profits on the invested capital than could have been done under the previous condition.

This tendency to concentration, says The Iron Trade Review, is combatted by the legislation that has been and is being made against combinations, based on the old principle that made engrossing or monopoly inimical to public policy, the root of the popular opposition to monopolies and combinations seeming to be the large returns many of them make for their stockholders. The Standard Oil Company, our contemporary says, is regarded as it is because it has made and is making fabulous profits, and not because it has oppressed the people with high prices, for this it has not done. And there is more of a socialistic germ than many will be ready to admit, in the popular thinking and feeling concerning large aggregations of capital, that because they are large exert great influence. Thus it is not uncommon to have it said that one and another of the country's most prominent millionaires could not have accumulated honestly the wealth they have, in the few years since they were known to be men of small or moderate means. The complaint against a protective tariff has been, not that any one has ever demonstrated that the home buyer would have been able to buy more cheaply from foreign producers if the latter had this field to them-

selves, but that certain captains of protected industry have been enabled to acquire wealth rapidly. The political revolution of 1892 in the United States that was socialistic at bottom, was an expression of popular dissatisfaction with this phase of the protective regime. It could not be successfully denied that the American wage scale was the highest in the world, nor that large fortunes had been made by industrial capitalists in free trade countries. It was enough that certain American manufacturers had become millionaires within a decade or two.

So far as the feeling against combinations springs from jealousy of success, or a belief that large accumulations of wealth by a few necessarily involve injustice to the many, we have no sympathy with it. But the protest against trust abuses, against the swollen certification that generally attends the formation of a trust, and the stock jobbing attachments that are so common, is one that fair-minded men will strongly second. Moreover, those who study these centripetal movements in industry and in trade will view with regret the increase in the proportion of employees, through the wiping out of individual establishments. With every new combination the official list becomes only a fraction of the number represented in its components. The prospect that the machinist had a few years ago of rising to the ownership of a shop, with from three or four to a hundred men in his employ, is growing steadily less with every year. So the clerk in a mercantile establishment finds that the big stores have practically wiped out the chance of proprietorship that was once within reach of the thrifty, alert and pushing, though the start was from the lowest round of the ladder. The student of American economics who makes up his mind, after looking out on Argentina and India and Russia, that there is no chance for the American farmer, may say with equal truth, as he watches the drift in manufacture and in commerce, that the chances of proprietorship there are steadily diminishing.

Yet, looking more closely into this phase of the question, what does it profit a hundred men to come up out of the ranks to the estate of employers, if ninety of them are to be pushed back again in time by the relentless hand of competition? The law of the survival of the fittest comes to the same goal of concentration in the end as the law of combination, but its operations are neither so speedy nor so kind.

Legislate as our Congresses and assemblies may against the evils of combinations, and deplore as we may some of the phases of the evolution that is making men think deeply of its outcome, the movement itself seems irresistible. Thirty years of machine methods in the United States, following the late war, have worked marvels of productive economy and efficiency. To do in a generation what in old world countries, at their average pace, would have required a century or two, has called for economic machinery as advanced as our mechanical appliances. Large blocks of capital, great corporations and often the aggregation of individual capitalists or corporations, have been the method. It has not been possible to have, side by side, the results of competition and combination, on a given product, so that the effects of each on prices could be measured simultaneously. There have been instances in which combinations, succeeding a period of fierce competition, have made an advance to recoup losses; and thus the consumer has given back to the producer, for a time, some of the so-called benefits of an unrestricted market. Two notable instances of prices

reduced under trust economies are the fall in oil from 24.24 cents a gallon in 1874 to 6.25 cents to-day, and in cotton-seed oil from 47.8 cents a gallon in 1884 to 23.5 to-day for standard summer yellow oil. In the iron and steel industry, which, in general, has been developed under competitive methods, there have been very marked reductions in the same periods, but accompanying them there has been a distinct concentration of capital, the bulk of the production to-day being in few hands as compared with twenty years ago. The tendency is plain, whatever the industry selected for illustration—a steady movement toward superior product and lower prices, in those lines of manufacture most highly organized, having the largest scale of operations and requiring greater capital for their prosecution.

It is no more conceivable that a return will be made to the regime of modest individual enterprises than that the textile machinery of to-day will be discarded for the hand-loom. Hardships to individuals and classes appear along the way, here and there an inequality is seen in the heaping up of profit for a time in the hands of a few. But concentration has proved in the main to be in the line of progress; it has given better products at lower prices and has secured a larger command of them by the people. Judged by its fruits, it does not deserve to be put under the ban in the way that has come to be popular.

OUR ATLANTIC STEAMSHIP SERVICE.

We have received in pamphlet form a copy of the second article on "Our Atlantic Steamship Service," contributed by Mr. Sandford Fleming to Queen's Quarterly.

We cordially concur with the author in his opinion that "before the country is bound to pay an enormous subsidy, it be first established that the expenditure has been wisely determined." Mr. Fleming mentions three objects which the proposed subsidy is intended to accomplish: First, that the products which we raise may be carried to their best market at the lowest cost and in the best condition. Secondly, that passengers and mails may be conveyed across the ocean as speedily and as safely as possible. Thirdly and generally, that the closest intercourse may be permanently established between Her Majesty's subjects on both sides of the Atlantic.

With respect to the first of these objects, Mr. Fleming's statements and arguments all go to show that a fast steamship service cannot possibly tend to the reduction of the cost of transportation of our products. He distinctly says: that "to secure low rates the products must be carried on steamships of moderate speed." "As a rule only passengers and mails would be carried in ships constructed for speed, and other ships would be designed for the transportation of freight. . . . In the one case, speed and safety would be the main object, in the other economy of carriage the primary consideration." Mr. Fleming lays down the proposition: "It is not simply a consideration whether the establishment of heavily subsidized steamships will benefit this or that city, or this or that province, but the extent to which it will be advantageous to the whole community." The whole community is interested in and would largely profit by any enterprise which would materially reduce the cost of transportation of our products or render their delivery in better condition, but if there is to be no reduction in freight charges, and if the condition in which the goods are to be delivered can be secured by other and

cheaper methods, why should any enormous subsidy be granted? It can hardly be pretended that any important section of the community is materially interested in the saving of one or two days in the delivery of letters to or from Europe; and as to closer intercourse with the mother country, will not this be better promoted by frequent rather than by rapid communication? That a fast ocean steamship service would be of some general advantage all will admit, but that the advantage will prove large enough to justify the cost is very doubtful. There are several public enterprises now projected, the accomplishment of which will prove of much greater benefit than fast steamships. The best consideration of Government should be devoted to the preparations required for providing for the great changes in inland transportation which will occur on the completion of our canal system; to meet which suitable harbor facilities will be required on our inland lakes, which, with cold storage appliances, will largely increase the value of our meats, dairy products, poultry, eggs, fruit, etc. Our two great railway trunk lines would derive the greatest share of any advantage which would accrue from the fast ocean service, and if each of the companies would contribute one-third, and the Dominion Government one-third of the proportion of the subsidy which Canada is to contribute, this would be a more equitable basis on which to proceed than is the proposal that Government should contribute the whole, and that mainly for the benefit of two gigantic corporations for which the country has already done so much, and from whose methods of operations it too often suffers much injustice.

Mr. Fleming, like a good many other recognized authorities on the subject, has grave doubts as to the successful operation of fast steamship service between Europe and Quebec or Montreal. He says: "In my previous paper, I submitted that the evidence of facts does not warrant the belief that steamships can always run with safety at great speed on considerable portions of the St. Lawrence route, and that this is especially the case in the approaches to the Straits of Belle Isle. Frequently the navigation is beset with ice-bergs for hundreds of miles; moreover, when within the straits the course of ships is confined between lines of rocky coast on both sides, while irregular currents and dense fogs frequently prevail." He admits that men of marine experience have declared that the navigation of the St. Lawrence is safe for the largest and fastest steamers. To this he replies: "I am disposed to agree with this testimony, with the proviso, whatever it may be worth, that the navigation is safe for fast steamers, provided they move as slowly as the occasion demands." In illustration of the dangerous character of the route, Mr. Fleming refers to the series of disasters which at one time befell the Allan Line, when eight passenger ships were lost in eight years, also, to the shipwrecks and losses sustained by the Dominion and Beaver lines. In support of this view, he refers to a work by Mr. Henry Fry, of Quebec, entitled "The History of North Atlantic Steam Navigation," in which Mr. Fry states that the distressing losses of life and property were not due to any want of skill or experience on the part of the owners or captains. He, however, expresses the opinion that the Government were not blameless in exacting speed, in the face of the serious obstacles which were presented to rapid steaming, and in imposing heavy penalties for non-punctuality in the delivery of the mails within the periods stipulated by contract.

Mr. Fleming's proposal is that the new steamship service should avoid the northern entrance to the Gulf, by way of Belle Isle, and should exclusively use the southern entrance by way of Cabot straits, making Sydney the ocean terminus during the summer months, and Halifax during winter. The steamers might run at full speed from their port of departure in Great Britain to Sydney, from which the mails and passengers, if they so prefer, might be conveyed by rail, and the steamer proceed through the gulf and river St. Lawrence to Quebec or Montreal. Or, in another way, one class of steamers might run between Montreal and Sydney, and connect there with the fast line of steamers whose service would be exclusively on the ocean. He shows that the distance between Montreal and London, via Sydney, using rail from Montreal to Sydney, is so much shorter than the distance from New York to London, via Liverpool, that the trip by the former route should be performed in six days, six hours, as compared with seven days, eighteen hours by the latter route. He claims:—

1. That the ocean passage would be nearly two days shorter.
2. That fewer steamships would be required to perform the regular weekly service.
3. That the consumption of coal on each voyage would be one-third less, and moreover the coal used would be obtained almost at the pit's mouth.
4. All other expenses of the voyage would be proportionally reduced.

If the same steamship is to make the full trip from say Liverpool to Montreal, but only to make fast time so far as Sydney, and proceed more slowly through the Gulf and river, taking the delay at Sydney, where is the great saving in time? If two classes of steamships were to be employed, one for river and gulf and the other for all ocean sailing, involving transfer of passengers and freight, how can it be claimed that such a service will reduce the rate of freight on our products or improve their condition on delivery? If the fast service via Belle Isle should prove as dangerous as Mr. Fleming describes it, will not passengers avoid it, and will not insurance companies exact higher rates?

AS GOOD AS THE BEST.

In the earlier part of this year when the Tariff Commission were making personal investigations of some of the manufacturing industries of the country, with a view to demonstrating the excellence of the pig iron produced by them, the Nova Scotia Steel Company made enquiries of some of their customers as to their experience with the "Ferrona" brand of iron. Among the replies the Company received were letters from the following well-known concerns, whose testimony is valuable:

The Massey-Harris Co., Toronto:—We have been using some of your pig iron for a considerable time past. We find the "Ferrona" to be a good iron for our use when mixed with North Shore irons, which we use largely. At present we use about twenty-five per cent. of your iron for our mixture. Lately, we have been making some experiments, and we are of the opinion that we could use thirty to forty per cent. with excellent results. We are also of the opinion that your "Ferrona" has been for the past year better iron than we ever had from you in the past.

Messrs Rhodes, Curry & Co., Amherst, N.S.:—We have been using "Ferrona" brand pig iron for about three and a

half years, and are quite satisfied with the quality. We have no difficulty in making good castings for all kinds of car work, as well as columns, cresting, etc., for buildings; also school desk castings. We are able to get good mixtures from your pig iron alone, or by mixing with scrap iron.

The St. Lawrence Foundry Co., New Glasgow, N.S.:—The only kind of pig iron we used for making water pipes during the years 1895 and 1896 was your "Ferrona" brand, and we found it quite satisfactory. We are at present using "Ferrona" pig iron in our foundry mixture with good results.

Burrell-Johnson Iron Co., Yarmouth, N.S.:—We take pleasure in stating that during the past five years we have used considerable of your No. 1 "Ferrona" pig iron, also some of your No. 3, and have had excellent results from the same. We think your No. 1 mixed with your No. 3 and the usual quantity of good scrap will do as good work as most any iron to be obtained.

Messrs. John Inglis & Son, Toronto:—We have been using your "Ferrona" brand of pig iron for some time, and consider it equal to any iron we ever used for our class of work.

Messrs. Frost & Wood, Smith's Falls, Ont.:—We have been using largely the "Ferrona" brand of pig iron the past three years, and when mixed with other brands, the castings from same have proved satisfactory.

Alex. Fleck, Esq., Ottawa:—I have been using your "Ferrona" No. 1 and No. 2 pig iron the past five years, and have found it a very good iron for general work. I am making mill, engine, electric and railroad castings, and have never had any cause to find fault with your iron.

Canada can produce as good iron as can be made anywhere in the world.

PROTECTION IN GERMANY.

Up to about twenty-five years ago, Germany was nearly altogether an agricultural country, but about that time its industrial era began; and its manufacturing industries, under the policy of protection, have flourished and extended since then at a rate which has excited the wonder and attention of all writers on political economy. The Manchester School demurs to the argument that this is any proof of the soundness of the doctrine of protection, and attempts to depreciate the progress of Germany by a comparison of its aggregate commerce with that of England. No one questions the superiority of Britain's commerce over that of any other country. But the question really is, does England now occupy that commanding position which it held fifty years ago, before the adoption of free trade? Granted that in manufacturing industries there has been great expansion, and that there has been a large increase in its wealth and commerce, is this increase on a parity with or superior to that which is being experienced in protectionist countries—Germany for example?

The December Summary of the Finance and Commerce of the United States for the year 1896, furnishes a good deal of information which enables a fair comparison to be instituted between England and Germany as to their progress during the past twenty-five years. The following few facts are selected:

Value of merchandise imported into the United States from the United Kingdom and Germany during the following years:—

	United Kingdom.	Germany.
1871	\$228,768,371	\$25,093,625
1880	210,613,694	52,201,237
1890	186,488,956	98,837,683
1895	159,083,243	81,014,065

During these twenty-five years, the imports from the United

Kingdom decreased nearly thirty-five per cent.; while the imports from Germany increased nearly 223 per cent.

The changes in the imports of a few lines of manufactured goods may be noted.

COTTON MANUFACTURES.

	United Kingdom.	Germany.
1871	\$26,453,777	\$4,899,560
1880	16,891,342	9,771,380
1890	11,892,881	8,498,434
1895	13,275,869	9,804,137

In these goods the imports from the United Kingdom decreased in value about one-half; while the imports from Germany increased 100 per cent.

IRON AND STEEL, AND MANUFACTURES OF.

	United Kingdom.	Germany.
1871	\$47,642,696	\$626,713
1880	57,260,470	1,633,724
1890	32,974,958	3,077,890
1895	18,647,222	1,886,333

In these goods the imports from the United Kingdom decreased in value \$28,995,474; while the imports from Germany were three times larger in 1895 than in 1871.

MANUFACTURES OF WOOL.

	United Kingdom.	Germany.
1871	\$37,005,726	\$3,693,387
1880	19,395,662	4,259,610
1890	31,266,425	12,318,783
1895	20,780,402	8,577,097

During the twenty-five years the value of imports of woolen goods imported from the United Kingdom decreased \$16,225,324; while the imports from Germany increased \$4,883,710.

Summary of above three descriptions of merchandise.

	United Kingdom.	Germany.
1871	\$111,192,199	\$9,219,660
1895	52,703,493	20,267,567

Decrease in imports from the United Kingdom in twenty-five years, \$58,488,706.

Increase in imports from Germany in twenty-five years, \$11,047,907.

While the imports from Great Britain fell off more than one-half, those from Germany were more than doubled.

Many similar results could be shown by a comparison in other classes of manufactures.

It may be observed that for the year 1890, the imports of iron and steel, and wood manufactures, from both of these countries were abnormally large, being brought in, in anticipation of the McKinley tariff.

The opponents of protection base their principal objections to this policy on the ground that it is detrimental to commerce, and imposes upon the consumers of the protected country higher prices for their goods than if there were no protection. If detrimental to commerce, how is it that during the last twenty-five years, the exports of Germany to the United States have increased 223 per cent., while those from England have decreased thirty-five per cent.? How is it that the port of Hamburg has now a larger commerce than that of Liverpool, whereas ten years ago Liverpool had the larger trade? In Hamburg, the tons received and shipped were, in 1885, 3,704,312; in Liverpool, 4,278,881; in Hamburg, in 1895, 6,256,000 tons; in Liverpool, 5,965,959 tons, the increase in ten years being, for Hamburg, about sixty-nine per cent.; for Liverpool, not quite forty per cent.? If goods are dearer in protected countries than in free trade countries, how is it, that,

subject to the same terms and conditions of import, the exports of protective Germany to the United States are rapidly increasing, while the exports from free-trade England are so rapidly decreasing? Is it not because by giving Germany for so many years the control of the Home market its manufacturers have been able to build up so large a trade, that in many lines its goods are now the cheapest in the world? It is not surprising that the Manchester School feels puzzled and angry in seeing Germany and other countries flourishing under a policy which, for many years, they so scotfully derided. Nor is it any wonder that there is such a growing distrust in the virtue of the free-trade policy which, year after year, fails to produce the beneficial effects which it was expected to accomplish.

THE SHAREHOLDER'S INCONSISTENCIES.

One of the queerest conglomerations of sense and nonsense imaginable is contained in an editorial in *The Shareholder* in which it discusses the proposed Dingley United States Tariff. It tells us that the duties that apply to Canadian trade are not advantageous to Canada—that they appear to have been prepared in a spirit of antagonism to this country; that the Canadian Government should, in the preparation of their proposed tariff changes, take the propositions of the Dingley bill into their serious consideration; that legislation in this direction (what direction?) cannot be made to apply to any one country, but, at the same time, the rates of duty on imports can be so regulated as to affect goods the bulk of which come from that country. We suppose the suggestion of *The Shareholder* to be that if it is possible to do so the Canadian Government would do well to make a tariff retaliatory in its operations as against the United States, but that legislation in this direction cannot be made to apply to that country alone. Our contemporary seems to be ignorant of the fact that our government may, if it so desires, adopt the American plan, and impose say the same duty upon American goods coming into Canada as the United States charges upon similar goods made in Canada going into that country, while a lower rate could be charged upon imports from countries that do not charge as much as the American rate.

