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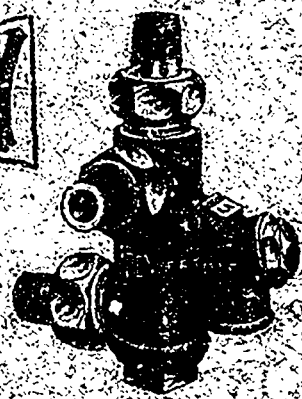
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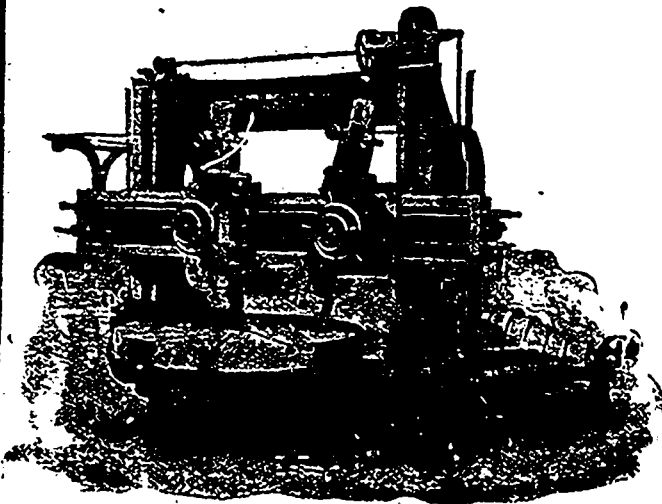
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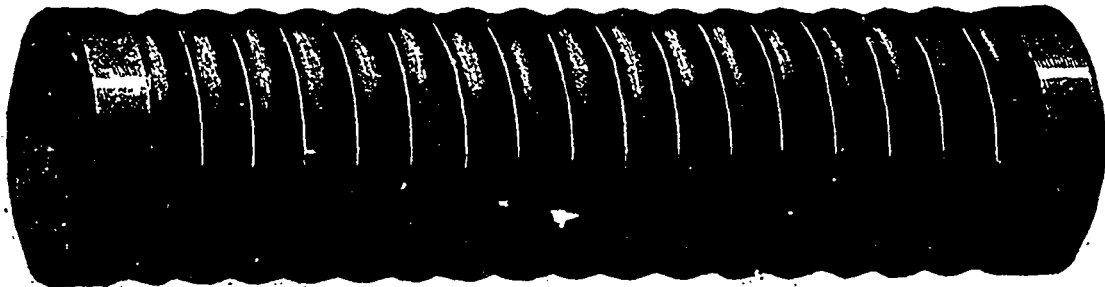