It refers to the Trade and Navigation Returns for the last fiscal year where it finds that the exports from Canada to the United States during that year amounted to \$44,448,410 while our imports from that country were \$58,574,024, the duty on which amounted to \$7,767,992, while the exports to Great Britain during the same period amounted to \$66,690,288, while the imports were only \$32,979,742 on which the duty amounted to \$7,358,514, the average duty collected on the imports from the United States during that year amounting to 13.26 per cent, while that on imports from Great Britain averaged 22.31 per cent., a difference of nine per cent. in favor of the United States, a result which *The Shareholder* says greatly regrets, as it is of an opinion that if any advantage be given it should not be to countries disposed to legislate against us, but to those which furnish the largest markets for our exports. This view of the situation is one that our contemporary frequently advances, with the unvarying result of ridiculousness. Its aim seems to be to create the impression that Canada imposes higher rates of duty upon merchandise coming from Great Britain than from the United States, and it never finds it convenient to disabuse the minds

of its readers that such is really not the case. It knows very well, as it may readily discover from the Blue Book from which it quotes, that a yard of cotton or woollen goods, or a ton of iron, or anything else coming into Canada from Great Britain, pays precisely the same duty as the same article pays coming from the United States, no more nor no less; then why should it greatly regret the fact it states? It might be admissible for politicians on the stump to advance such a silly argument, but a reputable journal should be above such a thing. If, on the one hand, the United States could produce cloths, silks, laces and many other things of as good quality as are produced in Great Britain, and at the same prices, perhaps the Canadian trade in those articles would be somewhat equally divided between them; but as this is not the case, our imports come very largely from across the water. If, on the other hand, Great Britain could produce raw cotton and some other articles, which we import duty free in large quantities only from the United States, the aspect would be quite different from what it now is. It would not be to our interest to impose a duty on raw cotton, no matter how high a wall Dingleyism or McKinleyism might erect against Canada, simply because cotton is a raw material that we require and cannot procure at the same cost from any other country. But there are many articles that we import, very largely from the United States, that are also made in Great Britain; pig and bar iron and steel, hardware, etc., upon which if the tariff discriminated in favor of the latter country, the current of trade would be changed; and one of the most effective ways in which Canada could show its resentment at the unfriendliness of the Dingley tariff would be, not to lower the duties on British goods, but to raise them on American goods.

The Shareholder declares that United States manufacturers should be made to realize that if they do not want our products we will not take theirs. This declaration should be qualified, for the United States produces many things that we want and must have, and can obtain from no other source, while there are many other things that we require that can be obtained not only in the United States but also in Great Britain.

We congratulate *The Shareholder*, however, upon its declaration in favor of closer trade relations with Great Britain, and its abandonment of unrestricted reciprocity with the United States.

EDITORIAL NOTES.

Our paper trade with Mexico is capable of considerable improvement. At the present time we send to that country nearly one-third of the paper goods that it imports, a little more than the imports from Spain, and considerably more than Germany or England supplies. Practically all the paper trade with our southern republic neighbor should be in the hands of the manufacturers of the United States.—*The Paper Mill*.

When it is considered that last year \$600,000 worth of pulpwood, the raw material of which American paper is made, was supplied from Canada, and that the hoggishness of the forthcoming Dingley tariff will result in Canada imposing a heavy export duty on pulpwood, we fail to observe why our contemporary thinks that all the paper trade of Mexico should be in the hands of American paper makers. It is quite likely that Dingleyism will drive many American paper makers into Canada—from whence they would be more likely to do a large export business to Mexico than from the United States.

The 1897 Canadian Tariff

The 1897 United States Tariff

The British Tariff

As soon as the new Canadian Tariff Bill is presented in the House of Commons at Ottawa it becomes the Law of the Land, going into effect immediately. The Dominion Parliament being already in session, it is the announced intention of the Government to present the Tariff Bill with as little delay as possible.

The new United States Tariff Bill has been already introduced into Congress, that body having been called together in Extra Session for the consideration of that subject; and it is expected that that Bill will become law and go into effect at an early day.

AS SOON AS THESE TWO IMPORTANT MEASURES—The Canadian Tariff and The United States Tariff—becomes law

A SPECIAL EDITION OF THE CANADIAN MANUFACTURER

will be published containing both of them and also The British Tariff, all reproduced in full from authentic copies obtained from official sources.

The edition of THE CANADIAN MANUFACTURER of September 7, 1894, contained the full and entire texts of The Canadian Tariff, which was confirmed July 23, 1894, and The United States Tariff, which went into effect August 28, 1894; and there are thousands of copies of that edition to be seen at this time in business offices, workshops, mills, factories, electric light stations, and other industrial establishments in Canada, United States, Great Britain and other countries.

The importance and value to all manufacturers and business men of having the Tariffs of these three great countries—Canada, United States and Great Britain—published in full within one cover cannot be too highly appreciated. The Special Edition of THE CANADIAN MANUFACTURER containing them will be printed on heavy paper, and provided with loop for hanging in any convenient place.

This Special Edition will possess unique and exceedingly valuable advantages as an advertising medium to all those who desire to have their business brought to the attention of the managers of thousands of cotton and woolen mills, pulp and paper mills, flour and lumber mills, coal and gold mines, engine and boiler shops, machine shops, electric lighting and street railway stations, bicycle factories, etc., in Canada and elsewhere.

ADVERTISEMENTS FOR THIS SPECIAL EDITION ARE SOLICITED at the following rates :

One Page, - \$20.00 Half Page, - \$12.50 Quarter Page, - \$7.50

COPIES OF PAPER FREE TO ALL ADVERTISERS. Single Copies, TEN CENTS EACH

For 100 or more copies a discount of 25 per cent. allowed.

Copy and instructions for advertisements, and orders for copies of paper, should be sent without delay to

The Canadian Manufacturer Publishing Company (Ltd.)

McKinnon Building, TORONTO, CANADA.

Orders for copies of this Special Tariff Edition should be sent in without delay.

Buyers of spruce deals for British markets have never before contracted for such large quantities in New Brunswick, Nova Scotia, and Province Quebec as this year. Prices are even higher than in 1896. The business boom is on in Great Britain and the consumption of lumber is enormous and unusual. The Canadian spruce manufacturers are in clover, and there is less necessity for seeking United States markets in the sale of spruce this year than usual. We predict that buyers in the United States will be disappointed at the light receipts of spruce from the Provinces the coming season. It would be a blessing to the lumber-manufacturing interests of this country if the Canadians could develop markets across the Atlantic for their entire lumber output. We have no doubt such a happy consummation would please the Canadians as well.—Northeastern Lumberman.

One of the most beautiful brochures that has appeared in this office is that issued by the Nova Scotia Steel Company, New Glasgow, N. S., containing the statement made by that company and presented to the Tariff Commission while at Halifax in January. It presents a brief history of the company from its inception in 1872 down through the various phases of its existence, and of the different concerns which have been absorbed into it, to the present; a description of the character and extent of its various industries; the importance of these works to Canada; the effects had upon it by the tariff, with suggestions touching legislation that might affect it; the variety and intrinsic value of its products, the employment of labor involved in its operations, etc. It is indeed a valuable contribution to the industrial history of Canada.

Senator David Mills is well known throughout Canada as one of the ablest men in the ranks of the Liberal party. He reads the signs of the times in the United States, and has come to the conclusion that, in view of the adoption of the Dingley tariff by Congress, the chances are altogether against the successful negotiation of a treaty of reciprocity with that country. On being asked what he thought the Parliament of Canada should do in the event of a reciprocity treaty not being possible, he replied; "I notice that the Dingley bill now before Congress proposes many radical changes in the United States tariff, and that a great number of these changes are directly pointed against the trade of this country. In taking this course the United States legislators do not profess to be actuated by any ill-will towards us, but assert that they have wholly their own interests in view. Now, we may do the same thing. Let us carefully examine the proposed tariff; let us notice the special articles that Congress is legislating to exclude, and let us alter our tariff in respect to all these articles in such a way that Canada may become the field in which the purchases by individual consumers of the United States would be made. In my opinion, a very moderate Canadian duty on cutlery, West of England broadcloths, silks, gloves and a number of other articles, would give our Government a much larger revenue from these sources than they would derive from a very high tariff, because the wealthy classes of the Republic would purchase their goods in all our border towns and cities. During the American Civil War there was a very large trade in goods of these kinds in all our border towns and cities, and under the Dingley tariff precisely the same traffic would be again undertaken. I have no doubt whatever that the Canadian revenue would be much increased by this means."

A few days ago in the House of Commons, Sir Richard Cartwright stated that the production of pig iron in Canada during the fiscal year named was as follows: For the year ending June 30th.

1892.....	30,294 tons
1893.....	46,948 "
1894.....	62,522 "
1895.....	31,692 "
1896.....	52,871 "

The new tariff bill, reported to the House of Representatives by Chairman Dingley of the Committee of Ways and Means has been carefully drawn for the two-fold purpose of securing a much-needed revenue for the Government treasury and for the protection of American industries. Probably its provisions will not be altogether satisfactory to everyone. No tariff bill ever was or ever will be that. But, when it is enacted into a law, it will represent the ripest judgment and the most patriotic sentiment of the statesmen and the party that is responsible for it. The country declared in no unmistakable tones last November for a change in the present tariff and that the new measure will meet the fullest requirements of the situation may not be doubted.—The Paper Mill.

If our American friends suppose that the Dingley tariff, or rather that portion of it by which exorbitant duties are laid upon Canadian lumber, and the threat that an additional duty of twenty-five per cent. shall also be levied if Canada should impose an export duty on pine logs, will be productive of a much needed revenue, they will be mistaken. As far as Canada is concerned, the duty upon lumber is virtually prohibitive, and therefore there will not be much revenue from that source. And as for the protection of the American lumber industry, particularly that of Michigan, where the dependence is almost entirely upon the supply of Canadian logs, the benefit will be entirely invisible. Mr. Dingley's bill may be "carefully drawn" as our contemporary suggests, but from present appearances it will neither be productive of the much needed revenue nor yet of any advantage to Michigan lumber mills; and if the bill in all its details will work as we imagine the lumber schedule of it will; and if it will represent "the ripest judgment and most patriotic sentiment" of the statesmen of that country, that country is indeed to be pitied.

The retroactive clause in the tariff bill is worrying Secretary Gage. While he cannot treat it as law, for in any event it will probably be three months before it can be made law, he cannot, or thinks he cannot, wholly ignore it. The Treasury expects little from it in increased revenue. Increased revenue was not its object. The scared importers had already been run in. It is intended to stand as a scarecrow to trade pending the consideration of the tariff bill; a threat to paralyze trade, and as such it will be effective. The chances are that at the last moment, and before the final passage of the bill by the Senate, it will be stricken out. Then the conference can strike it out. To keep it in would make endless confusion and litigation in the administration of the customs law, and, what is more, make the mere mention of tariff legislation hereafter a bugbear to business. One very serious trouble with the clause being in the bill is that it will give to people having inside information as to the final disposal to be made of the clause, a big speculative advantage in all goods largely affected by changes, and thus taint the whole tariff bill as a gigantic job and a national scandal.—New York Financial News.

Our dear friend, the Dingley bill, is likely to have a lively time of it in the Senate. Even Senator Allison, one of the most influential Republicans, gives warning that it need not look for a bloodless victory. "We will meet the House on the principles of ample revenue and fair protection to American industries," he says, "But we will decide the details for ourselves. We amended the McKinley bill in 1890. If my memory be not at fault we made 363 amendments to that measure. We amended the Wilson bill until it was almost unrecognizable. It would be strange if this measure were not amended as we think best." Mr. Dingley had better photograph his bill if he wants to remember what it originally looked like.—Montreal Star.

The Canadians maintain a lobby at Washington when Congress is in session, and sometimes they send us down a Canadian minister of trade and commerce or a Canadian minister of marine and fisheries, to instruct us in our duties, especially in the interest of commercial relations with Canada. Thus far under this new administration their mission has been a hopeless one. They have harnessed into their lobby a score or more of eastern Michigan lumber manufacturers, knowing full well that unless they can influence legislation at Washington they are powerless. The Dominion government has no power, without the consent or approval of Great Britain, to enter into any reciprocal arrangement with the United States. Hence it may be considered pretty certain that no reciprocity treaty will be made which does not suit Great Britain. Canadian manufacturers are not very anxious to have a reciprocity treaty concluded between Great Britain and the United States which will permit American manufacture free entry into Canada. We do not want Canadian lumber, logs or pulpwood. We do not need Canadian farm products or Canadian fish, hence we do not see what she has to offer on a basis of reciprocity, unless it is to permit American manufacturers free entry into her domains.—North-eastern Lumberman.

Our intelligent contemporary should read up in current history and learn that Great Britain interferes in no manner with Canada in the management of our fiscal affairs. It should learn, too, that there could be no reciprocity treaty made between Great Britain and the United States affecting Canada without the consent of Canada. But if the United States declines all reciprocity in manufactured or other products, Canada is prepared to offer reciprocity of tariffs. McKinleyism is a two-edged sword.

The Department of Trade and Commerce recently received an interesting report from Mr. J. S. Larke, Commissioner to Australia, on his recent visit to Queensland, in which he says that one of the great drawbacks to trade between Canada and Australia has been to obtain return cargoes to Canada; but with Queensland this difficulty would disappear, as that colony produces a number of articles which might profitably be imported into Canada. There are wool and hides, preserved meats tallow, sugar, arrowroot, tin, coffee, tobacco, rice and spices. Sugar is really the article that could be imported by Canada with profit. There are 77,247 acres under cane, and, although last year was extremely unfavorable, the output was 86,255 tons. A beginning has been made in the importation of Australian sugar by the British Columbia Refining Company which may lead to the building up of a considerable trade. The Queensland preserved meats are of the best, and could be sold in our mining regions. Among the imports from Canada, flour and wheat figure very largely. The Gov-

ernment has a protective duty of fourpence per pound on cheese. Canadian meals, malt, hops, potatoes, onions, and apples could find a ready sale if they were shipped at the proper season and in good shape. Pine lumber is heavily protected, and there is little opening for any shipments in that line. Canadian fish should be appreciated in Queensland. With Canadian apples the trouble has been imperfect packing in every shipment. All fruit should be placed on the market there before Christmas. Mr. Larke finds it rather strange that Canadian paper and pulp manufacturers are making no effort to enter the Australian market. Canadian paper is being continually asked for, and unlike most other articles from the Dominion, the sale would be an immediate one.

Vessel owners of the lakes are showing no direct interest in the tariff bill, although it would seem that there is a great deal in the measure as now proposed that is of considerable importance to them. Statistical reports from the treasury department show that during the year ending June 30, 1896, there was shipped into Canada from Ohio and Pennsylvania, by lake and rail, 3,045,965 tons of coal, of which 1,675,109 tons was bituminous and 1,370,856 was anthracite. A very large part of this coal, especially of the bituminous kind, was moved in vessels from Lake Erie ports, and the vessel interests should join the producers of Ohio and Pennsylvania in opposing an increase in the duty on coal. There is a good prospect that the Canadian government will reduce its duty on bituminous coal if our government shall not make an advance in its present duty. Then, too, it is understood that the imports of coal on the New England coast from the Cape Breton district and on the Pacific coast from the Vancouver district do not amount to more than 1,000,000, as against more than 3,000,000 tons going into the convenient market across the lakes from Ohio and Pennsylvania. The lake vessels interests should do all in their power to help the coal dealers of Ohio and Pennsylvania, who would be justified in asking for the entire removal of the duty on soft coal. But they do not do so. They simply ask that no advance be made in the duty, or that a reciprocal provision be made that our rate of duty on bituminous coal shall not exceed the Canadian rate of duty on the same article; and that in the event of a reduction of the duty by the Canadian government, our rate of duty shall be equalized with theirs.—Cleveland Marine Review.

The up-to-date character of the *Methodist Magazine* and *Review* for April, is seen in the fresh and vigorous articles on the *Cabinet Celebration* with descriptive text, pictures and poetry, and "The Red Cross in Turkey," with fifteen fine engravings. An interesting account is given of Bach, the greatest of all musicians, and of Schubert, whose centenary has just been celebrated. The Rev. A. Browning has a capital sketch of "The Gold Boom in Cariboo." "The World's Progress," "Recent Science," and other departments are up-to-date and well illustrated. William Briggs, Toronto, \$2 a year.

Outing for April easily maintains its high position among publications devoted to sports and pastimes. Beautiful illustrations and many seasonable sketches of sport, travel and adventure in all parts of the world give the needful variety to a most acceptable number. The contents are: "Western Yachts and Designers," by Arthur J. Pegler; "Housekeeping in Venice," by Theodore Purdy; "The Bloodhound and His Training," by A. P. Poore; "Woodland Archery," by Maurice Thompson; "Likuku," by May D. Hatch; "A Modern Kite and Government Experiments," by H. C. Hunter; "Goose Shooting on Cascumpec Bay," by R. R. Fitzgerald; "Canoe and Gun," by Ed. W. Sandys; "An April Morning," by C. F. Middlebrook; "A Wheel Through the Tidewater of Virginia," by J. B. Carrington, and the usual editorials, poems, records, etc.

RECONSTRUCTION OF THE ALTERNATING CURRENT SYSTEM OF THE ROYAL ELECTRIC COMPANY, MONTREAL, CANADA.

BY P. A. GOSSIKR.

To meet the generally increasing demand for light and power supplied from central stations, it has, in many instances, been necessary to erect new generating stations, or to reconstruct the existing plant, discarding the old inefficient apparatus and substituting therefor equipment of modern design. In some of the larger cities this fact has apparently been appreciated for some time, as there have been erected stations which are magnificent examples of modern generating plants, operating with the highest economy obtainable at the present time and giving evidence in their design of the highest engineering skill.

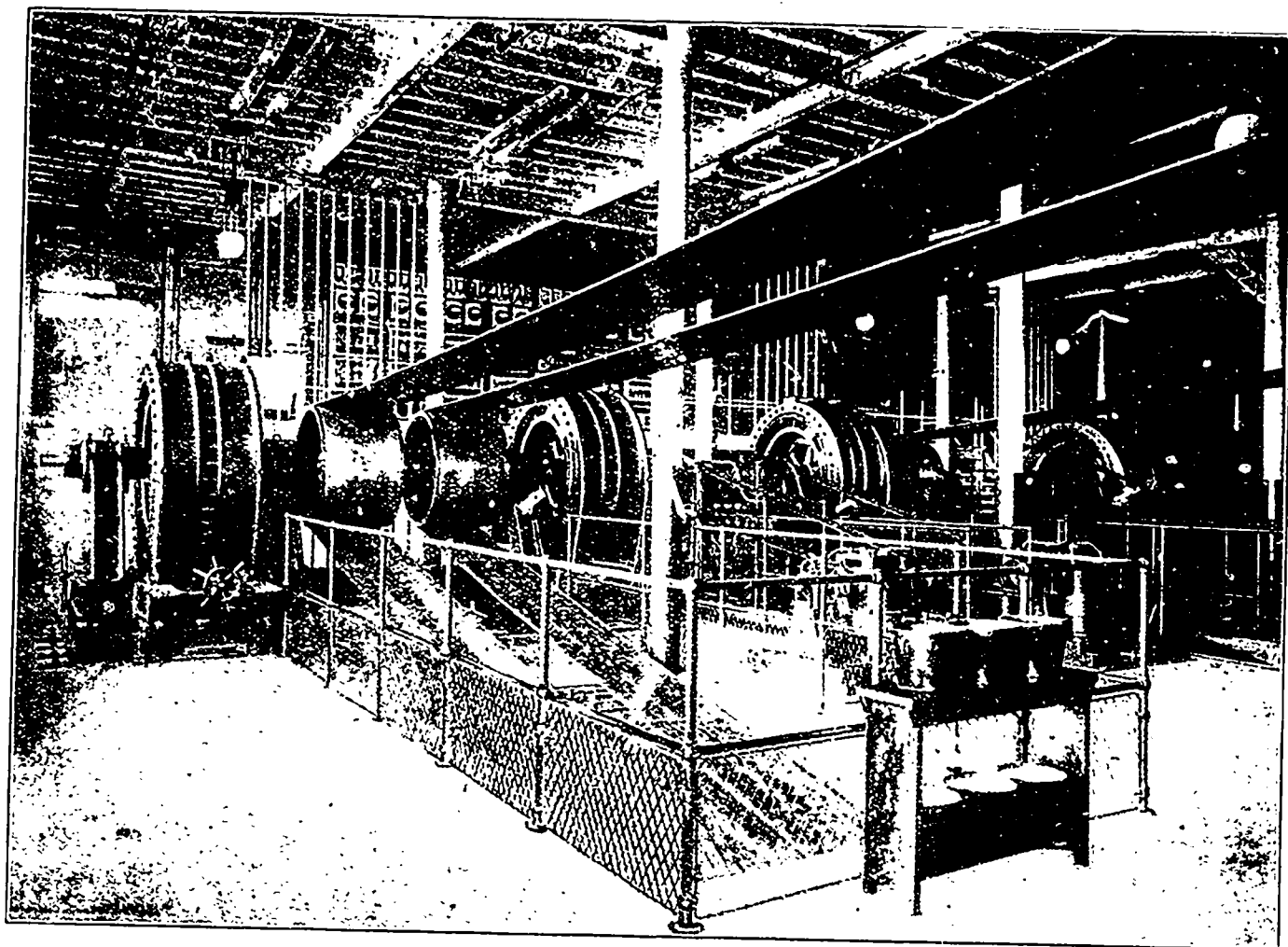
Many generating stations at present supplying a large output have attained their growth gradually, having from time to time

capacity, or secondly, to reconstruct or re equip the existing plant to conform to the aforementioned requirements.

The latter plan of reconstruction will, without doubt, be decided upon in the majority of cases, as the use of large units permits of the installation of sufficient capacity, in the same space occupied by the old apparatus, to meet future demands for a reasonable length of time.

There have been numerous descriptions published giving examples of plants erected to replace those found to be inefficient and giving unsatisfactory service. It is to be noted that, so far, these new plants, with but few exceptions, are direct current stations serving light and power to congested districts and comparatively small areas. This account is of the reconstruction of an alternating current system supplying current to a large territory.

The history of the Royal Electric Company of Montreal, and the growth of its lighting and power plants from a twelve light arc machine in 1884 to the present time of serving about 65,000 incandescent lamps, 1,750 arc lamps and 750 h. p. in motors has been told in previous issues of electrical journals.



S.K.C. Generators, Royal Electric Company's Alternating Current Lighting Station, Montreal.

installed additional apparatus as it was required by an increasing business and extension of territory supplied. These stations are now confronted by figures and results showing their cost of operation per unit of output to be much more than it should be, or would if the same output was produced by more efficient apparatus operating under modern conditions. Besides, there is generally a multiplicity and variety of apparatus, the operation of which is accompanied with danger and unsatisfactory service.

The necessity of giving satisfactory and uniform service, of reducing the cost of operation, and of meeting the increasing demands for light and power being recognized, and the conditions being such as to permit of meeting these requirements, an investigation of the existing conditions generally results in the adopting of one of two plans: First, the building of a new generating station and equipping it with modern apparatus, utilizing the old plant for continuing the service during the course of the construction of the new one, and possibly retaining it afterwards as spare

Early in 1896 the directors of the company, upon the recommendation of the general manager, Mr. W. H. Browne, authorized the entire reconstruction of its alternating current station and lines—this reconstruction to be carried out upon plans which should adapt the system to be served either with power from its existing steam plant or from the water power plant at Chambly, which is at present being rapidly developed.

The foresight shown in the recommendation and authorization of this wholesale reconstruction and re-equipment has been well established by results already obtained. The economy of replacing inefficient apparatus by apparatus which is the production of the highest grade of engineering is, in this instance, no longer a possibility but an established fact.

One of the generating stations of the R. E. Co. is devoted exclusively to supplying direct current arc service.

The equipment of the second or Queen street station, for serving light from an alternating system, with a spare series arc capacity,

prior to its reconstruction, consisted of eighteen alternators, six exciters and nine arc machines, with their numerous belts, pulleys and shafting, shown in diagrams 1 and 2, representing the apparatus on the ground and first flats. The D. C. power generators and engines are located in a separate building.

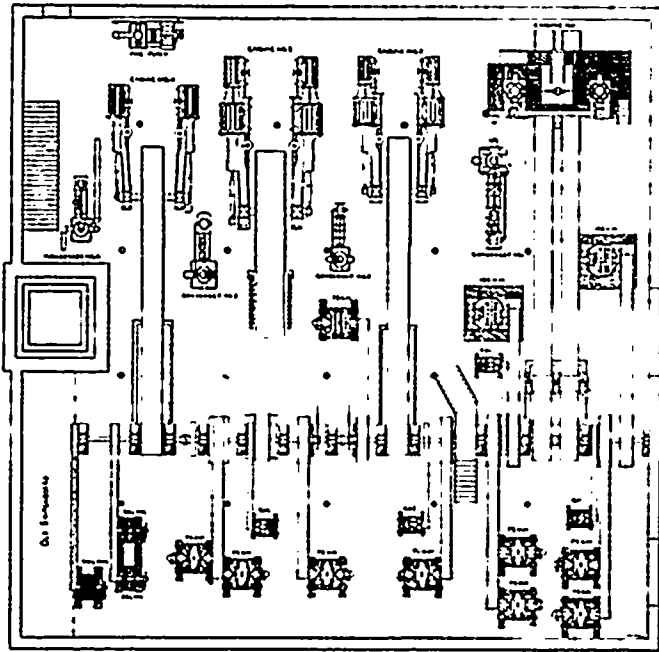


DIAGRAM NO 1

The upright engine, known as No. 1, shown next to Queen street in diagram 1, was connected by two thirty inch belts to a line shaft from which were operated four seventy-five k. w. and two 150 k. w. alternators and two exciters. Operated from the line shafting connected to No. 2 engine were three seventy-five k. w. alternators and an exciter.

No. 3 engine, located on the ground flat was belted by a fifty inch belt to a line shaft on the first flat, shown in diagram 2. To this line shafting were connected seven seventy-five k. w. alternators, two exciters, one forty-five k. w., D. C. generator, five forty light and one thirty five light arc machines. These latter were used only as spare capacity for the series arc system located in the east end station, and the forty-five k. w. generator as spare cap.

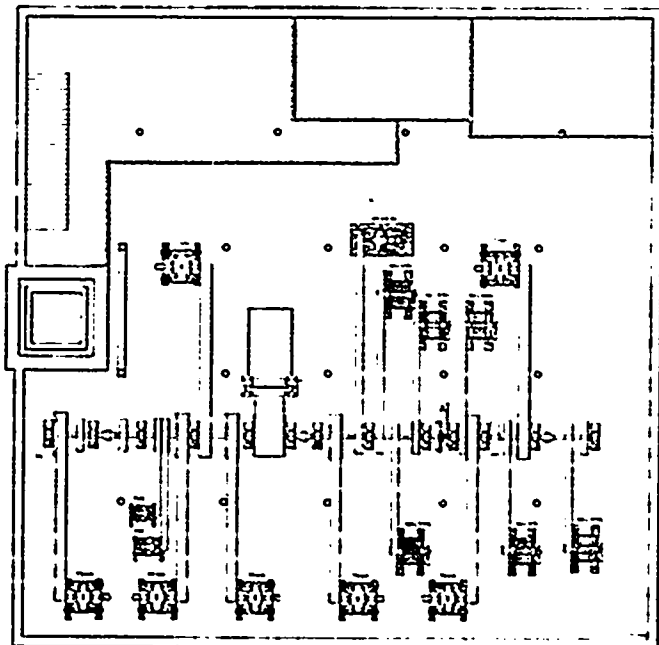


DIAGRAM NO 2

city for the D. C. power system. The total capacity of the machines connected to this line shafting was much more than the capacity of the engine consequently only part of the machines connected to No. 3 line shafting could be fully loaded at any one time. With that part of the shafting thrown out of service by the

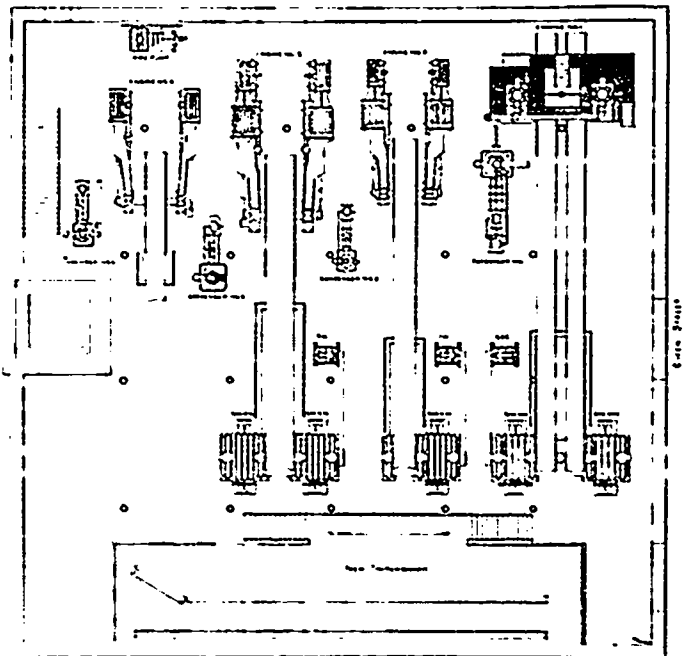
clutch shown at "A" diagram 2, there yet remained connected to the shafting in service three forty light arc machines, which had to be up to speed whether they were required or not. To No. 4 engine were connected by line shafting two seventy-five k. w. alternators and three fifty light arc machines.

It will be unnecessary to give in detail the heavy line shafting losses, the dangers and disadvantages of such an arrangement of machines as shown in diagrams 1 and 2, as they will be apparent at first sight.

There was another danger that menaced the safety of the entire system—a wooden switchboard, the capacity and arrangement of which was entirely inadequate for the service required of it.

The alternators connected to the same engine were run in parallel, six operating in parallel from No. 1 engine, three from No. 2, seven from No. 3 and two from No. 4 engine. The ordinary advantages to be gained from operating in parallel were to a great extent offset by the fact of there being no clutches on individual machines. This also introduced irregularities and interruption to the service from armature burn-outs. In running so many comparatively small units in parallel it was difficult to overcome the "idle" currents in the alternators, and the numerous belts and pulleys required a nicety of adjustment which was hard to maintain after synchronism had once been established.

The foregoing statements setting forth past conditions have been made to illustrate the results of a gradual growth. It is needless to state that had the present demands for light and power been



foreseen, and the efficient apparatus of to day been available, the station equipment, in all probability, would have been far different from that which necessitated its entire reconstruction. The first step of this reconstruction was the rearrangement of the overhead lines. These had been divided into three routes, each taking approximately one-third of the station output. The relative positions of the wires on the poles forming these routes were such as to cause serious fluctuations in the lights, due to mutual induction. This became so objectionable that it was necessary to operate all the circuits forming one pole line from one set of alternators running in parallel to get comparatively steady service. When the total load was too heavy to be run from one set of alternators, this condition of the pole lines necessitated the running of two or three engines underloaded, introducing a serious loss in coal consumption. The relative positions of the wires on the poles were changed to overcome this mutual induction and most satisfactory results were obtained, as after this change it was possible to operate any circuit from any engine without the slightest fluctuation resulting.

The transformer system was next rearranged, the old transformers being replaced by ones of close regulation and small core losses and secondary systems established wherever economical. The extent to which the latter was carried may be judged from the fact that 1,161 old transformers were replaced by 628 "Stanley" transformers, with a consequent reduction in leakage load of 245 amperes, representing a tremendous saving in coal.

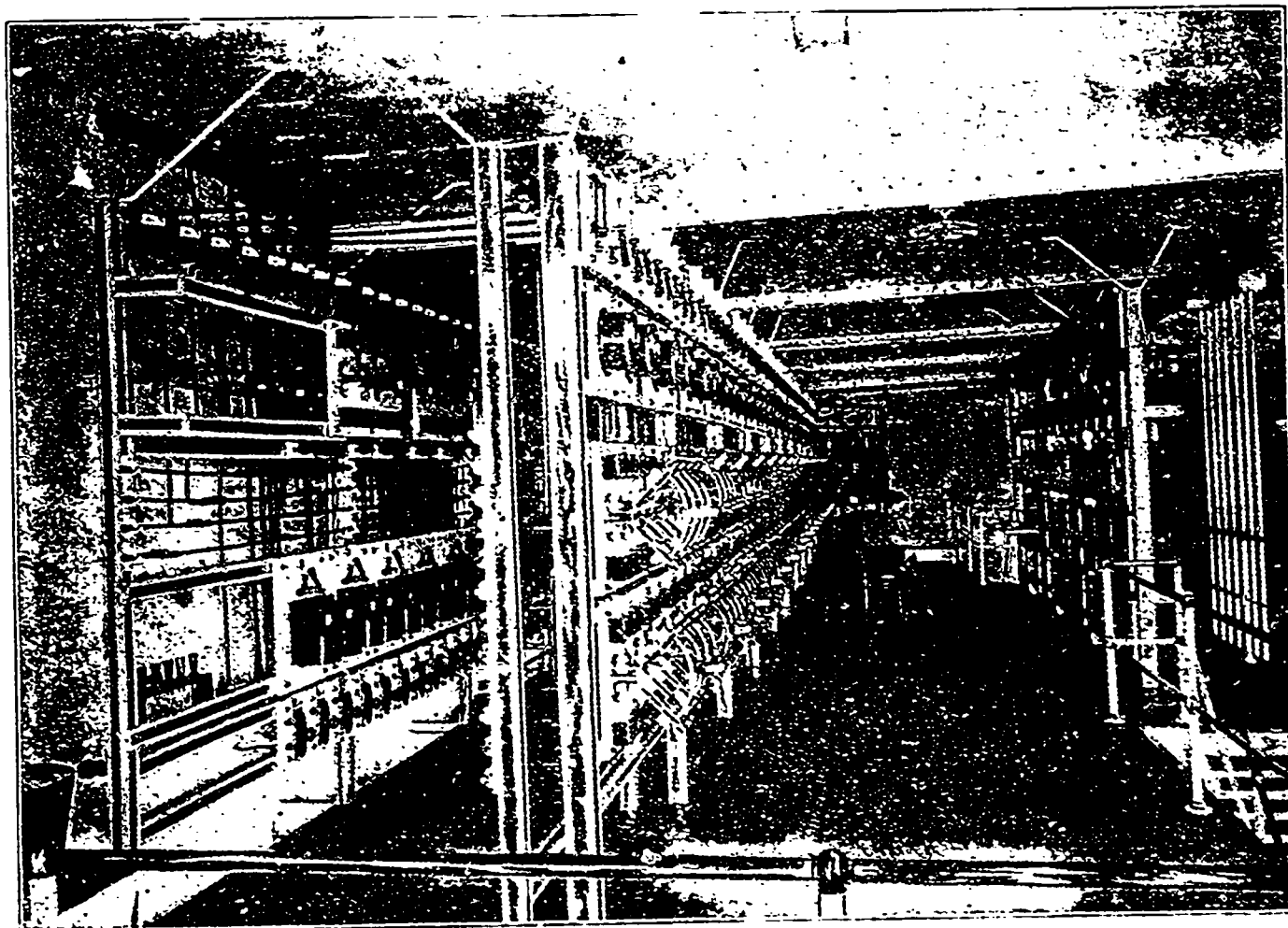
After getting the lines in shape attention was next directed to constructing a new switchboard and installing new alternators.

Diagrams 1 and 2 show the generating plant prior to its reconstruction, occupying two flats. Diagram 3 represents the generating plant as it at present exists, occupying one instead of two flats—eighteen old generators being replaced by five 300 k.w. generators of the S. K. C. inductor type, the latter being belted directly to the engines. Also, in diagram 3 is shown the outline of the new switchboard, located overlooking the generator and engine room.

The five 300 k.w. S. K. C. two phase generators were built in the manufacturing department of the Royal Electric Company. To utilize the engines in their existing condition it was necessary to have the shafts of the two alternators for No. 1 engine rigidly connected, also the shafts of the alternators for No. 3 engine rigidly connected. The machines on No. 1 engine are run in parallel, also the two in No. 3 engine are run in parallel. This arrangement practically makes 600 k.w. units on both of these engines, at the same time having the many advantages of being able to subdivide these units and have four independent alternators.

upper flat which had previously been run by No. 3 engine. By this time the fall load was near at hand with the new machines yet to be installed on No. 1 engine. This was an unpleasant fact confronting us at this time, and it was a great temptation to allow the old equipment to remain on No. 1 engine until spring, but the saving sure to follow the installation of new generators on this engine made it advisable to complete the reconstruction. The load had increased to such an extent that it was not safe to be without at least, part of the capacity of No. 1 engine at all times. To provide for this there was installed, to be run temporarily from No. 1 engine, one 300 k.w. generator, and later, owing to a heavy increase in load, one 180 k.w. generator, both belted directly to the engine and running with very short centres to allow of the new generators intended to be run regularly from this same engine being placed in their proper positions, in line with the generators connected to No. 2 and No. 3 engines.

During the time of installing the new generators there was also



Main Distributing Switch-Board, Royal Electric Company's Alternating Current Lighting Station, Montreal.

Due to the crowded condition of the station prior to reconstruction, the installing of the new machines and construction of the new switchboard, at the same time maintaining continuous service, introduced many conditions and difficulties not encountered in the erection of a new station. All of the available space being occupied by old equipment it was not possible to first install new apparatus to replace that which was to be removed. It was therefore necessary before beginning the station reconstruction to await such time as the capacity of one of the engines could be dispensed with, with the least danger of running short of capacity in case of accident to one of the other engines.

To have at all times sufficient capacity to meet the requirements and at the same time to have spare capacity for emergencies was of course the difficult part of the reconstruction.