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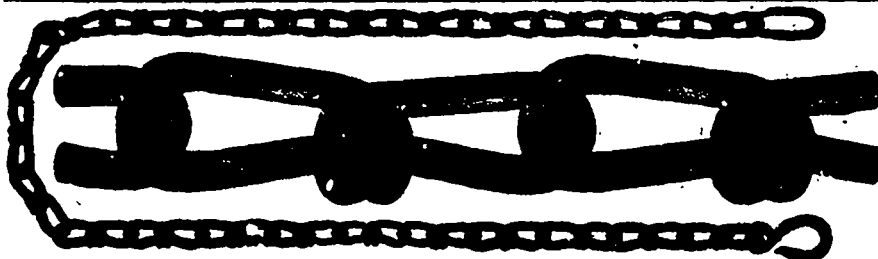
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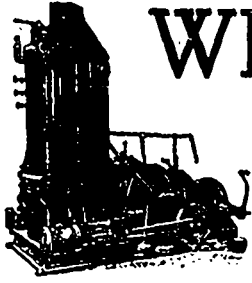
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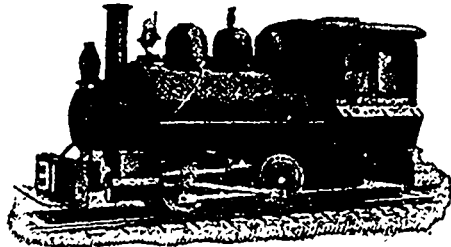
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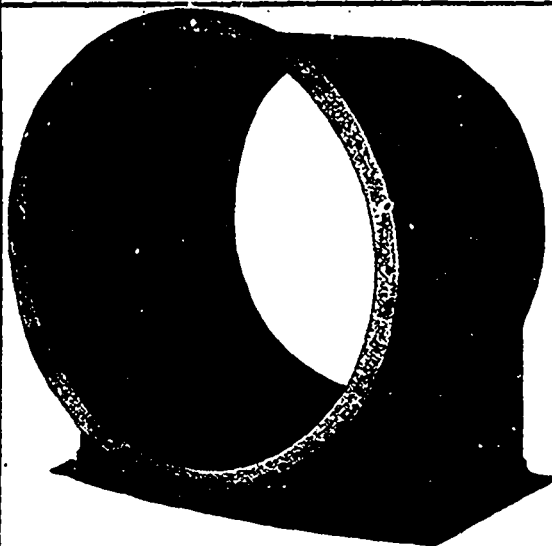
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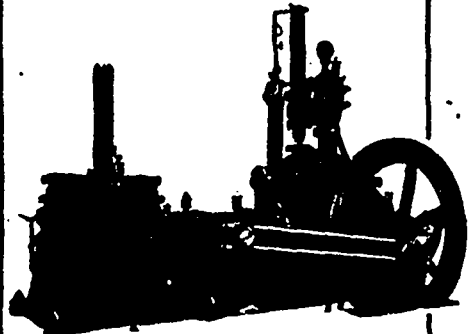
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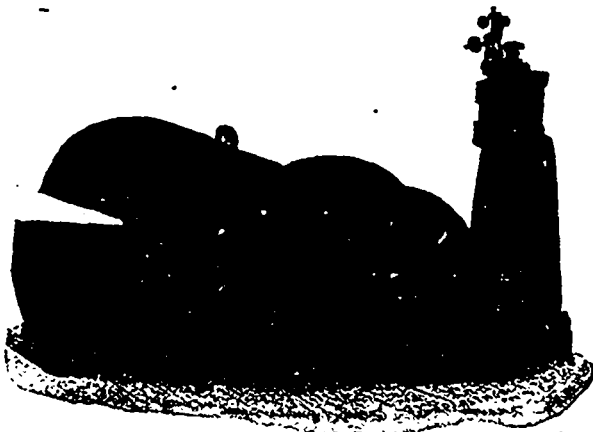
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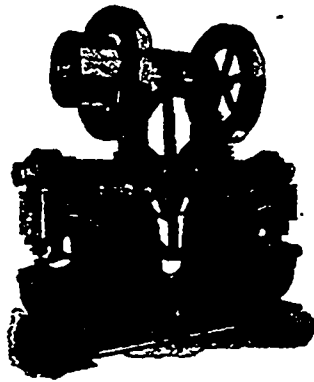
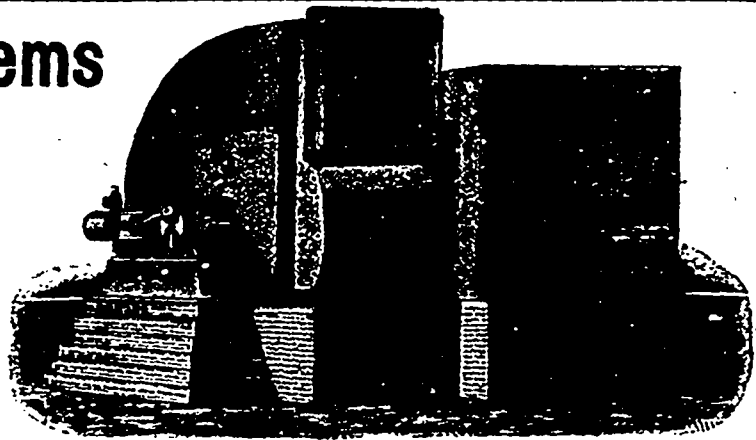
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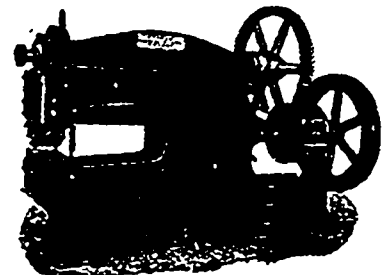
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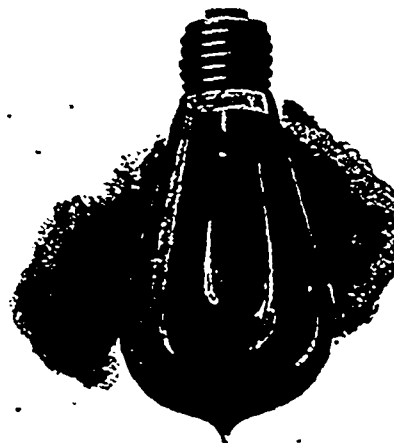
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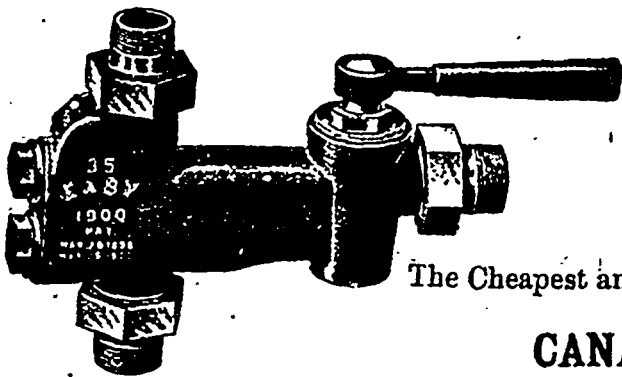
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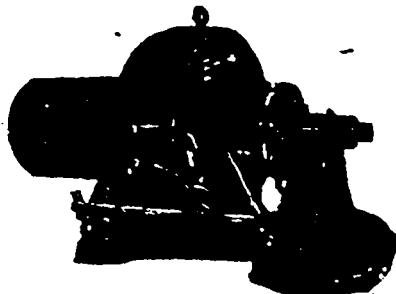
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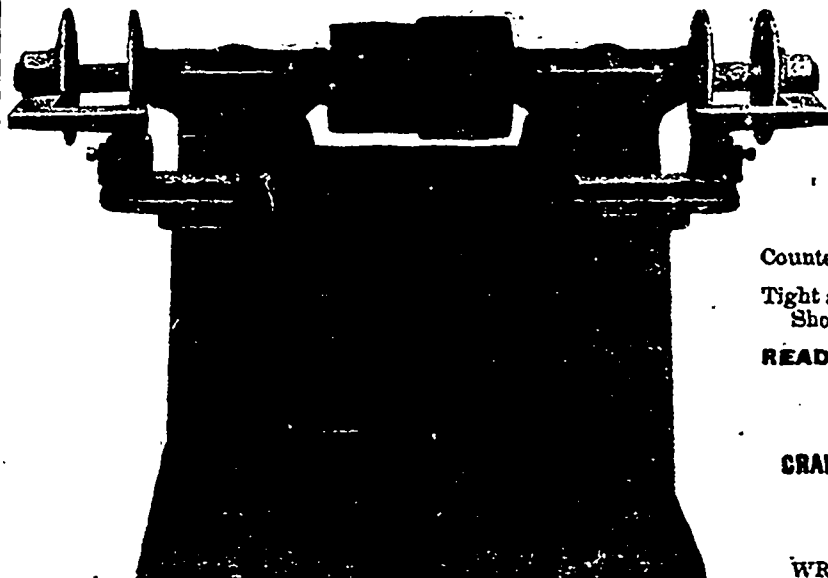
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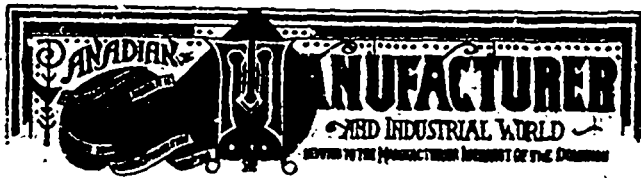
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Classified IndexPage 39
Index to AdvertisersPage 46

OUR TARIFF PLATFORM.

If a revision of the tariff is to be undertaken at the ensuing session of the Dominion Parliament, or whenever such a revision is made, it should include the following features :

1. The tariff should be of a dual character—a minimum tariff to apply to imports from commercially friendly countries, such as Great Britain—and a maximum tariff to apply to imports from commercially unfriendly countries, such as Germany.
2. The duty imposed upon imports should be (a) specific only and always where possible, or (b) compound, i.e., both specific and ad valorem ; to be ad valorem only when neither specific or compound is practicable.
3. Tariff rates under all circumstances should be sufficiently high to afford adequate protection to every Canadian manufacturing and industrial interest.
4. Every possible safeguard should be thrown around the administration of the tariff laws to prevent undervaluation and other frauds upon the Customs.
5. There should be no special preferential provisions in the tariff, such as now exist, as such features would be included in the minimum tariff, and applicable not only to British imports, but also imports from any other country which treats Canada with equal commercial favor.

Such tariffs would be automatic in their application ; and it would be free to any country to decide under which its products would be admitted into Canada.

Specific duties would prevent importation of inferior goods of all descriptions, and also undervaluation. Compound duties would apply to textile fabrics, ready-made clothing, etc., and would prevent or restrict imports of shoddy and inferior goods.

But first, last and always, the salient feature of the Canadian tariff should be adequate protection to every Canadian industry.

THE BONDING SYSTEM.