Work was commenced in the station by the removal of the old equipment connected to No. 2 engine and replacing it by one 300 k.w. S.K.C. generator. The apparatus connected to No. 3 engine was next replaced by two 300 k.w. S. K. C. generators. No. 4 engine was then reconnected to part of the line shafting on the

being constructed the new switchboard. From the diagrams it will be seen that the location of the new board brought it directly over several of the old generators, and the close quarters in which the work was done in the station will be appreciated from the statement that the iron framework supporting the floor of the board cleared the eye bolts on top of these old machines, still operating, by only six inches.

The installation of the five 300 k. w. generators was completed by the middle of October just at the beginning of the heavy winter load, and the new two phase board was completed about the same time.

The transferring of the service from the old to the new switchboard transformed the entire alternating system from a single to a two-phase system. The operation of transferring the circuits from the old to the new board was, of course, made with all circuits alive and while this transfer would not have been a particularly difficult operation with the service "dead," the transferring without any interruption to the service was a rather ticklish undertaking. It was made in the day time, within a period of ten hours,

without any interruption to the service or inconvenience to the customers, in fact, they were not aware at any time of the changes taking place in the station.

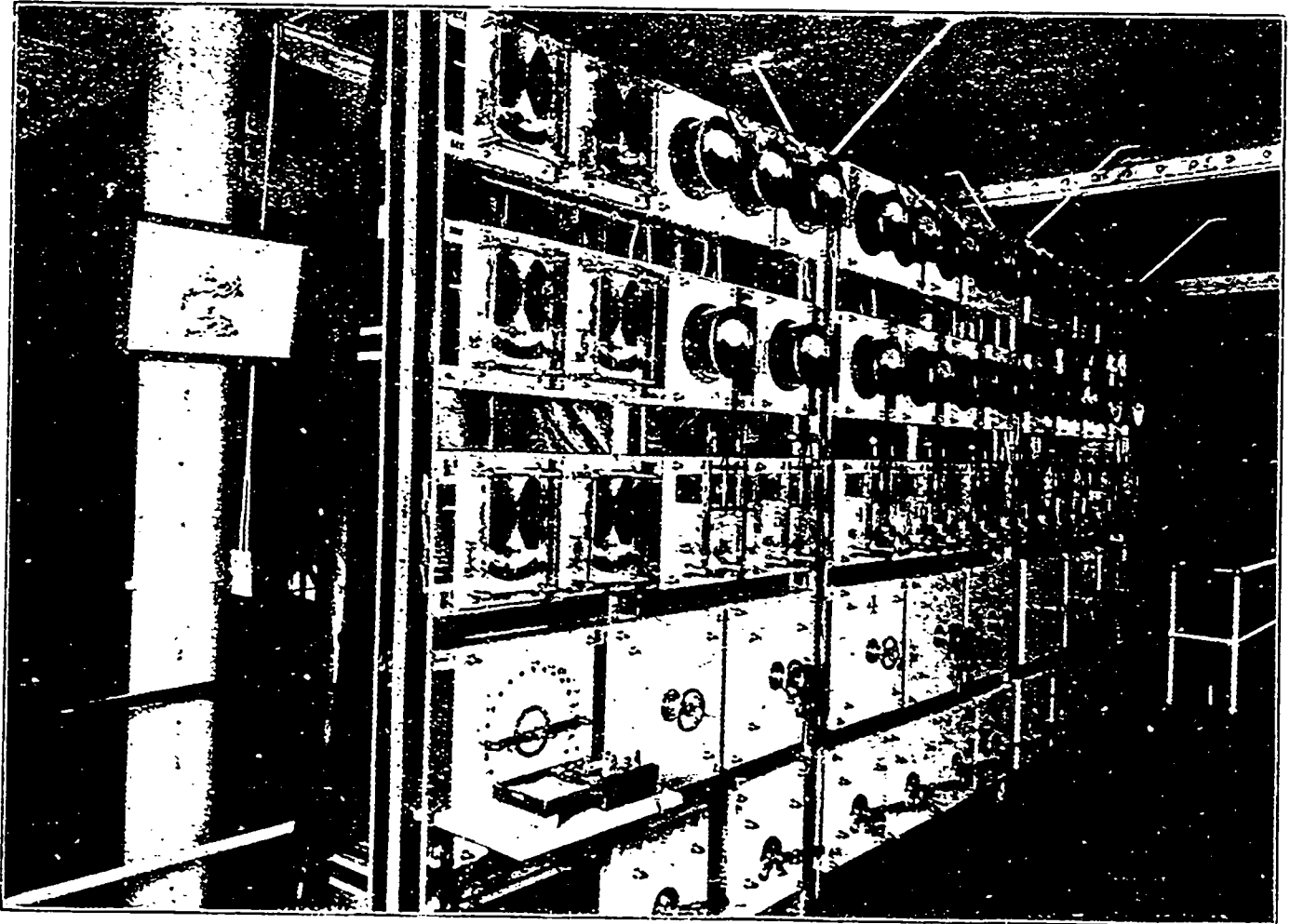
Cut 2 represents the generator board and cut 3 represents the circuit board and the terminal board of the new switchboard. The board has been designed on the "universal combination" plan, by means of which there is a universal interchangeability of circuits, dynamo and exciter connections, enabling any circuit to be operated from any generator, and any generator to be excited from any exciter.

Diagram 4 shows the arrangement of switches, rheostats, and instruments on the generator board. The instruments on the top row, excepting the three mounted on single bases, are voltmeters, there being one for each phase of each generator; the single instruments are ammeters in the exciter circuits. Below these are the generator ammeters and switches, there being one for each phase of each generator. The two lower rows show the rheostats and exciter switches.

board, shown in diagram 3, directly in front of the driving belts of the engines, is of course not desirable, but it was the only available space. There have been erected heavy wrought iron bars immediately in front of the belts for protecting the board in the event of a driving belt breaking.

The framework of the switchboard consists of seasoned white oak, over which is a layer of asbestos, and over this two layers of mica, the edges of this framework being protected for mechanical purposes with fibre angles. This character of framework for switchboards was first used in the construction of the switchboard of the United Electric Light and Power Company, New York City, and after that company had made extensive experiments with iron and frame switchboard construction. It is practically fireproof as well as being a good insulator, and from the severe tests during the past four years which it has withstood, there are reasons to believe that it is a very superior and satisfactory framework for switchboards.

The switches, fuse blocks, etc., are of the standard S.K.C. type.



Generator Switch-Board, Royal Electric Company's Alternating Current Lighting Station, Montreal.

The circuit board consists of two rows of four-pole switches, two switches being required for each circuit. These switches are so connected that by a single throw of one switch a circuit can be connected to any generator. Above the rows of switches are mounted ammeters, one ammeter for each phase of each circuit, and above the ammeters are fuse blocks.

In the rear of the circuit board is the terminal board, on which are mounted a single row of four-pole switches, one switch for each circuit, and an auxiliary set of buss bars, and below these a row of recording meters. By means of these auxiliary switches and buss bars any circuit panel or panels on the main circuit board can be cut "dead" and the circuit or circuits transferred to the terminal board. As the buss bars on the latter can be connected to any alternator, the terminal board duplicates to a great extent the circuit board and generator board. During the day the entire output can be handled from the terminal board.

Diagram 5 gives a floor plan of the switchboard and detail of iron framework supporting the slate floor. The location of the switch-

They are independently mounted on the switchboard, which permits of great interchangeability of all parts of the board.

From the preceding account it will be noted that every part of the alternating system of the Royal Electric Company was rearranged and redesigned. The lines and circuits were rearranged to overcome objectionable inductive effects and to transform them from single to double phase circuits. One thousand one hundred and sixty-one old transformers were replaced by 628 new transformers with a reduction in leakage load of 245 amperes. Eighteen old style single phase generators, with their revolving wire on the armatures, collector brushes and rings, their numerous belts, pulleys and line shaftings, were replaced by five S.K.C. generators of the inductor two phase type, the latter being belted directly to the engines. The old wooden single phase board was replaced by a new fireproof two phase board to distribute current for light and power from the same circuit.

All of this reconstruction has been designed and carried out on plans which adapt the system to be served either from its existing

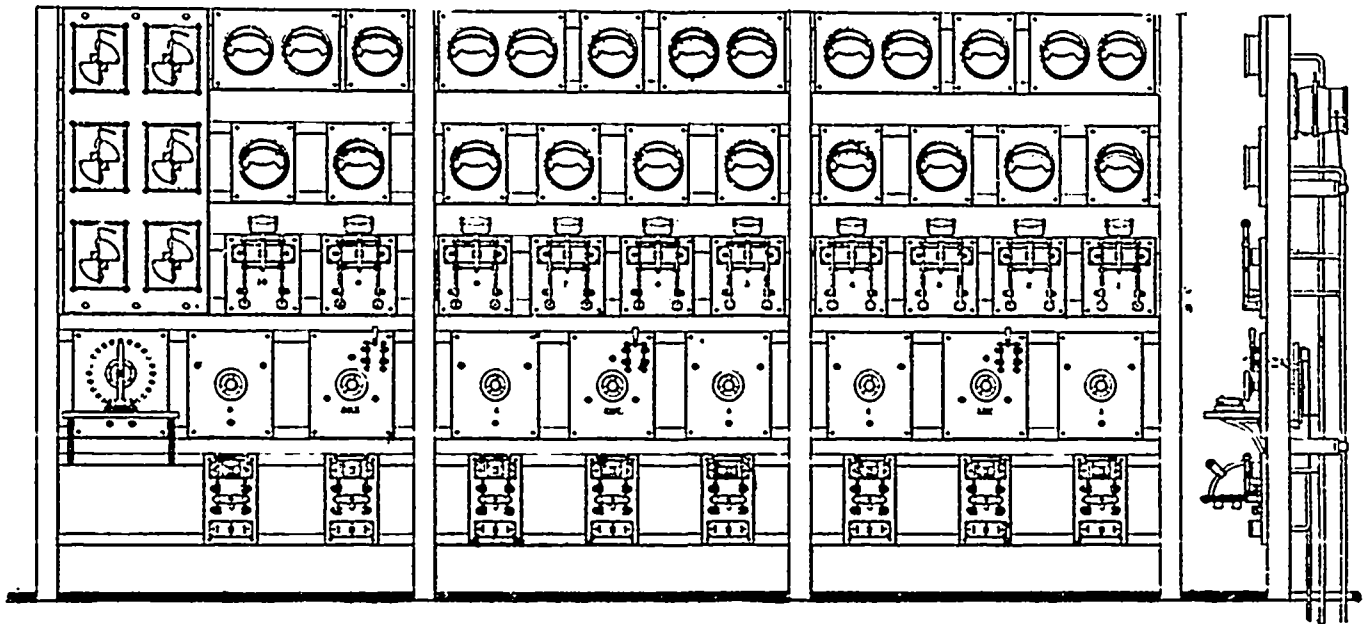


DIAGRAM NO. 4.

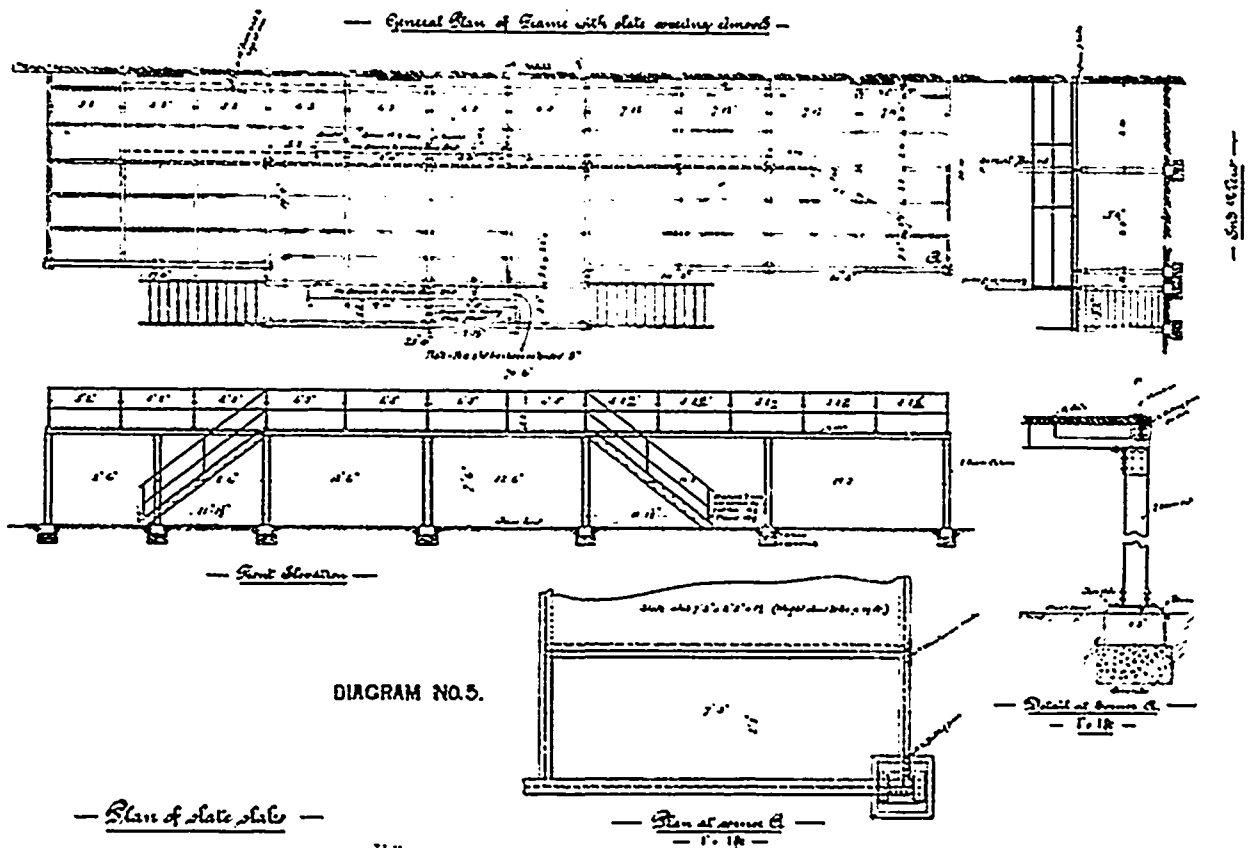
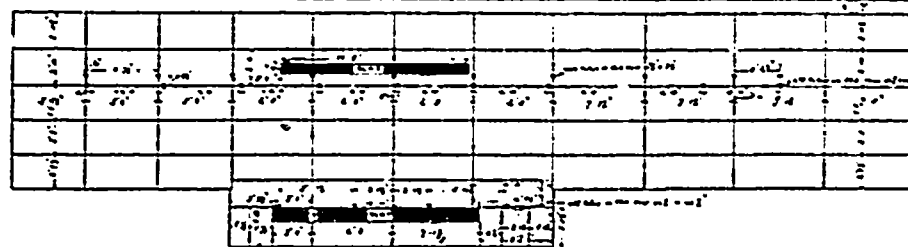


DIAGRAM NO. 5.

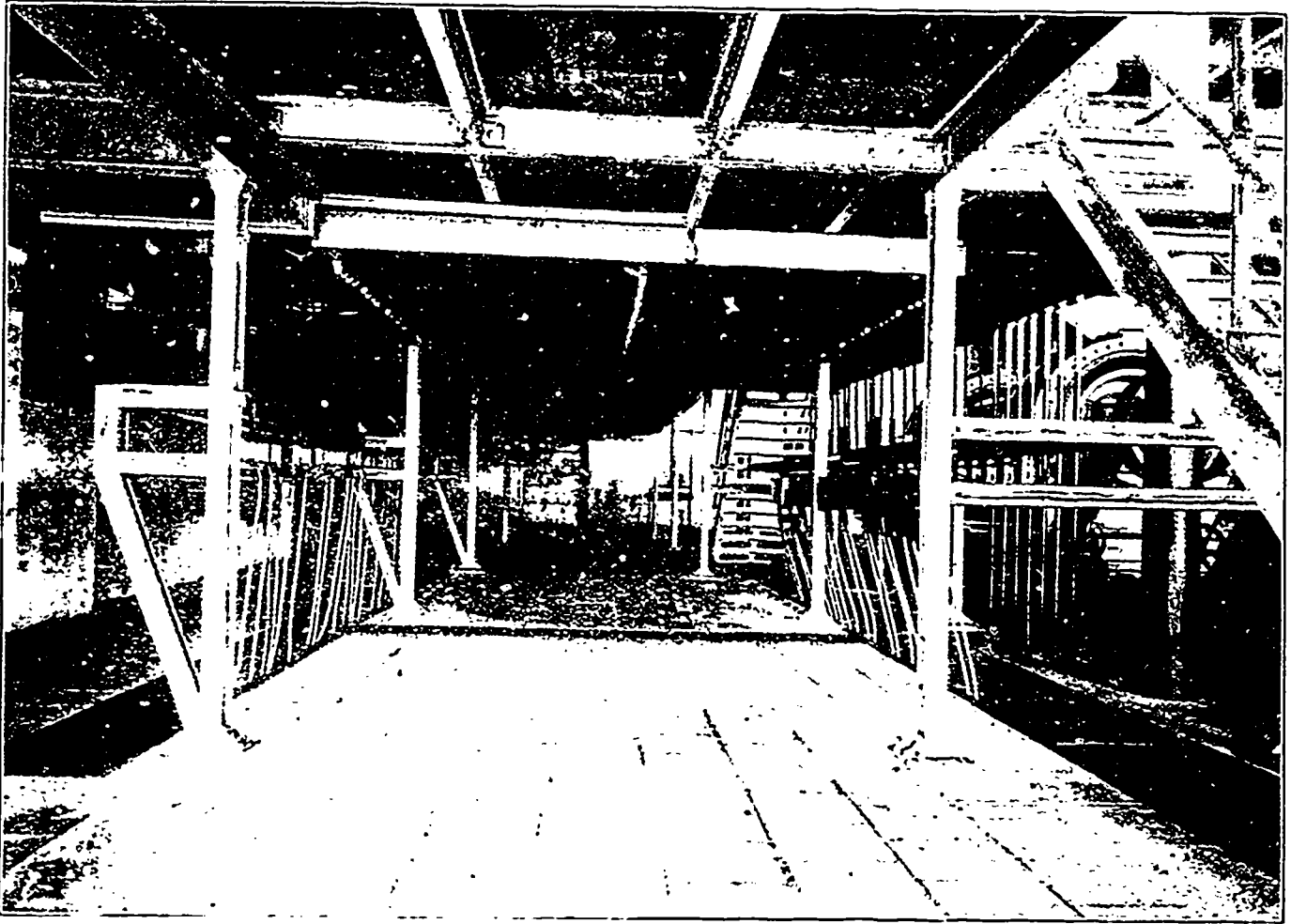


Plans and Diagrams of New Switch-Board in Royal Electric Company's Alternating Current Lighting Station, Montreal.

steam plant or from the Chambly water power plant. Upon the delivery of power from Chambly, the five k.w. generators recently installed will be used as synchronous motors, from which will be operated the D.C. arc machines.

The system affected by the above-described changes, operating

for five months under the old conditions, from Oct. 1, '94, to March 1, '95, consumed 2,931 tons of coal more than was consumed in the five months from Oct. 1, '96, to March 1, '97, the number of incandescent lights being 10,200 more during the latter than during the former period.



Space Underneath Switch-Board, Showing Wires from Generators, Royal Electric Company's Alternating Lighting Station, Montreal.

THE TARIFF COMMISSION AT MONTREAL.

(Continued from last issue).

WATCH CASES.

The next item is watch movements and watch cases. These gentlemen have tried to convince you that twenty-five per cent. duty on watches does not encourage smuggling at all, but ten per cent. duty on diamonds is a direct incentive to smuggling. I say in that case people would go to Europe to buy their diamonds. There are a thousands men who want to import a watch and there are thousands of men who use watches to one who wears a diamond. Watches are smuggled a thousand times easier than diamonds, and because we import watches from just across the line, and where we can buy watches twenty-five per cent. less than we can buy them here.

A voice—No, no.

Mr. Doll—I have a watch in my hand which cost \$250. It was made in Switzerland. If this watch was not smuggled in, then the importer paid twenty-five per cent. duty. Now that watch goes into one's pocket just as easily as a diamond, in fact, you can put four of them in your vest pockets and a dozen of them on your person. The duty on four of these watches alone would pay your passage to Europe, and enable you to have a good time of it besides. Now, gentlemen, do you think there is much duty collected on watches and movements? They say that ten per cent. duty is all right on movements—if you raise the movements above ten per cent. you cannot collect the duty. They say we do not pay but five per cent. really now, because the American manufacturer gives the American importer a rebate of five per cent. which really gives the Canadian

jobber this five per cent. of what the American jobber is paid. I say if the Canadian jobber gets five per cent. if you raise the duty to fifteen per cent. the American manufacturer will still pay half the duty. We will get a good revenue and the goods cost very little more. They say the people are satisfied with the duty on watch cases. Then why is it that I have a number of letters here from several retail jewelers expressing a very decided opinion on the matter?

Diamonds should bear a duty, and for this reason the United States Government collected in 1892 under a tariff of ten per cent. duty on over \$16,000,000 worth of diamonds, and the year before they collected duty on \$12,000,000; but they could not and did not, collect the proper proportion of revenue, when the tariff was twenty-five per cent. Now, surely we Canadians are as honest as the Americans, and if we are as honest the Government will certainly be able to collect ten per cent. on diamonds as well as the Americans do.

(To be continued in next issue).

The Metallic Roofing Company have just been awarded the contract for the sheet metal work for the large block of stores at present being erected in Fort William, Ont., for Jos. G. King, Esq., covering 100 x 100 feet. This will be the finest block of stores in that thriving Western town, having a most imposing front, three stories high by 100 feet wide, which will be entirely constructed of galvanized iron made to details prepared by the architects. The exterior will be covered with "special" single stone rock, faced siding in different sized courses, while the interior will be finished with embossed steel ceiling.

Why not Get The Best?

If you are paying more for LEATHER BELTING than we charge, you are paying too much.

If you are paying less than we sell at you are not obtaining as good a quality.

SADLER & HAWORTH.

FACTORIES AT

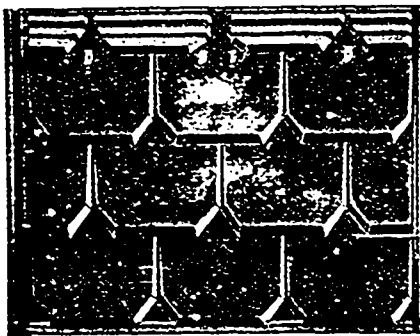
511-513-515 WILLIAM ST. MONTREAL. 9 & 11 JORDAN ST. TORONTO.

Hayes' Patent Steel Lathing

"UNQUESTIONABLY THE BEST FIRE-PROOF LATHING YET PRODUCED"

FOR BUILDINGS OF EVERY DESCRIPTION ALSO BOILERS, HOT AIR FURNACES, FLUES &c.

USED IN DOMINION BANK, BOARD OF TRADE, CONFEDERATION LIFE AND TORONTO UNIVERSITY BUILDINGS, TORONTO. Send for Sample and Price List.



Eastlake Steel Shingles

STEEL	PRESSED	BRICK	
MFD. BY			
THE METALLIC ROOFING CO.			
TORONTO		ONT.	
SEND FOR CIRCULAR			

FIRE, LIGHTNING AND STORM-PROOF, DURABLE, ORNAMENTAL AND CHEAP

WHEN APPLIED OVER A LAYER OF PAPER IS WARMER AND DRYER THAN BRICK VENEER.

Write for prices and ask for Catalogue "O."

METALLIC ROOFING CO., Ltd., Manufacturers,

TORONTO

CAPTAINS OF INDUSTRY.

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

If a new manufacturing enterprise of any kind is being started, or an electric lighting plant instituted, or an electric railroad, or a telephone, or a telegraph line is being constructed; or a saw mill, a woolen, cotton, or knitting mill; or if any industrial establishment has been destroyed by fire with a probability of its being rebuilt, our friends should understand that possibly there may be something in the event for them. Do you catch on to the idea?

The starting of any such concern means a demand for some sort of machines, machinery, or supplies, such as steam engines and boilers, shafting, pulleys, belting, lubricants, machinery supplies, wood or iron working machinery, ventilating and drying apparatus; pumps, valves, packing, dynamos, motors, wire, arc and incandescent lamps, and an infinite variety of electrical supplies, chemicals, acids, alkalis, etc. It is well worth the while of every reader of the Canadian Manufacturer to closely inspect all items under the head of Captains of Industry.

Messrs. D. L. Shannon & Co., saw mill, Prince Albert, Sask., have sold out to S. McLeod.

The Windsor Specialty Manufacturing Company, Windsor, Ont., is being incorporated with a capital stock of \$10,000, to manufacture novelties, etc.

Waterloo, Ont., is to be lighted by electricity, to be furnished by the Waterloo Manufacturing Company.

The Jenckes Machine Company, Sherbrooke, Que., recently received an order for a car load of machinery for a new pulp mill at Chicoutimi, Que.

The Automatic Can Company's factory at New Westminster, B.C., has been completed. It has a capacity of 150,000 cans per day.

The Globe flour mills, Cornwall, Ont., were burned April 8th. Loss about \$20,000.

The Waterloo Manufacturing Company's factory at Waterloo, Ont., was damaged by fire, March 28th to the extent of about \$3,000.

The Buffalo Forge Company, Buffalo, N.Y., report that this season their orders for induced draft for boilers on shipboard exceed those of any previous season thus far. They recently received and shipped an order for a large outfit for a French steamer. They inform us that within the past ten years, mechanical draft apparatus, both of the forced and induced type has rapidly grown into popular favor,—that before that time induced draft was scarcely known and that with its attendant short stack, it is to-day considered essential for nearly every large boiler plant and in many instances adopted in preference to the high chimney.

We are in receipt of a handsome calendar from the Canadian General Electric Company, Toronto, and although late in arriving is much appreciated. This company manufactures all kinds of electric railway and lighting apparatus and supplies; direct current incandescent generators; alternating current single phase monophase and three phase generators; induction motors, transformers, lamps; sockets, fan motors, etc. Besides being a good calendar for 1897 a table of dimensions and resistances of copper wire and another of equivalents of wires are given.

THE - - - -

WM. HAMILTON MANUFACTURING CO., Ltd.

MANUFACTURERS OF

THE "RELIANCE"

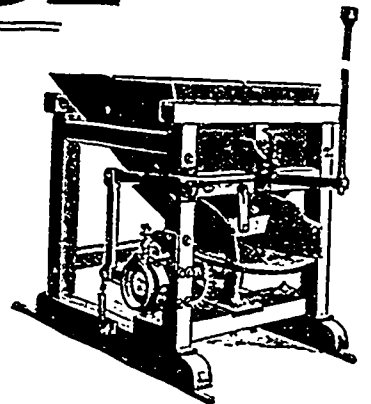
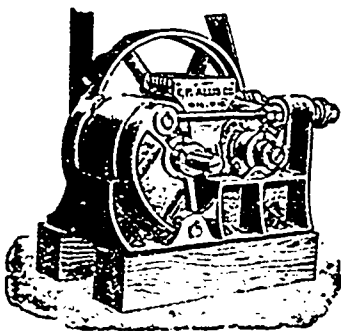
Mining, Milling

AND

Smelting Machinery

FOR THE DOMINION OF CANADA

(Under License from The E. P. ALLIS CO., Milwaukee, Wis.)



Crushers, Rolls, Jigs, Concentrators, Screens, Stamps, Pumps
Compressors, Hoists, Boilers, Engines, Water Wheels, Etc.

Branch Office

VANCOUVER, B.C.

 PETERBOROUGH, ONT.

The Maritime Pure Food Company, Woodstock, N.B., is being incorporated with a capital stock of \$30,000, to erect factories for the curing, packing, cold storing, etc., of fruits, meats and vegetables.

The Attercliffe Station Natural Gas Company, Attercliffe Station, Ont., has been incorporated with a capital stock of \$2,000.

The Latimer Carriage and Implement Company, Montreal, is being incorporated with a capital stock of \$40,000, to manufacture vehicles and implements of all kinds.

The Reinhardt Manufacturing Company's premises, Montreal, manufacturers of jewel cases, brushes, etc., were damaged by fire March 26th, to the extent of about \$10,000.

Mr. Wm. Thuburn, Almonte, Ont., has recently added a large number of broad looms to his flannel mill.

The machinery is being removed from the sugar beet factory at Farnham, Que., to Rome, N.J.

Messrs. Fraser Bros. New Glasgow, N.S., have recently filled the following orders for mining machinery. A crusher and engine for the New Glasgow Mining Company's mill at Goldenville, N.S.; a crusher and hoisting gear for the Bluenose Mining Company at the same place, and a crusher and engine for the mines at Country Harbor. They are now engaged upon the manufacture of a ten-stamp mill, engine and crusher for the New Glasgow Co's mill.

The Niagara Falls Acetylene Gas Machine Company has been incorporated with a capital stock of \$24,000.

The Locked Wire Fence Company, Ingersoll, Ont., will engage in the manufacture of metallic shingles, siding and ceiling.

Preparations are being made for the construction of a fifty-stamp reduction mill at the Dick and Banning Water Power, Keewatin, Ont., and work will be commenced at once.

The Delaware and Mount Brydges Oil and Gas Company, Mount Brydges, Ont., has been incorporated with a capital stock of \$10,000, to prospect and drill for petroleum and gas.

The Biscotasing Improvement Company, Pembroke, Ont., is being incorporated with a capital stock of \$15,000 for constructing dams, slides, etc., on the head waters of the Spanish River, Ont.

The Middlemiss Oil Company, Middlemiss, Ont., has been incorporated with a capital stock of \$2,000, to drill for gas and petroleum.

The Electrical Construction Company, London, Ont., has been incorporated with a capital stock of \$45,000 to take over the business of the London Electric Motor Co., of that place.

Wm. J. Matheson & Co's bulletins No. 53-54 have been received. The former shows dyings of wool blacks, and the latter several shades of hemolin, morn yellow and alizarine red on wool. Samples may be had by addressing Wm. J. Matheson & Co., 178 Front street, New York.

The Wallaceburg, Ont., Board of Trade has appointed a committee to promote an electric road from that town to Chatham.

Right of way has been secured for nearly the whole length of the Slocan River line, a branch for which the C.P.R. are asking tenders, and grading will begin as soon as the frost is out of the ground.

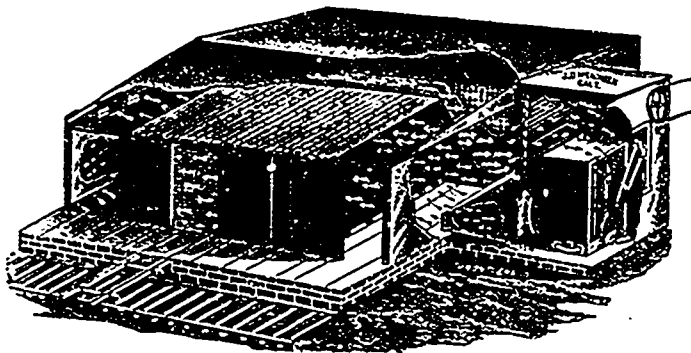
Mr. Herrick Rocho, of Kingston, Ont., claims to have invented an arrangement by which motormen can run street cars on to switches without the use of the switch now in universal use.

The London Electric Motor Company has recently installed the following motors in Toronto: a ten h. p. motor for Norway Cabinet Co., 219 and 221 Queen street East, and a two h. p. motor for Mr. Wilcocks, corner Dufferin and Dundas streets.

The Toronto Carpet Manufacturing Company has already taken steps to add its quota to the celebration of the Queen's diamond jubilee, and have prepared an exceedingly handsome "Jubilee rug." In the centre there is a wreath of the rose, shamrock and thistle, with the crown over all, supported on either side by Union Jacks floating over a sea-colored ground. In the centre of the wreath is "37-97." In each corner is a shield, the legends being "India," "Australia," "Canada," "Cape," representing the defence of the Empire by colonies in the four quarters of the world. A border of maple leaves forms the groundwork. The name "Victoria," forms the base of the whole. The design and coloring are the work of the company's own resident designer Mr. Leslie Jones, who is the winner of a Queen's prize out of 3,700 competitors in the national art examinations in monochrome painting in May, 1895, and also a holder of twenty-three certificates of the art and science department of the South Kensington School of Art and Design. The quality of the carpet in the rug is exceedingly fine. It is a very fine grade of Axminster, giving a close velvet surface and a fine well-woven wool back.

McEachren's System of Drying, Heating and Ventilating

Under Recent Patents.



In construction and process of drying this Kiln differs widely from all others in use. They have given entire satisfaction where all others Dry Kilns have failed. They will season More Lumber in a Given Time, with a given heating surface and a given quantity of steam than any other Kiln now in the market. Their construction and mode of operating is such as to season lumber without Case Hardening, Checking or Warping. They work equally well on Lumber Right from the Saw and on Air Seasoned Lumber, the only difference being that one takes a little more time than the other. By a Peculiar Arrangement Found Only In Our Dry Kilns we extract the moisture from the heated air, return it through the heater again and thus preserve the heat passing from the Kiln instead of wasting it as is the rule with all other Blast Kilns.

Ventilating Fans, Shaving Fans, Pressure Fans, all sizes.

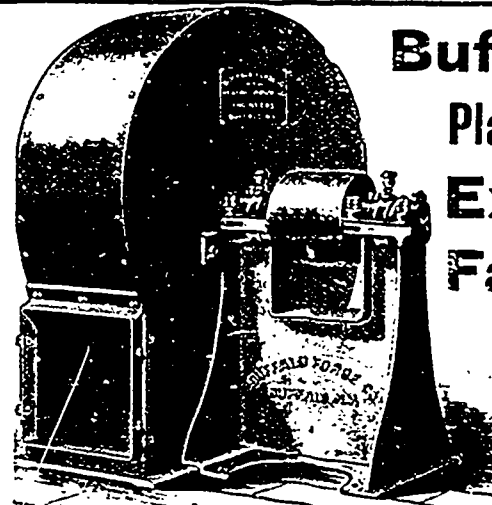
BLAST HEATING SYSTEM FOR LARGE BUILDINGS

Little Wonder Boiler and new Hot Water Heating System half price of usual hot water system. STEAM BOILER CLEANERS, Feed Water Heaters covered by Patents of recent date in Canada and United States.

Second-hand Heaters and Fans made by the best American Manufacturers, only in use a short time, for sale at great reduction. Send for Illustrated Catalogue and Prices to

McEACHREN HEATING & VENTILATING CO.

GALT, ONT.



Buffalo Planing Mill Exhaust Fans

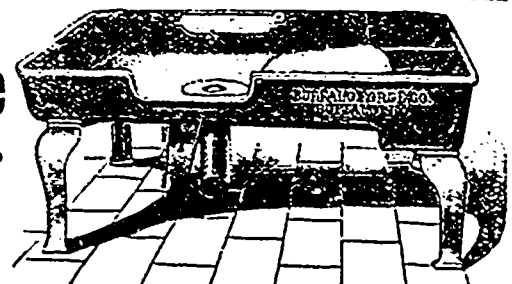
EFFICIENCY
UNEQUALLED
DURABILITY
UNSURPASSED
SMOOTH
RUNNING
INCOMPARABLE

THE LARGEST

Forge

IN THE WORLD

Thirty-Eight other Designs of Portable and Stationary Types.



BUFFALO LUMBER DRY KILNS

Blowers, Blacksmiths' Tools, etc.

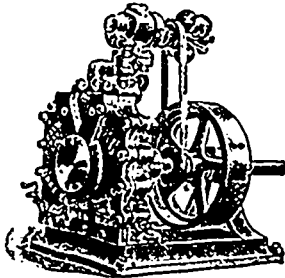
SOLD IN

Toronto, Ont., by H. W. Patrie.
Brantford, Ont., by Canadian Machinery and Supply Co.
Montreal, Que., by Canada Machinery Agency.
Chicago Store, 22 and 24 West Randolph Street
New York Office—26 Cortland Street

A. C. NEFF
 CHARTERED ACCOUNTANT
 AUDITOR, ASSIGNEE, ETC.
 28 Wellington St. E., Toronto
 Audits and Investigations a Specialty.

The Dake Engine

For Running Dynamos in



Small Isolated Plants

CONTRACTORS' HOISTS

STEADY AND EVEN MOTION,

ALSO FOR

Attachment Direct to Fans, Blowers, Centrifugal Pumps, Stokers, Steering Gear, Etc.

Correspondence Solicited.

Phelps Machine Co'y,
 EASTMAN, P.Q.

BOILERS

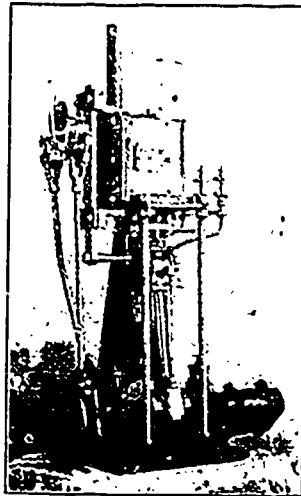
You Want Them
 We Make Them

WRITE FOR PRICES

BANNERMAN & FINDLATER,
 Boiler Makers, OTTAWA, ONT.

ALBERT BELL

DUNNVILLE, ONT.