In a recent issue of this journal was reproduced the gist of an article written by Mr. George Johnson, Dominion Statistician, having reference to the ability of Canada to produce enough wheat to satisfy all the demands of Great Britain, independent of the contributions of other countries. The statement, which was well sustained, was an eye opener to many who were not aware of the possibilities of the grain-growing sections of Canada ; but with the establishment of the

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fact comes the showering of cold water upon it, the effort being made to show that in certain events and under certain circumstances, the grain could not be exported from Canada except through American ports, and by permission of the United States Government. The Liverpool Mercury, supposed to be good authority upon such subjects, speaking disparagingly of Mr. Johnson's suggestion, says :

Canada, through her Government statistician, claims to possess resources in wheat cultivation which almost take the breath away. The statistician, with sublime confidence or audacity, divides Canada into sixty-seven squares, and declares any one of these squares, each possessing eleven and a half million acres in superficial extent, would grow sufficient wheat to place England independent of the rest of the world. During the winter Canadian wheat would have to be consigned in ships through the ports of the United States. If ever a duty is imposed on American wheat imported into England we may make up our mind that every bushel of Canadian wheat passing over United States ground will be compelled to pay at least an equal duty. The intended preference would be a delusion and a snare.

Mr. Edward Atkinson, of Boston, Mass., a prolific writer on economic subjects, whose dicta usually carries weight, commenting in Bradstreet's on the article states his conviction that Mr. Johnson is correct in what he says about the wheat growing capabilities of Canada. But, he says, "for five months of the year the canals and rivers of Canada are frozen and during this most important period the crop must find its way to the British steamers across parts of the United States." Having settled that the Canadian crop must go that way, Mr. Atkinson says, "the imports and exports of the Dominion are now permitted to pass in bond, by courtesy only, by the consent of the executive officers of the United States government, and not by treaty."

Mr. Johnson, giving attention to this bonding "privilege," so called, writes to Bradstreet's from which we make some extracts. He says :

The subject thus brought up is the bonding arrangement, one very important, that the business men on both sides of the line should fully understand in order to remove misconceptions detrimental to trade. It used to be called by us the bonding privilege, and it was a great privilege to the old Province of Canada to be able to send its products during the winter to European countries and to receive from them and from South American countries their products through the Atlantic ports of New York, Boston and Portland. It was a great boon to snowed-up Canada, and was considered such a benefit that to make it more sure we got it put into one of the treaties made between the United States and Great Britain as

our suzerain. But that was over thirty years ago, and in the meantime Canada has not stood still. When, in 1866, the United States abrogated the reciprocity treaty of 1854, it did something for which we are increasingly thankful as the years roll by. We were thrown upon our own resources. The two large interior provinces, now known as Ontario and Quebec, were then like Russia is to-day, seeking from Constantinople to Dalny, from Black Sea to Yellow Sea, a seaport open all the year. We were unlike Russia, however, in that that giant finds itself opposed in its efforts at every point, now at the Persian gulf, now at the Bay of Bengal and now as Wei-wei. The old Provinces of Upper and Lower Canada looked far to the eastward and saw the magnificent frontage of Nova Scotia, with more sea ports of first-class dimensions along its 300 miles of sea front than are to be found along all the Atlantic sea line of the United States from Machias Bay to Galveston. They said, "there is our outlet to the Atlantic ocean." But no serious effort was made by the United States to prevent the interior provinces finding open seaports, and in time came confederation and the construction of the Intercolonial Railway.

Well, we got the Intercolonial Railway to Halifax in 1876, and a few years after we got the Canadian Pacific Railway across the state of Maine to St. John, on the Bay of Fundy, and still later we got railway connection with the Strait of Canso and with Sydney. Each year is witnessing the stringing together by railway of the ports on the Nova Scotia seaboard.

We have the Canadian Pacific Railway across the continent to Vancouver, and now we feel that, so far as the Canada of to-day is concerned, the bonding arrangement is no longer a privilege for us to secure by means of a treaty. It is now an arrangement mutually beneficial. If the Grand Trunk Railway carries goods from points in the western states through Canada to Portland, it also carries goods from points in Canada to the same ocean terminus. If the Canadian Pacific Railway picks up goods at various points in Canada and carries them to St. John, it does the same for goods billed from different points in the United States. If the Michigan Central obtains great assistance by being able to carry freight from points in Michigan over the Canada Southern to United States ports, it benefits Canada by doing the same for her goods. In fact, the business has become so developed that any attempt to deprive Canadians of the bonding arrangement would, I think, cause a stronger protest from United States business men than from Canadians.