Maker of

YACHT ENGINES, 1 H.P. to 50 H.P.
Safety Water Tube BOILERS
PROPELLER WHEELS
Stationary Engines and Boilers

WRITE FOR CIRCULARS

Kemp Mfg. Co.

TORONTO.

Galvanized Steel Pails

FOR FIRE PURPOSES ONLY.
 NO HOOPS TO FALL OFF.

PRICES ON APPLICATION.

The Mechanics Manufacturing Co., Summerside, P.E.I., will shortly commence the manufacture of woodenware.

The Hamilton Iron Mining Company, Hamilton, Ont., is being incorporated with a capital stock of \$90,000, to carry on the business of a mining and reduction company.

The Ball Nozzle Company, with headquarters at Toronto, is being incorporated to manufacture nozzles and all kinds of appliances for fire extinguishers, etc.

The assets of Messrs. Dalgleish, Paterson & Barrett, woollen manufacturers, Campbellford, Ont., have been sold to Geo. Dalgleish who continues the business.

Messrs. Tromblay and Gingras have commenced the manufacture of sash and doors at Maisonneuve, Que.

ALGOMA IRON WORKS

SAULT STE. MARIE, ONT.

Engineers
Founders

AND

Machinists

PULP AND PAPER MILL

AND

MINING MACHINERY

DESIGNED, CONSTRUCTED and REPAIRED

RHODE ISLAND HORSE SHOES

Cut Nails

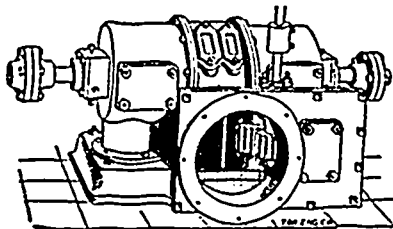
Bar Iron and Steel

Railway Spikes

Pressed Spikes

Washers

ABBOTT & CO., - MONTREAL



Horizontal Type.

"LITTLE GIANT" TURBINE

...FOR ALL PURPOSES...

HORIZONTAL AND VERTICAL.
 BUILT IN 44 SIZES.

We guarantee a higher percentage of power from water used than any other wheel on the market.

Water Wheel Governors, Machine Dressed Gearing, Pulleys, Shafting and Bearings.
 Catalogue and Gear List mailed on application. Correspondence Solicited.

J. C. WILSON & CO., - - GLENORA, ONT.

Canada Chemical Manufacturing Co.

Manufacturers of

Sulphuric, Nitric, and Muriatic Acids — Commercial and Chemically Pure.

Mixed Acids for Explosives.

Liquid Ammonia, Glauber Salts, Copperas, Muriate Tin,

Tin Crystals, Acetic Acid, Nitrate Iron, Bisulphite Soda,

Acid Phosphate for Baking Powders and General Chemicals.

Fertilizers, etc.

LONDON
 ONT.

The Campbell Logging Company, New Westminster, B.C., is being incorporated with a capital stock of \$10,000.

The British Columbia Stock Exchange of Rosland, B.C., is being incorporated with a capital stock of \$5,000.

The Milwaukee Brewing Company, Victoria, B.C., is being incorporated with a capital stock of \$20,000.

The Watson-Foster Company, Maisonneuve, Que., is being incorporated with a capital stock of \$450,000 to manufacture paper hangings and colors, glue, pulp, paper, etc.

Messrs. T. T. Shurtleff and C. A. Fox, Coaticooke, Que., have registered a partnership as the Barnston Woollen Company. The firm will manufacture woollen goods.

The patent rights for Europe for the Doherty process of casting and hardening iron, discovered by Thos. Doherty, of Sarnia, Ont., has been sold, to an English company, for £100,000.

Work has commenced on the construction of the new C.P.R. elevator at Owen Sound, Ont.

W. O. Morse, manufacturer of mineral paints, Walsingham Centre, Ont., has been succeeded by Chas. M. Hazen.

The Portland Packing Company's lobster factory at Canso, N.S., was destroyed by fire April 5th.

The Sherbrooke (Que.) Street Railway Company have purchased one-half the water-power, on the Magog River, from the dam used by the Gardner Tool Company.

**BREWERS
COPPER
WORK**

Brewing Kettles, Boiling Coils,
Beer Coolers, Attempartors
Spargers, etc., etc.

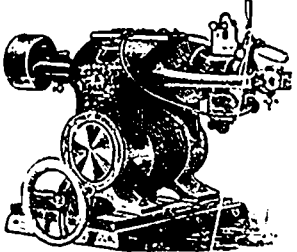
—THE—
BOOTH COPPER CO.
LIMITED,
TORONTO, ONT.
Established 1854.

**VALVES AND
PIPE . . .
FITTINGS**

WRITE FOR LATEST PRICES

**RICE LEWIS
& SON, Ltd.**
Corner King and Victoria
Streets
TORONTO

**ELECTRIC
BARGAINS**

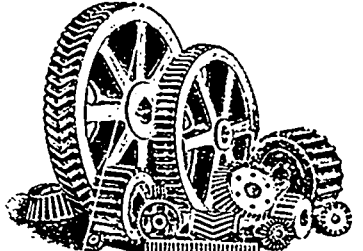


Two Incandescent and one Arc
Dynamo, in perfect condition,
for sale at a sacrifice.

We also Manufacture a complete line of
**MOTORS,
DYNAMOS
and PLATERS.**
WRITE FOR PRICES.

THE JONES & MOORE ELECTRIC CO.
22 Adelaide Street West
TORONTO.

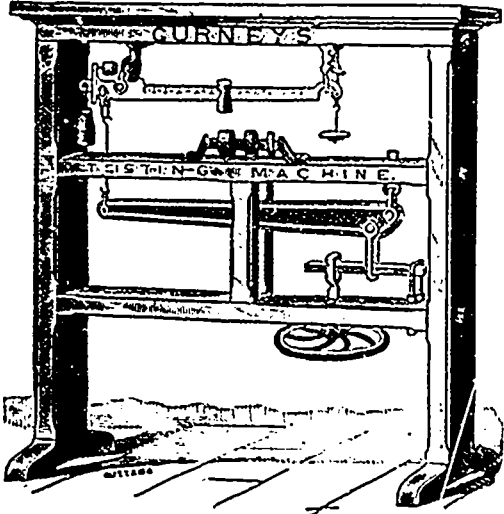
**THE DOWNER PATTERN WORKS, J. M. DOWNER,
Prop.**



Patterns and Models in wood or metal of
every description made to order. The largest
and best equipped pattern shop in Canada,
and employing the largest staff of skilled work-
men of any one in the trade. Telephone 2672.
89 Wellington St. W., TORONTO.

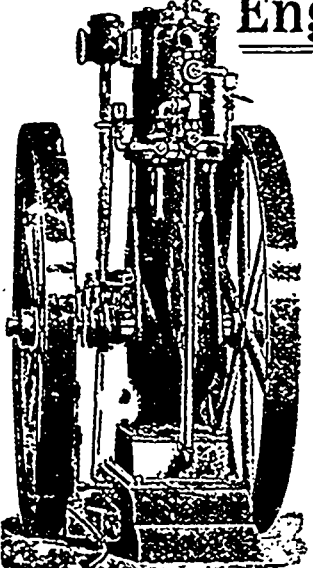
FOUNDRYMAN'S TESTING MACHINE

A Durable and Effective
Machine for the Use of Foundry-
men in Testing the Strength
of Best Iron, and
ascertaining the Best Mixture
of Iron for any work,
thus showing positively which is
the Best Iron for the Re-
quirements.
Can be done in a few minutes.
...
SUBSTANTIALLY CONSTRUCTED.
HIGHEST CLASS OF
WORKMANSHIP.
CAPACITY, 5,000 POUNDS.
...



Manufactured by... **THE GURNEY SCALE CO., Hamilton, Ont.**

**THE ELECTRICAL GAS OR GASOLINE...
Engine**



WRITE
FOR
PRICES
AND
TESTI-
MONIALS

J. R. BAIRD
WOODSTOCK, - - - ONTARIO

A return brought down in parliament recently shows that the bounties paid on iron and steel manufactured from Canadian ore since February of last year is as follows:— On pig iron, 42,404 tons, \$84,809; iron puddled bars, 4,353 tons, \$8,708; steel billets, 35,757 tons, \$71,514.

Messrs. A. B. Jardine & Co., manufacturers of machinist's taps, tube expanders and blacksmith's tools, Hespeler, Ont., have sent us their illustrated catalogue. Among the articles manufactured by this firm may be mentioned Jardine's patent extension and self-feeding expander, Dudgeon pattern tube expander, taper reamers, bolt clippers, axle straightener and setter, Jardine axle cutter, universal grinder, hand drilling machine, etc.

Wm. Jack's sash and door factory at Do Cowsville, Ont., was destroyed by fire April 5th. Loss about \$5,000.

Messrs Goldie & McCulloch, Galt, Ont., supplied a 150 h.p. engine for the new G. T. R. shops at London, Ont.

The John McPherson Company of Hamilton, Hamilton, Ont., has been incorporated with a capital stock of \$100,000 to take over the business hitherto carried on by John McPherson & Co, manufacturers of boots and shoes.

The Schultz Bros. Company, Brantford, Ont., is being incorporated with a capital stock of \$90,000, to take over the business heretofore carried on by Messrs. Schultz Bros. as builders and contractors.

The Nova Scotia Steel Company, New Glasgow, N.S., recently made a new tail-shaft for the steamship Grand Lake.

The Hanover Manufacturing Company, Hanover, Ont., is being incorporated with a capital stock of \$20,000, to manufacture furniture of all kinds, woodwork, lumber, etc.

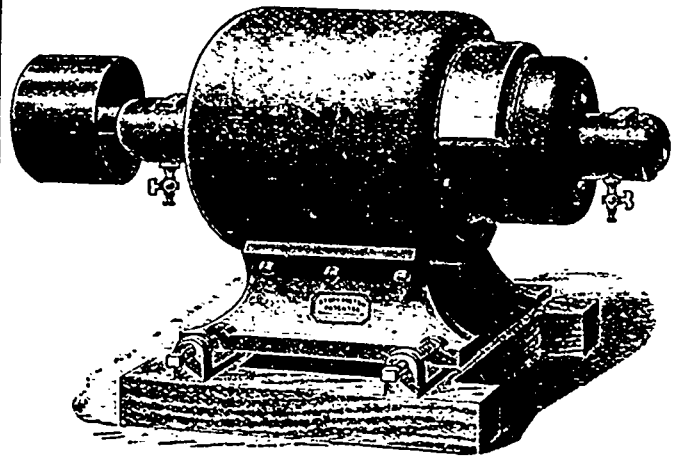
Messrs. Creamer & Gray have opened a machine shop at Qu'Appelle, Assa.

The Central Bridge and Engineering Company, Peterborough, Ont., have secured the contract to build a bridge across the Thames at London, Ont., for the Street Railway company of that city.

A factory for the manufacture of acetylene gas is likely to be erected at Magog, Que.

ARE MANUFACTURED BY

THE Storey Motor and Dynamo

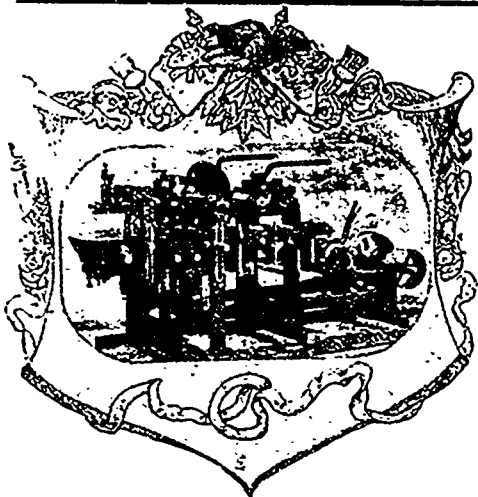


MANUFACTURED BY

THE STOREY MOTOR AND TOOL CO.

John St. North, Hamilton, Can., and Philadelphia.

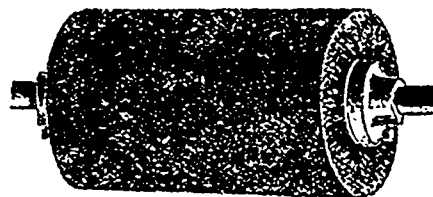
Send for Catalogue.



Wood or Iron-Working Machinery, Engines, Boilers, Motors, Shafting, Etc.

The Toronto Machinery Supply Co., 164 King St. W.

FACTORY BRUSHES



All Kinds of MACHINE BRUSHES Made and Blocks Re-filled.

Highest Quality and Best Workmanship ... Guaranteed.

... CLOSEST POSSIBLE PRICES...

CHARLES BOECKH & SONS, Manufacturers, TORONTO, ONT.



BRASS, BRONZE, PHOSPHOR BRONZE, ALUMINUM BRONZE, COPPER, ZINC and ALUMINUM CASTINGS TO ORDER. Large or Small.

Write for Prices... DEAN BROS., 184 Richmond St. West, Toronto

FERGUSON & PATTINSON

PRESTON, - - ONTARIO.

MANUFACTURERS OF

FINE AND MEDIUM TWEEDS

The Dominion Coal Company, Cape Breton, is shipping coal to London, England.

The McMillan and Haynes Company, St. Catharines, Ont., propose to erect a new saw factory provided no adverse change is made in the tariff.

Messrs. J. Matheson & Co., New Glasgow, N.S., have sent us their 1897 catalogue and price list of shafting, hangers, pulleys, mill supplies, etc. This firm carries a full stock of rubber and leather belting, sight feed lubricators, packing, saws, water wheels, etc.

The Metal Shingle and Siding Company, Preston, Ont., is being incorporated with a capital stock of \$10,000 to manufacture metal roofing, sidings and ceilings, metal cornices, etc., and to acquire the plant and business of The Safe Lock Metal Shingle and Siding Company of Smithville, Ont.

The Cookshire Lumber Company of Cookshire, Que., shipped during February 730 car loads of pulpwood to the United States.

J. H. Larochelle has purchased the boot and shoe factory, machinery, plant, etc., of the Harvey Van Norman Co. at Quebec city.

The Jenckes Machine Company, Sherbrooke, Que., are furnishing a complete outfit of machinery for the Sultana mine, near Rat Portage, Ont. The mill will be built or accommodate fifty stamps.

The Gould Bicycle Company, Brantford, Ont., employ 450 hands and turn out over 100 wheels a day. The business was started in 1887 and then turned out from 200 to 300 wheels a year. The factory is now run twenty-two hours a day to keep up with orders.

H. Baker has purchased the shoddy mill at Stratford from W. S. Duncan.

The Renfrow (Ont.) Town Council will submit a by law to the ratepayers to raise \$72,000 to provide a waterworks and sewerage system.

The McKinnon Dash and Hardware Company's factory at St. Catharines, Ont., was damaged by fire April 3rd to the extent of \$1,000.

The smelter at Trail, B.C., now has a capacity to work up 560 tons of ore per day. A refining plant is also in course of erection which when completed will turn out both gold and silver ready for the mint.

The Watrous Engine Works Company, Brantford, Ont., recently put in a new band mill for S. P. Benjamin, Wolfville, N.S.

HAHLO & LIEBREICH
 Machinery Merchants and Exporters
 BRADFORD, ENG.
 NEW & GOOD SECOND-HAND **WOOLLEN MACHINERY**
 SHAKE WILLEYS, TEAZERS, RAG PICKERS, GARNETTS, AUTOMATIC FEEDS, WASTE CLEANERS, CARDS, CONDENSERS, SELF-ACTING MULES, TWISTERS, LOOMS, HYDRO-EXTRACTORS, SHEARING MACHINES, Etc.
 GOOD Second-Hand COTTON and WORSTED MACHINERY
 BELTING, CARD-CLOTHING, PICKERS, PICKING BANDS, etc.

Dominion Oil Cloth Co.,
 Manufacturers of....
OIL-CLOTHS OF EVERY DESCRIPTION
 Floor Oil-Cloth, Table Oil-Cloth, Carriage Oil-Cloth, Enamelled Oil-Cloth, Stair Oil-Cloth, etc., etc.
 Office and Works
 Cor. St. Catharino and Parthenais Sts., MONTREAL, Que.

D. K. McLAREN
BELTING, CARD CLOTHING
- - - MILL SUPPLIES
 COTTON AND WOOLEN SUPPLIES
 SHUTTLES, PICKERS, HEDDLES
 REEDS AND HARNESS
 Sole Agent for....
Messrs. Wilson & Ingham
 MIRFIELD, ENGLAND
 24 Victoria Square, - Montreal

ST. LAWRENCE FOUNDRY CO.
 OF TORONTO.
ARCHITECTURAL IRON & STEELWORK
 MANUFACTURERS OF: ROOF'S, GIRDERS, BEAMS, FRONTS, STAIRS, AREA LIGHTS
FORGINGS & CASTINGS.
 CAST IRON, GAS, WATER, & SEWER PIPES
 SPIKES & BOLTS.
PATTERNS & MODELS.
 REPAIRS & MACHINE TURNING DONE WITH DESPATCH ESTIMATES GIVEN A WORK EXECUTED ON SHORTEST NOTICE.
 262 TO 278 FRONT ST. EAST. TORONTO.

SHUTTLES BOBBINS
 SPOOLS
 PICKER STICKS
 CLOTH ROLLS, Etc.
JOHN HOPE & CO., - - LACHUTE, QUE.

Penman Manufacturing Co., Ltd.
 PARIS, ONTARIO.
 Manufacturers of
 HOSIERY, SHIRTS, DRAWERS,
 GLOVE LININGS AND YARNS
 Selling Agents: D. MORRICE, SONS & CO., Montreal and Toronto.

ROSAMOND WOOLEN COMPANY
 ALMONTE, ONT.
 FINE TWEEDS, CASSIMERES, AND FANCY
 WORSTED SUITINGS AND TROUSERINGS.

Guelph Woolen Mill Co., Ltd.
 GUELPH, ONTARIO
 Manufacturers of
 Underwear, Hosiery, Wheeling, Fingering and Worsted Yarns
 EIDERDOWN FLANNEL, ETC.
 Selling Agents: Donald Fraser, Montreal E. H. Walsh & Co., Toronto.

AUBURN WOOLEN COMPANY
 PETERBOROUGH, ONT.
Manufacturers of Fancy Tweeds, Etc.
 Selling Agents, D. MORRICE, SONS & CO., Montreal and Toronto.

Low Water

You may have it in the Summer, or you may want more Power now.

THE CROCKER TURBINE

WILL HELP YOU.

Perhaps you have an undeveloped power. Why not use it? It will increase your income.

WRITE US FOR DESCRIPTIVE CIRCULAR.

Address,

Jenckes Machine Co.,
28 Lansdowne St. - SHERBROOKE, QUE.