Canada's railway policy, developed and yet to be developed, has effectually set aside Mr. Atkinson's idea that our crops must find their way during five months of the year to United States seaports. Some years ago I examined the question of the extent to which Canada used United States seaports, and found from United States returns that during the period, 1868-94, Canada had utilized the bonding system to the extent of 15.12 per cent. of her external trade.

Of recent years our Canadian returns give a table showing the value of goods exported and imported through United States seaports. For the year ending June 30, 1903, the extent to which we used the bonding arrangement was equal to 15.92 per cent. of our total export and import trade, or \$74,352,406 out of a total of \$467,084,685. In the previous year it was 16.6 per cent., and in 1901 it was 15 per cent. Practically, then, we use the bonding system for one-seventh of our external trade. Twenty-seven years ago we used the system for more than one fifth of that trade.

The lowest year was in 1888, when threats of non-intercourse aroused our merchants, and they countermanded their orders for delivery via United States seaports, and sent their produce to England via Canadian ports, as a measure of precaution. The percentage carried via United States seaports dropped to 10.32 per cent., though their action only influenced the business for part of the year. The oversea freight carried by the Intercolonial was doubled that year.

Mr. Atkinson refers to Canada as frozen. I watch the newspapers closely, and I venture the assertion that in the recent storm stress there were fewer trains cancelled in all Canada than were cut out in New York City alone.

Mr. Atkinson does not express with his usual accuracy the precise position of the bonding system law. The arrangement about the intransit trade is a treaty arrangement and is regulated by article XXIX of the treaty of Washington, 1871.

The transshipment branch of the business, regulated by article XXX of the treaty of 1871 was removed from treaty stipulations by the abrogation of that article in 1885. It was thought at first that all goods entering the United States for or from Canada would have to pay duty, but the authorities at Washington concluded that the act of 1866 referring to this kind of transportation revived when the treaty clause ceased to be operative. In 1900 the present law was passed, so that the bonding system for this branch of the business rests not upon the courteous consent of the executive officers, but upon an act of Congress, which must be discussed and repealed by an instrument of equal authority before the customs officials can have an opportunity to exercise their courtesy.

CANADIAN GRAIN TRANSPORTATION.

The United States Government have published a brochure written by their Consul General, Mr. A. W. Edwards, at Montreal, relating to American exports of grain through Canadian waterways.

The removal of the tolls on the Canadian canals, says Mr. Edwards, has resulted in a heavy movement of grain over the Canadian lake route and thence down the St. Lawrence, as the exporters can now handle corn for 3 cents less a bushel than by the part-lake and part-rail route to Boston. A record of 1,000,000 bushels of corn within five days is the showing that the customs reports make for the amount of grain brought from Chicago to Montreal. The record, which is for the five days previous to August 23, 1903, is more than 200,000 bushels greater than any amount ever handled in a similar period.

The Montreal Board of Trade reports up to August show that during the year 1903, 9,000,000 bushels of wheat and 4,500,000 bushels of corn have passed through the port of Montreal, as against a little more than 1,000,000 bushels of wheat and 4,000,000 bushels of corn shipped from Boston.

The matter has drawn attention to the channels in which Canadian grain at present moves to the seaboard. From a pamphlet compiled by the Northwestern Miller, the information is gleaned that last year there was shipped from the two Canadian Lake Superior ports, Fort William and Port Arthur, 35,525,798 bushels of grain. Of this total, 13,500,654 bushels, or 38 per cent. was shipped to Buffalo and Port Huron, the balance—62 per cent.—going to Canadian ports as follows:

Owen Sound.....	bushels	1,308,160
Midland.....	"	3,816,672
Depot Harbor.....	"	3,515,760
Point Edward.....	"	192,904
Meaford.....	"	972,684
Goderich.....	"	2,759,484
Kingston.....	"	4,985,176
Total.....	"	22,051,140

The following is the grain drawn from Duluth to Canadian ports:

Owen Sound.....	bushels	102,000
Midland.....	"	1,633,000
Depot Harbor.....	"	3,591,000
Meaford.....	"	1,065,000
Quebec.....	"	574,000
Goderich.....	"	100,000
Kingston.....	"	58,000
Port Sarnia.....	"	19,000
Total.....	"	7,142,000

In addition there was also handled 813,000 bushels of flaxseed.

Chicago shipped extensively to Canadian ports as follows:

Montreal.....	bushels	254,000
Depot Harbor.....	"	4,691,000
Port Sarnia.....	"	2,349,000
Midland.....	"	3,707,000
Collingwood.....	"	2,366,000
Meaford.....	"	186,000
Goderich.....	"	271,000
Other Canadian ports.....	"	81,000
Total.....	"	13,985,000

Altogether these two United States ports (Duluth and Chicago) shipped to Canadian ports 21,129,000 bushels of grain, as compared with 13,500,654 bushels shipped from the two Canadian ports (Port Arthur and Fort William) to American ports. In other words, almost 20 per cent. of the grain crop of the United States shipped by water from these two leading American inland ports passed through Canadian waterways. The routes chosen are of interest; they were:

Midland.....	bushels	13,736,972
Depot Harbor.....	"	11,797,760
Kingston.....	"	5,043,176
Goderich.....	"	3,130,484
Port Sarnia.....	"	2,363,000
Collingwood.....	"	2,366,000
Meaford.....	"	2,223,684
Owen Sound.....	"	1,410,160
Quebec.....	"	574,000
Montreal.....	"	254,000
Point Edward.....	"	192,904
Other Canadian ports.....	"	81,000
Total.....	"	43,171,140

These figures show that 48 per cent. of the grain making use of the Canadian water route was grown in the United States.

Of course, not all of these 43,171,140 bushels were exported, as a considerable portion of the Canadian-grown grain was retained for home consumption. The grain exports from Canadian ports were:

Montreal.....	bushels	19,934,278
St. John's.....	"	2,311,872
Quebec.....	"	1,629,860
Total.....	"	23,876,010

The balance of twenty million odd bushels, less home consumption, as well as the twelve million odd bushels of Canadian grain sent into the United States via Buffalo, were exported as follows:

New York.....	bushels	7,733,993
Boston.....	"	6,610,512
Portland.....	"	5,896,078
Philadelphia.....	"	1,555,938
Baltimore.....	"	104,000
Total.....	"	21,900,521

There was, therefore, more Canadian grain exported from United States ports than from Canadian—in fact, nearly as much as was exported from Canadian ports of both American and Canadian—and the Canadian grain is a considerable item in the traffic of these American ports. Last year it supplied over 21 per cent. of the grain exports of New York, 40 per cent. of the grain shipments from Boston, and nearly 65 per cent. of the Portland shipments.

It is estimated in the West that the grain acreage of Manitoba and the North-West Territories is full 20 per cent. above the previous year.

The Great Lakes and St. Lawrence Transportation Co. had last season ten ships in commission between Duluth and Quebec bringing grain from the West. The vessels are the largest carriers on the St. Lawrence canals,

being 256 feet long, 41 feet deep, and carrying 2,250 tons each on 14 feet draft of water. These vessels are able to bring grain to Quebec for from 4½ to 6 cents per bushel.

THE REDUCTION OF IRON ORE BY THE ELECTRICAL PROCESS.

Mr. Lewis Simpson, of Ottawa, delivered a most interesting address a few days ago before the Ottawa Board of Trade upon "Iron Ores, their Reduction in Electric Furnaces, and its Subsequent Conversion of the Metal so Obtained into High Class Steel."

The manufacture of steel direct from the ore by electricity being at present in a nebulous condition, and some processes looking in that direction not having resulted as satisfactorily as their promoters had desired, Mr. Simpson began his address by explaining two such cases which had come under his observation. He said:

More than once I have been gravely informed that the electric reduction of iron ore was not possible and that the great Mr. Edison had spent much time, and had lost much money in endeavoring to discover a workable process. Now, what are the facts? Mr. Edison spent much time and money in developing a process which had for its purpose the electric concentration of a very low grade iron ore, and the subsequent briquetting of the concentrated ore for the purpose of enabling the concentrated ore to be smelted in an old-time blast furnace. The electrical machinery invented and patented by him was found to do its work most satisfactorily, but he experienced great difficulty in the process of briquetting, and eventually found the cost of this process—including the cost of the necessary binding material—to be so high that his finished briquet cost him more than he could sell it for. However, in spite of this high cost I understand that an English company owns a works in Sweden, concentrating and briquetting a special iron ore, and that they are using Mr. Edison's machinery and patents for that purpose. As to the electric reduction of iron ores, I am not aware that Mr. Edison has made any special study of the matter.

Again I have been informed that Mr. Clergue of Sault Ste. Marie fame, had tried and made a failure of electric smelting. Since some months I have not heard Mr. Clergue so frequently quoted, at least in respect to manufacturing processes, but I have thought it right to investigate such statements as were made to me and the result was that I ascertained that at the Soo considerable experiments had been made with the view of discovering a method by which nickel iron ores might be reduced electrically. As the presence of nickel makes any ore very refractory and therefore hard to reduce, and as up to now there exists no known method of treating such a description of ore in an electric furnace, it is evident that Mr. Clergue's failure cannot be made to apply to the reduction of straight iron ores.