Hamilton Blast Furnace Co.

HAMILTON, - - ONTARIO (Limited)

Manufacturers of

HIGH GRADE PIG IRON

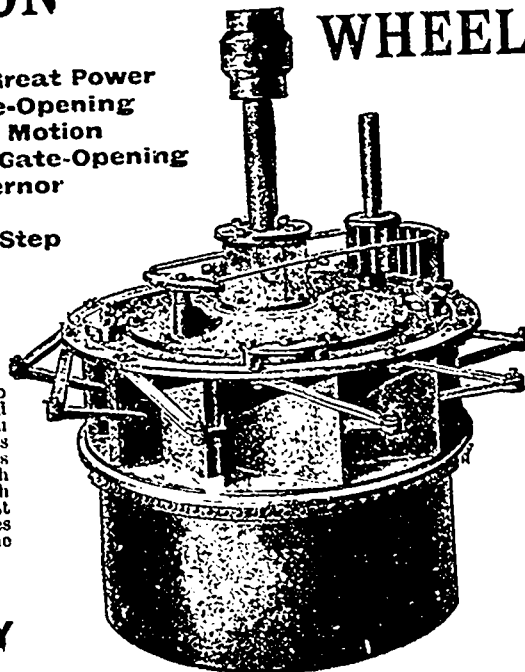
THE . . . DOMINION WATER WHEEL

SPECIAL FEATURES
Economy in Use of Water, Great Power
Equal Efficiency at any Gate-Opening
Steadiness and Strength of Motion
Sensitiveness to Change in Gate-Opening
Ease for Regulation by Governor
Strength and Durability
Freedom from Trouble with Step
Not Clogged by Ice
Accessibility to all Parts

St. Catharines,
February 9, 1897
Messrs. Wm. & J. G. Greey,
Toronto.

GENTLEMEN,—Your favor of the 5th to hand. Have been away from home, and hence delay in answering your letter. You ask us how your Dominion Wheel compares with the . . . Well, sirs, the comparison is this—we have been using two 33 inch diameter, double wheels, and your 51 inch Dominion wheel we put in December last gives us as much power as both, and does not use but very little more water than one of the 33 inch wheels.
Yours truly,
COOKE & SON.

MANUFACTURED ONLY BY
WM. & J. G. GREEY
TORONTO



The Harriston Flax Manufacturing Company, Harriston, Ont., is being incorporated with a capital stock of \$6,000 to grow and manufacture flax.

The partnership heretofore existing between I. H. Northrup and S. A. Hoyt, St. John, N.B., doing business under the name of Northrup & Co., has been dissolved. Mr. Northrup continues under same name and style as heretofore. This firm does a large wholesale business in groceries, fish, etc., handling a large quantity of the product of the British Columbia canneries.

The Electrical Construction Company of London, formerly the London Motor Company, London, Ont., have recently closed contracts with D. S. Perrin & Co. and the London Bolts Works, London, Ont.; A. R. Williams & Co. and Norway Cabinet Company, Toronto, and Berlin Daily News, Berlin, Ont.

The Directors of the Rat Portage, Ont., Mining Exchange, having found the time at their disposal insufficient for making adequate preparations to ensure the success of the mining convention heretofore announced to be held at Rat Portage on the 6th, 7th and 8th of April have postponed the date for holding the convention to June 2nd, 3rd and 4th next.

WE BUILD

STEAM AND ELEVATORS ELECTRIC . .

WRITE US FOR PRICES

MAGUIRE & DRYDEN

78 ESPLANADE WEST, TORONTO

SPECIALTIES.

Machinery Brushes for woollen and flour mills, jewellers, shoes, breweries, dairies, platers, foundries, and all machinery work; old rollers refilled.

Frank Wehrle & Co.,
Brush Manufacturers,
131 Bay Street, Toronto.

JOHN HALLAM TORONTO

WHOLESALE DEALER IN

DOMESTIC and FOREIGN WOOLS
Sumac, Japonica, etc.

Cans, Solder

AND

CANNERS' SUPPLIES

WE have special facilities for manufacturing Solder in triangle bars, large bars and wire.

GET OUR PRICES BEFORE BUYING

THE NORTON MFG. CO.
Hamilton, Ont.

A. H. TURNER & CO.

Accountants and Auditors

28 Wellington St. E., TORONTO.

BOOKS WRITTEN UP.
STOPPING LEAKS A SPECIALTY.

Messrs. R. Taylor & Co., Halifax, N.S., manufacturers of boots and shoes, have been succeeded by Robert Taylor & Company.

The MacGregor-Gourlay Company, Galt, Ont., are making extensive alterations and improvements in their works.

The St. Raymond Company, Montreal, is being incorporated to manufacture wood pulp, etc.

The Metropolitan Railway will be extended from Richmond Hill to Newmarket, Ont., to be completed by May 24th, next.

The Kormann Brewing Company, Toronto, purpose building an additional four storey brick brewery to cost \$10,000.

A. Warner's saw mill at Angus, Ont., was destroyed by fire April 6th. Loss about \$1,000.

The Cooper Manufacturing Company of Toronto has been incorporated with a capital stock of \$20,000 to manufacture gas, gasoline and oil engines, noiseless carriages, etc.

The Winsor Barker Company of Toronto, has been incorporated with a capital stock of \$3,000 to manufacture chemical, pharmaceutical and proprietary preparations, physicians, dentists' and barbers' supplies, etc.

M. J. Nealon, Woodville, Ont., will start a portable saw and shingle mill.

Messrs. Lalonde & Girard, Montreal, manufacturers of sash and doors have dissolved. D. Lalonde continues.

F. X. Brouillett has commenced the manufacture of agricultural implements at St. Narcisse, Que.

The new Metallic Roofing Company of Preston, Ont., have received their machinery and expect to be ready to start work in a few days.

The Ontario Chemical Company, Toronto, is being incorporated with a capital stock of \$150,000, to carry on a general lumbering, saw mill, factory, pulp and paper mill business, etc.

A 25,000 bushel elevator will be built at the McGregor, Man., flour mill this spring. Power will be secured from the mill by the rope transmission system.

The Bluevale Flax Manufacturing Company, Bluevale, Ont., has been incorporated with a capital stock of \$6,000 to grow and manufacture flax.

Messrs. Barber & Watson, foundry, Meaford, Ont., have dissolved. Mr. C. Barber continues.

Messrs. W. Doherty & Co., Clinton, are building an addition to their organ factory, which will enable them to turn out 500 high grade organs per month. If their trade continues to increase like it has in 1896 '7, they will accommodate the trade and their ever-appreciative customers by building large enough to manufacture 1,000 organs per month.

In a recent suit in the United States Circuit Court of Ohio, in Dodge v. Post, the Dodge and Phillion patent No. 260,462 for a separable pulley in which the meeting ends of the rim are in contact and the meeting faces of the spoke bar and hub are slightly separated so that they may be compressed by clamp bolts upon the shaft, has been held valid and infringed.

The Thompson Electric Co.

HAMILTON, ONT.

"Enclosed Arc Lamps"

To burn 150 hours without Recarboning, for Series, Incandescent, Alternating and Power Circuits.

"Open Arc Lamps"

For all Circuits, Single and Double Carbon Lamps.

We are the only concern in Canada making a specialty of manufacturing all kinds of Arc Lamps.

WRITE US FOR PARTICULARS.

The Packard Electric Co., Ltd.

MAKERS OF

Lamps and Transformers

Sole Agents for SCHEEFFER RECORDING WATT METERS

ST. CATHARINES, ONT.

THOMAS PINK
PEMBROKE, ONT.

MAKER OF THE FAMOUS

Pink Peaveys, Handles, Cant Hooks

Split Maple Handles
Duck Bill Cant Hooks
Cast Steel Skidding Tongues
Duck and Round Bill Peaveys.
Car Load or Dozen Lots

CLIMAX TIMBER GAUGE

(Patented Nov., 1896)

MOST COMPLETE MACHINE IN THE MARKET

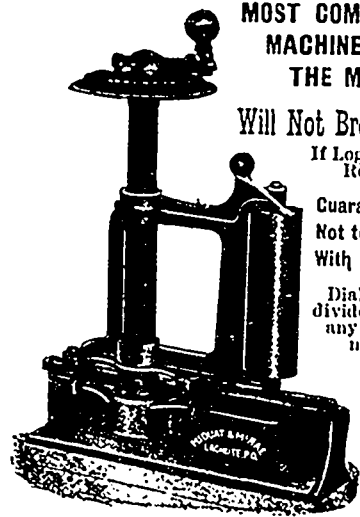
Will Not Break..

If Log Strikes Roller.

Guaranteed Not to Clog With Sawdust

Dial plate divided to cut any thickness.

Sent on 30 Days Trial



Send for Circular, etc.

McOUAT & McRAE,
LACHUTE, QUE.

The Watson Pattern Works

CEO. A. WATSON, Prop.

Patterns and Models of every description. Inventors assisted in perfecting their inventions. Good work. Close prices. Estimates given.

BURKE'S BLOCK

Cor. Richmond and Sheppard Sts., Toronto

TELEPHONE 2326.

J. S. JOSELIN,

130 Richmond St. W., - TORONTO.

Patterns and Models made for Engines, Pumps, Furnaces, Stoves, Agricultural and Architectural Work and Machines of Every Description.

THE CANADIAN OFFICE & SCHOOL FURNITURE CO. LTD.
PRESTON, ONT.

FINE BANK OFFICE & COURT HOUSE & SCHOOLS FITTINGS
OFFICE, SCHOOL, CHURCH & LODGE FURNITURE
SEND FOR CATALOGUE

THE CASHMORE MAGAZINE SPORTING RIFLE.

The accompanying illustrations are of an improved Magazine sporting rifle recently invented, and patented in Canada, the United States and elsewhere by E. J. Cashmore, of Toronto. The peculiarities of the invention are that it rectifies the obvious defects in other quick-firing repeating arms, the action being, as is claimed for it, the simplest and the strongest of any rifle ever used.

dragging movement. In the Cashmore arm the arrangement is such that when it is at full cock the action cannot be manipulated at all, as a catch is so arranged as to fall into a notch in the locking lever connected with the fire-arm, thus making it perfectly safe and reliable.

In other magazine rifles, when supplied with ammunition, where it is required that the fire-arm must be pushed forward to inject the cartridge into the barrel, great annoyance is frequently caused by the breaking of the locking arrangement, rendering the

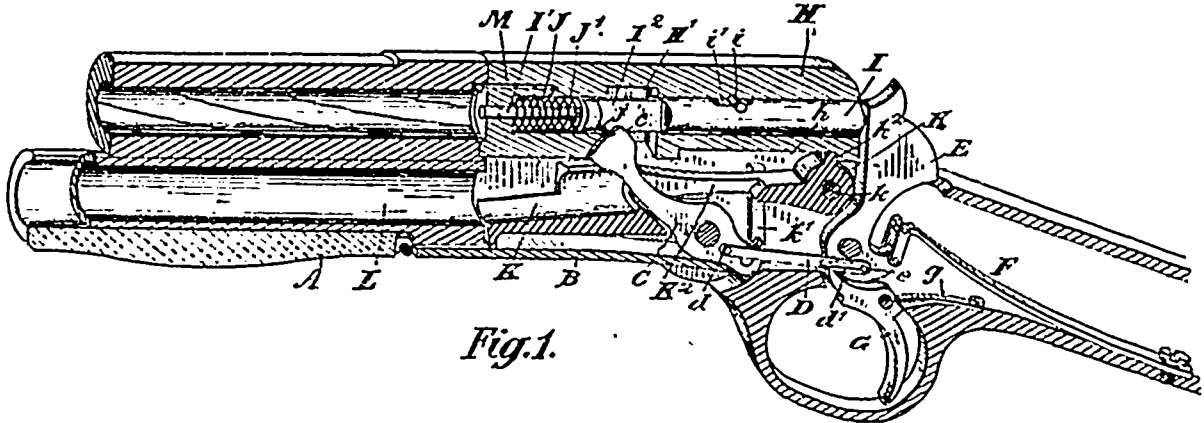


Fig. 1.

As will be seen by reference to the illustrations, the method of operation is by a sliding fire-end, the difference from other arms being that when the cartridge is in the chamber the fire-end is drawn back against the solid frame or body, thus enabling the user to hold the weapon firmly to the shoulder, instead of having it

weapon unsafe and unuseable. In the Cashmore arrangement this annoyance is obviated entirely as it is not necessary that the fire-end be locked when the rifle is being pressed to the shoulder, and no damage can possibly occur no matter how hard the arm is held back, because the fore-arm rests against the frame or body, the

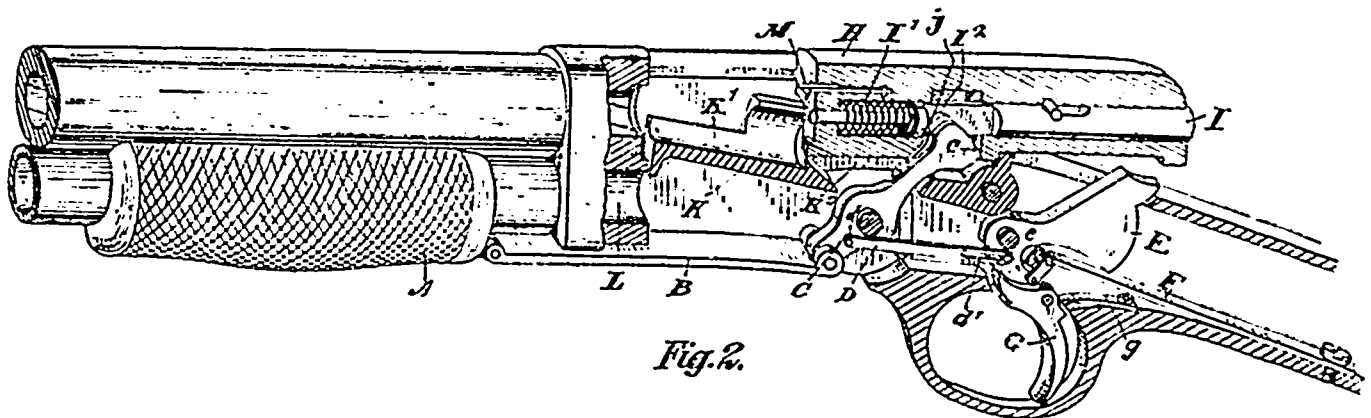


Fig. 2.

depend upon a small catch, or lock, as in other arms. It should be observed that the sliding fire-end is connected by a slotted-bar to a lever that operates the breach-bolt. On this lever is a small slotted bar engaging the hammer, by which the hammer is thrown to full cock when the arm is operated; this being accomplished, in other arms, by a sliding bolt which generally occasions a hard

unweildy, inconvenient and far-reaching under lever being done away with entirely.

Mr. Cashmore intends at an early day to go abroad to explain the merits of his invention to certain parties who are interested in the manufacture of sporting rifles. In the meantime his address is at 21 Scott street, Toronto.

We have received from Messrs. James L. Robertson & Sons, 204 Fulton Street, New York, their 1897 catalogue fully illustrating and describing their Robertson-Thompson indicator, Victor aluminum reducing wheel, standard averaging planimeter, Hine's eliminator, etc.

The Packard Electric Company, St. Catharines, Ont., have for some time been sending out each month a blotter calling attention to some specialty of their business. That for April gives a portrait of Her Majesty the Queen, and announces that the company is prepared to furnish all varieties of plain, fancy and colored miniature and candelabra lamps for electrical displays for the approaching Jubilee celebration.

The Dominion Government have passed an order-in-council granting \$300,000 to the G.T.R. for the extension of Victoria Bridge over the St. Lawrence, and this has been supplemented by a grant of \$150,000

from the Provincial Government. The work is to be commenced by May 1st and completed in October, 1898. The extension includes double tracking for railway purposes, constructing a double electric railway track and a road and footway.

The new handsome illustrated catalogue issued by Messrs. Cowan & Co., Galt, Ont., will be welcomed with pleasure by this old firm's numerous customers, and examined with profit by all who contemplate the purchase of engines, boilers or wood-working machinery. Messrs. Cowan & Co. well deserve the reputation attained by them, through forty-five years of perseverance, energy, square dealing and strict attention to the wants of the times.

We have received from Messrs. Jackson, Cochrane & Co., Berlin, Ont., their 1897 catalogue fully illustrating and describing the improved and patented wood working machinery manufactured by them—sand-

papering machines, planers and jointer, tenoning machines, wood lathes, chair back tenon machines, chair mortiser and boring machines, fret scroll saws, power feed rotating machines, rod, pin and dowel machines, carving machine, veneer presses, etc. Catalogues on application to the firm.

A petition from the farmers of Champlain, Nicolet, St. Maurice, Joliette, Vaudreuil and Three Rivers counties, signed by over fourteen hundred persons, will be presented to the Hon. W. S. Fielding, Sir Richard Cartwright and the Hon. Wm. Paterson, asking the government to encourage the manufacture of charcoal iron from bog ore in the Province of Quebec.

The Warton Woollen Mills Company, Warton, Ont., is being incorporated with a capital stock of \$20,000, to take over the business at present carried on at that place by A. W. Patterson, under the name of the Warton Woollen Mills.

FETHERSTONHAUGH & CO.

PATENT BARRISTERS AND SOLICITORS

ELECTRICAL AND MECHANICAL EXPERTS AND DRAUGHTSMEN

Head Office: Canadian Bank of Commerce Bldg, Toronto, Ont.

Patents Procured in Canada and all Foreign Countries.

Offices in Montreal, Que., Ottawa, Ont., and Washington, D.C.

THE Defiance Machine Works

DEFIANCE, OHIO, U.S.A.

Established 1850

INVENTORS AND BUILDERS OF UP-TO-DATE NINETEENTH CENTURY

AUTOMATIC Wood-Working Machinery

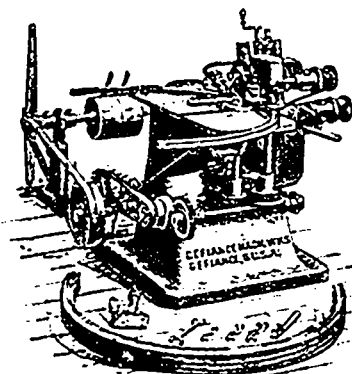
For Making

WAGON AND CARRIAGE WHEELS, HUBS, SPOKES, RIMS, FELLOES, SHAFTS, POLES, NECK-YOKES, SINGLE-TREES, BARREL HOOPS, Etc., Etc.

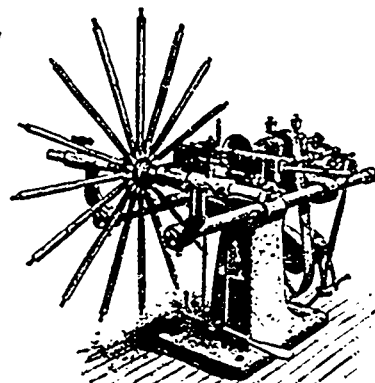
Send for 300-Page Catalogue—FREE
GENERAL CANADIAN AGENTS

ESTATE OF T. T. COLEMAN

SEAFORTH, ONTARIO, CANADA



RIM PLANING MACHINE



WHEEL TURNING MACHINE

Electrical Construction Co., Ltd.

LONDON, - - ONTARIO

MANUFACTURERS OF

ELECTRIC MOTORS, LIGHTING DYNAMOS, POWER GENERATORS

DEALERS IN ELECTRIC SUPPLIES

REPAIRS OF ALL KINDS, AND ANY SYSTEM, ON SHORT NOTICE

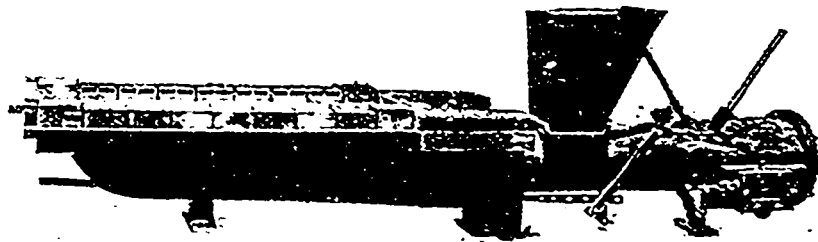
.....

Contractors for Street Railways, Electric Light and Power Plants, and Power Transmission. Estimates Given

THE WEEKS-ELDRED CO. OF TORONTO, LIMITED

Mechanical, Civil and Sanitary Engineers

GENERAL CONTRACTORS. STEAM POWER, HEATING and VENTILATING. Sewage Disposal Plants a Specialty



Sole Canadian Manufacturers of the

Improved Jones Under-feed Mechanical Stoker

Perfect Combustion. No Smoke. No Ash.

Offices..

BOARD OF TRADE BUILDING, - - TORONTO, ONT.

Send for Illustrated Catalogue

THE TORONTO PAPER MFG. CO. CORNWALL, ONT.

Manufacturers of....

Engine Sized Superfine Papers
White and Tinted Book Papers
Blue and Cream Laid and Wove Foolscaps, Account, Envelope and Lithographic Papers, etc.

G. G. ELRICK & CO.

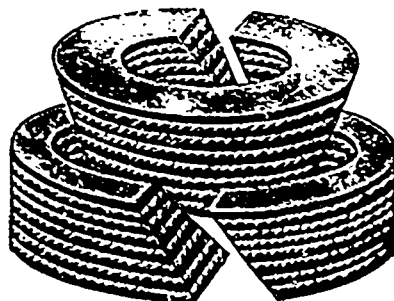
MANUFACTURERS OF

HORN and RUBBER COMBS, Etc.

FACTORY—Sheppard Street, Toronto.

MONTREAL OFFICE—Fraser Building.

ENGINEERS' FAVORITE RING PACKING



Rainbow Sheet Packing. Eclipse Gasket Packing

Sheet Rubber and Plumbago.

Square Flax. Hemp and Soapstone.

Asbestos Cement and Pipe Covering.

Sutton's Boiler Compound.

Albany Grease.

WILLIAM C. WILSON & CO.

LUBRICATING OILS AND GREASES

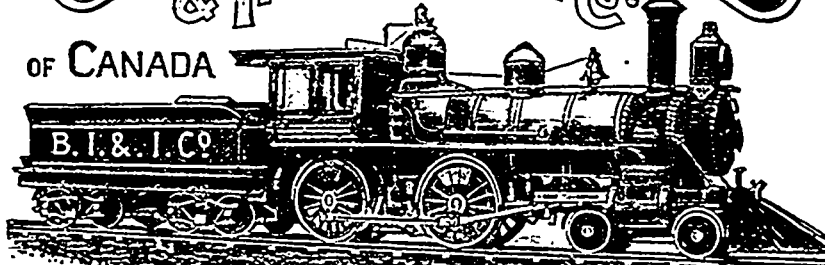
24 FRONT STREET EAST,

TORONTO

DO YOU REQUIRE  Rubber Belting ?

IF SO, BUY THE BRANDS MADE BY
The CANADIAN RUBBER COMPANY of MONTREAL
CAPITAL \$2,000,000.
Manufacturers of all Kinds of Rubber Goods

ONTARIO BRANCH—Cor. Front and Yonge Streets, TORONTO.
J. H. WALKER, - - MANAGER.

<p>When Were Your BOILERS Last Inspected ?</p>	<p>Consulting Engineers— G. C. ROBB, Chief Engineer A. FRASER, Secretary-Treas.</p>	<p>JOHN L. BLAIKIE ESQ. PRES.</p> <p>THE BOILER INSPECTION & INSURANCE CO.</p> <p>OF CANADA</p>  <p>C. WRATHBUN ESQ. VICE-PRES.</p>	<p>Head Office, TORONTO</p> <p>Are You Sure THEY ARE SAFE AND IN Good Condition?</p>
---	---	---	---

Established 1823

Telegrams: "WILSONS, CORNHOLME."
A.B.C. Code Used.

Wilson Bros.

(Limited)

Cornholme Mills, - TODMORDEN, ENG.

Bobbin and Shuttle

Manufacturers . .

30 Prize Medals Awarded.
High-Class Workmanship.
Seventy Years' Reputation.

LARGEST BOBBIN MAKERS IN THE WORLD
(OVER 1,200 WORKMEN).

ADDRESS: CORNHOLME MILLS,
Todmorden, England.

BRANCH ESTABLISHMENT:
ATLAS BOBBIN WORKS. GARSTON, LIVERPOOL.

OFFICE AND SHOW-ROOMS:
14 MARKET PLACE, - MANCHESTER.

ESTABLISHED 20 YEARS.

A. KLIPSTIEN & CO.

122 PEARL ST., - NEW YORK.

ANILINES, DYESTUFFS, AND
CHEMICALS

Of every variety, of the best quality and at the lowest prices.
Delivery made at New York, Montreal or Hamilton

WRIGHT & DALLYN, Agents,
HAMILTON, ONTARIO



**KERR
Water Motors**

1 8 to 20 HORSE POWER.

Noiseless Running, Require No Attention,
operated with water at a pressure of 30 pounds
and upwards.

Reliable intending purchasers can have our Motors on
trial by writing us, stating water pressure available, power
required and class of work to be done.

Our Motors are sold on their merits. Our prices are low.
Write us. Enquiries solicited and cheerfully answered.

KERR WATER MOTOR CO., NIAGARA FALLS,
CANADA.

THE LONDONDERRY IRON CO., Ltd.

A. T. PATERSON,
President and Managing Director.

R. L. MILDRETH,
Secretary.

.... Manufacturers of.....

PIG IRON **PUDDLED BARS**
BAR IRON **NAIL PLATES**
WATER PIPES, ETC.

Office....

MONTREAL

Works..

LONDONDERRY, NOVA SCOTIA

CANADA IRON FURNACE CO., Ltd.

Montreal, Radnor and Three Rivers

Manufacturers of the well-known

"C.I.F." Three Rivers Charcoal Pig Iron

Suitable for Car Wheels, Cylinders and Fine Castings,
where the utmost strength is required.

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

Offices: *Canada Life Insurance Bldg., Montreal.*

The NOVA SCOTIA STEEL COMPANY, Ltd.

MANUFACTURERS OF

BRIGHT COMPRESSED STEEL SHAFTING

FROM $\frac{1}{2}$ TO 6 INCHES IN DIAMETER. GUARANTEED STRAIGHT AND TRUE TO WITHIN $\frac{1}{32}$ 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

HEAVY FORGINGS a Specialty

"FERRONA" PIG IRON, For Foundry Use.

Works--NEW GLASGOW, N.S., and FERRONA, N.S.

Head Office--NEW GLASGOW, NOVA SCOTIA

The Wellington Mills, **LONDON, ENGLAND**

GENUINE EMERY

Oakey's Flexible Twilled Emery Cloth.
Oakey's Flint Paper and Glass Paper
Oakey's Emery Paper, Black Lead, Etc.
Prize Medal and Highest Award Philadelphia, 1876, for Superiority
of Quality, Skillful Manufacture, Sharpness, Dura-
bility, and Uniformity of Grain.

Manufacturers

JOHN OAKEY & SONS, Ltd., Wellington Mills, Westminster Bridge
Road, London, Eng.

Inquiries should be addressed to

JOHN FORMAN, 650 CRAIG ST.,
MONTREAL.

BICYCLE CHAINS

—MADE WITH—

HARD PINS AND HARD BLOCKS

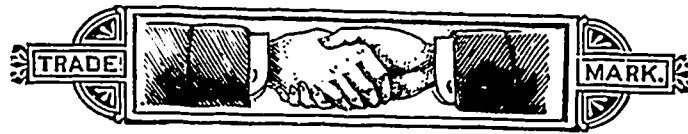
Write for Samples and Prices

Manufactured by.....

McKINNON DASH AND HARDWARE CO.'Y

ST. CATHARINES, ONT.

The United Alkali Company, Ltd., of England



CAUSTIC SODA, 60°, 70°, 74°, 76°, 77°.

SODA ASH, all strengths.

SAL. SODA.

PURE ALKALI, 58°.

WILSON, PATERSON & CO., MONTREAL, SOLE AGENTS.

Importers of . . .

SULPHATE OF ALUMINA
HYPO SULPHITE OF SODA
BICHROMATE OF SODA

SILICATE OF SODA
CAUSTIC POTASH
CRYSTAL CARBONATE

BORAX
COCONUT OIL
PALM OIL

CASTOR OIL
COTTON SEED OIL
ROSIN OIL

ROSIN

ALL CHEMICALS USED BY

SOAP, PAPER, WOOLEN, AND COTTON MANUFACTURERS

New York Office

133, 135, 137 FRONT ST.

Galt Machine Knife Works



Stave Cutter Knives

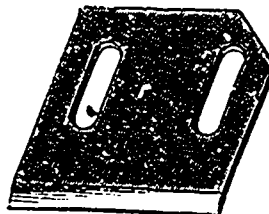
PLANING
MACHINE
KNIVES . . .



Stave Jointer Knives



Moulding,
Tencning,
Mitreing



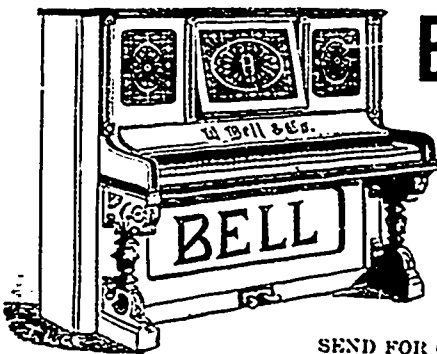
SHINGLE . . .
JOINTER . . .

AND OTHER IRREGULAR SHAPES.

Cheese Box and Vencer, Paper Cutting, Leather Splitting, and any Special Knife made to order.

SEND FOR PRICE LIST.....
ALL WORK WARRANTED....

PETER HAY, - GALT, ONT.



BELL -

HIGH-CLASS
INSTRUMENTS

Used and
Recommended by

Leading . . .
. . . Musicians

SEND FOR CATALOGUE.

THE BELL ORGAN AND PIANO CO., Ltd.
GUELPH, - - - ONTARIO

IT LEADS THEM ALL

THE OLDEST
THE LARGEST

THE SAFEST
THE CHEAPEST

Canadian Life Insurance Company is

The CANADA LIFE ASSURANCE CO.

CAPITAL AND FUNDS OVER \$13,000,000

WRITE FOR PROSPECTUS

A. G. RAMSAY,
President.

GEO. A. & E. W. COX,
Managers for Toronto
and Eastern Ontario.

FIRSTBROOK BROS.

Dovetail and Packing Boxes

Top-Pins, Side Blocks and Cross Arms. Wood
Printers, Etc.
Cigar Boxes. Shipping Cases.

TORONTO, - - - ONTARIO

Write for Prices.

THE PARIS ELECTRO-PLATING CO..

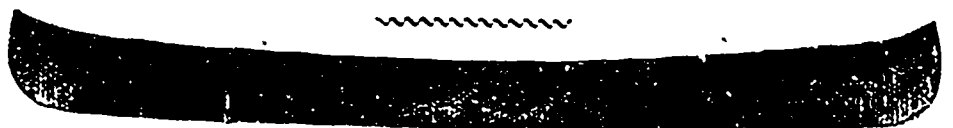
Manufacturers of

Stove Trimmings, Organ and Piano
Trimmings, also all kinds of
Brass and Nickel Plating Done

Paris Station, - - Ontario

DO YOU WANT

A Canoe or Row-Boat?



WE HAVE THEM in all sizes, and at prices which should INDUCE YOU TO BUY

The Canadian Canoe Co., Ltd.

BOX 107, . . . PETERBORO, ONT.

Send stamp for catalogue and mention this paper.

The Goldie & McCulloch Co., (Limited)

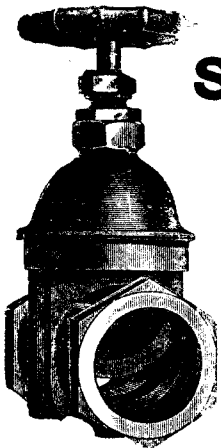
GALT, - - ONTARIO

MANUFACTURERS OF

STEAM ENGINES, BOILERS, WATER WHEELS

Flouring and Saw Mill Machinery, Wood Working Machinery, Wool Machinery.
Fire and Burglar Proof Safes, Vault Doors. Wood Rim Split Pulleys,
Friction Pulleys, Friction Clutch, Couplings, etc.

"Dumfries Foundry," Galt, Ontario, Canada



The WEBBER Patent Straitway Valve

For Steam, Water or Gas.

EVERY VALVE TESTED.

The Kerr Engine Co. Ltd.

WALKERVILLE, ONT.

SOLE MANUFACTURERS FOR CANADA.

SEND FOR PRICE LIST

HAMILTON COTTON CO.

HAMILTON, ONTARIO.

**Yarn Manufacturers
Dyers and Bleachers**

Warp Yarns of all descriptions, in Skein, Chain, or on Beams.
Hosiery Yarns in Single or Double; in Cop, Skein or Cone.
Yarns of all kinds for Manufacturers' use.

Twines, Lampwicks, Webbing, Etc.

Dyeing of all colors, including **GENUINE FAST BLACK.**



THE STANDARD DRAIN PIPE COMPANY, ST. JOHN'S, P.Q.

Manufacturers of Salt Glazed Vitrified Sewer Pipes, Double
Strength Railway Culvert Pipes, Inverts, Vents, and
all kinds of Fire Clay Goods.

The Standard Drain Pipe Co of St. John's, P.Q., Ltd. W. C. TROTTER
President.

REGISTERED..... BRAND

The Samson Brand IS A HIGH
GRADE OF

Portland Cement.

..UNIFORM.. ..FINELY GROUND.. ..RELIABLE..

Quality equal to the best English and German Brands.
Manufactured by the

Owen Sound Portland Cement Co., Ltd.

SHALLOW LAKE, - ONTARIO.

Over 39,000 BARRELS Sold

During 1895, and not a single complaint as to quality.

For Prices and further information address the Manager at Works,
Shallow Lake, Ont., or

JOHN LUCAS, 377 Spadina Ave., Toronto, Ont.
Correspondence Solicited.

WOOL

A. T. PATERSON & CO.

MERCHANTS

35 FRANCOIS XAVIER ST., - MONTREAL



Represented by MR. DAVID GUTHRIE

The Canadian Colored Cotton Mills Co.

1897 ——— SPRING ——— 1897

COTTONADES, TICKINGS, DENIMS, AWNINGS, SHIRT-
INGS, FLANNELETTES, GINGHAMS, ZEPHYRS, SKIRT-
INGS, DRESS GOODS, LAWNS, CRINKLES, COTTON
BLANKETS, ANGOLAS, YARNS, Etc.

Wholesale Trade Only Supplied

D. MORRICE, SONS & CO.

AGENTS

MONTREAL AND TORONTO

USE THE McCASKILL STANDARD VARNISHES

SATISFACTION GUARANTEED

Manufactured by.....
McCASKILL, DOUGALL & CO.

Montreal, Que.

PLUMBAGO FOUNDRY SUPPLIES THE DOMINION FOUNDRY SUPPLIES 48 St. Sacrement Street, MONTREAL.

ALIZARINES
-AND-
ANILINES

FAST COLORS A SPECIALTY.

Chemicals, Dyestuffs and Acids
"LOGWOOD EXTRACTS."

BELLHOUSE,
DILLON & CO.

47 Wellington Street East, Toronto
30 St. François Xavier Street, Montreal



The Ontario . . .
Malleable Iron Co.

(Limited)

....Manufacturers of....

MALLEABLE IRON Castings to Order for all kinds of

AGRICULTURAL IMPLEMENTS .

....AND....

Miscellaneous Purposes



OSHAWA - - ONT.

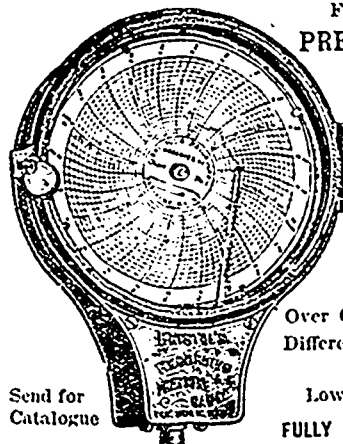
Sault Ste. Marie
Pulp and Paper Co.

SAULT STE. MARIE, ONT.

GROUND
WOOD
PULP

FOR DOMESTIC AND EXPORT TRADE

BRISTOL'S
Recording Instruments



For.....
PRESSURE

Tempera-
ture
AND
Elec-
tricity

Over One Hundred
Different Varieties.

Low Prices and
FULLY GUARANTEED

THE BRISTOL CO.
WATERBURY, CONN., U.S.A.

SMITH'S FALLS

Malleable
Iron
Works

00000

CAPACITY 2,000 TONS

00000

WILLIAM H. FROST

PROPRIETOR,

SMITH'S FALLS

ONTARIO, CANADA.

Manufacturers of
FINE VARNISHES
Japans—Asphaltums—Shellacs
Maple Leaf Brand Coach Varnishes

J. H. FARR & CO.

Armature Insulating Compound

Insulating Compound for Weather-Proof Wire, Tube Compound, Mica Paste, etc., etc.
6 to 16 MORSE STREET
TORONTO

CARRIER, LAINE & CO. | Dredges

SAW MILL
MACHINERY

Montreal Branch....
147 St. James St.

Reeds Mill Supplies

Sheets and Fillet Stock in Montreal

8 ST. HEDEN STREET, MONTREAL.