After describing the constituents of iron ore, the usual methods observed in blast furnace practise in recovering the iron therefrom, the fluxes and fuels used therein, etc., approaching the subject of such manufacture by the electric process Mr. Simpson said:

It was three years ago that my attention was first attracted to this important question. After much patient investigation, part of which I had to make in Europe and in the United States, I satisfied myself that, under the conditions existent in Canada, the electric reduction of iron ores and their conversion into steel was and is commercially possible and practicable, and that a concern to manufacture by the electric process under the conditions existing, if properly managed, should be remunerative.

It must not be forgotten that the bonuses paid by the Dominion and Ontario Governments upon the manufacture of steel are very considerable and are sufficient to eliminate any risk of loss.

I was so fortunate as to interest the Dominion Government in this question. After a thorough examination into the evidences that had been collected by me, Dr. Haanel, the

superintendent of mines, who from the first recognized the importance of this question to the Dominion of Canada, made a report advising the appointment of a Government commission. In August of that year such a commission visited the States, and now a commission, consisting of Dr. Haanel and Mr. Brown, assistant manager of the Canadian General Electric Company, have left for Europe where they will associate with themselves a steel expert of repute. They will visit Great Britain, France, Italy and Sweden. They will probably inspect the eight or more works where electro-metallurgical work is now being done upon commercial lines. It is their intention to secure such data as to the quantity of electric current used, as to the wear and tear sustained by the furnaces, and by the electrodes (in such cases where electrodes are used), as will enable Canadians to make a correct estimate of the cost of producing steel by the several processes in the several different sections of Canada. They will gather samples of the iron ore being used and of the resultant steel, and these samples will, upon their return, be assayed, in fact they will make such an examination as will satisfy the most careful and exacting investor.

At the works to be visited, furnaces of several different forms are employed, some being used for the reduction portion of the process, whilst others again are used in the conversion end of the process. It is quite possible that the commission may find one furnace the best for the manufacture of a certain quality of steel, whilst another type of furnace may be found to give better results when manufacturing another quality of steel. But of this you may be assured that the examination will be faithfully, carefully and reliably undertaken and carried out.

The electric process, as a commercial possibility, depends 1st, upon low priced electric power: 2nd, upon cheap iron ores. Low priced electric power can only be secured where a large flow of water exists falling from a considerable height, thus enabling a large unit of power to be produced at a small expenditure per horse power. Again, the position of the fall must be of a character to allow the placing of the electric furnaces in close contiguity to the power house. Such contiguity prevents a considerable loss in power and reduces in a very material manner the expenditure upon capital account. To have to transmit electric power any distance, such as is used in electric furnaces for the purpose of reduction or conversion, would simply handicap the industry.

It is not wise to expect to be able to produce more than three tons of steel for each electric horse power year used; the importance, therefore, of low priced horse power is evident.

The annual cost of electric horse power is made up of wages, maintenance, depreciation and taxes. The wages paid in a power house of small output, because of the low head of water available, may be as considerable as those paid in a power house using a high head but which consequently possesses an output ten times as large. For this reason I am of opinion that the quality and description of the water power available should be a factor in determining the installation of any plant intended to undertake this industry.

Thirty years ago it used to be said that cotton was king. For some years past steel has been proclaimed king, whilst cotton has had to take second place. Whilst steel is king, it is not the reduction and conversion departments of the steel trade that, owing to the large number of workmen employed, has placed steel in the premier position. For every 100 men employed in the reduction and conversion 500 men are employed in the process antecedent, such as mining, and 5,000 men in the processes subsequent, that is in the processes by which the steel ingots are changed into rods, bars and sheets, into castings and machinery, into engines, boilers and implements, in fact into the hundred and one things into which steels, in these days, are manufactured.

The present chief centres of the iron trade of Canada are Montreal, Toronto, Hamilton and the country around Hamilton, all localities which have been chosen because they are nearest the source of the supply of the raw material used. For instance Montreal is near England and Scotland, and Toronto and Hamilton are near Pittsburg, Buffalo and Cleveland.

Were carbonized peat or sawdust used, or even were charcoal used for the small quantity of carbon needed, then in that case it would be possible to manufacture steel solely from ingredients found in Canada.

It is claimed that there are peculiar points about the electric furnaces which secure the best quality of steel. These points are as follows:—Less carbon being used, carbon can be used that is free from sulphur, in any case as only one-tenth the quantity of carbon used in a blast furnace is required the iron could only receive from the coke one-tenth the quantity of sulphur. All coke contains sulphur more or less.

The temperature of the electric furnace can be better regulated and a higher temperature can, at will, be secured. It is claimed that this increase in temperature drives off the gases left in the steel, which is a matter of the utmost importance. It will be possible to make steel castings at a reasonable cost and yet be free from flaws or blow holes. There is a large market in Canada for such casting, both for gears as well as for mining machinery generally. The tensile strength of a cast iron casting is given as from 10,416 to 31,057 pounds, whilst that of a steel casting as from 54,928 to 63,840 pounds. It is evident therefore that mining machinery made from steel casting would need fewer repairs as the machines could be made lighter and so save much expense in freight and transit rates. Either of these advantages are matters of great importance to mine owners. Perfect steel castings, low in carbon, are sought for by all makers of electrical generators and motors. Such castings can be secured by the electric process.

Mr. Simpson summarized the general advantages of the electric process as follows:

1. Outside the expenditure upon the hydraulic and electric power, which will always be worth value, whether the electric manufacture of steel be profitable or not, the expenditure upon capital account is ridiculously small.

2. Such a steel works could be put into satisfactory operation within six months of breaking sod.

3. It is possible to commence with a comparatively small works, and when that is working satisfactorily, when the market is assured, when the raw half has been made into expert help, then the works can in six months, be doubled, trebled or quadrupled in size.

The manufacture of steel by the electric process gives the greatest percentage of profit with the expenditure of the least amount of capital spent upon the steel plant, and with the least risk and delay to the investor, and, further, as has been shown, produces the best quality of steel.

A BONDING INCIDENT.

A new phase of the bonding privilege is bothering Boston says the Montreal Herald. The Collector of Customs at Montreal started to enforce a law which requires Canadian goods to be transported in Canadian bottoms to escape customs charges. Why this law has been on the statute books without being in force is a question. But during its dormancy the transportation companies to and from Boston worked up quite a business carrying manufactures of Ontario in bond to Boston, and then sending them by steamer to Maritime Province ports. These steamers were, of course, of United States register, and under the Canadian law duty should have been charged at the ports of entry on the Canadian goods carried. That is what is being done now. The result is that the goods will go by an all-rail Canadian route in future, and the United States railroads, steamship companies and the city of Boston will lose some business.

While there may be some curiosity as to the reason the law has not been enforced heretofore, there is likely to be a good deal more as to the reason for ever having such a law made. The law was enacted by Canada because the United States has precisely the same coasting provision. For that reason the Americans are not in a position to criticize Canada for the application of an act which has an American counterpart. The Maritime Provinces have been seriously affected by the American act.

The St. John River runs through New Brunswick. The upper waters, however, are in Maine. Lumber-cut there is of

American origin, but it has to be floated down the St. John river in bond and loaded into vessels at the city of St. John, for carriage to American ports. The vessels which carry this lumber must be of United States register to have their cargoes entered duty free, for that is the American law.

Before this law was enacted the carrying trade was done by schooners which were built, owned and sailed by Canadians. Now they are all of United States register. To get that register they have to be built in the United States. Hence the Canadian ship building industry has suffered. The lumber carriers are now launched from Maine yards. To retain the American register the captain must be an American citizen. This provision has compelled a good many of the hardest captains on the coast to foreswear allegiance to the British Crown, on the penalty of losing their commands. If the United States trade will be injured by the enforcement of the Canadian law it will be the repaying of injury with injury.

Of course it would be better for both Canada and the United States if the coasting provisions of each country were abandoned. They are only a restraint upon trade, and while the laws of each country injure the other, neither country derives much benefit from its unneighborly regulations.

The sooner the provisions are repealed by both the better. However, as the United States is the larger and more powerful country, and therefore should be the more generous, it should be the first to repeal the law. Then, for once, Canada would be well advised to follow the American example.

INDENTURED APPRENTICES.

A commendable effort is being made by the Employers' Association of Toronto to improve the quality of workmen by introducing a form of indenture, by which apprentices are bound to their employers for a term of years under certain articles. This system has worked well in the Old Country, and it is contended on behalf of the Association that it will accomplish much good in steadying the boys through the period of training undergone by young workmen. This is thought to be the more desirable because of the increasing demand for skilled labor. The desirability of having apprentices regularly bound has been impressed by the association upon every manufacturer, not only for the sake of his own protection, but for the proper education of the apprentice. The form adopted by the association is very general in character, but it may be amended to suit the various trades.

The first clause provides that the company shall give the apprentice such opportunity for learning the trade as may be suited to his capacity. This, the association believes, should be the determining factor, but a later clause provides that the boy may be employed in such other department as may be required by the interests of the business. This, it is claimed, will give a variety to his work, and give him a wider knowledge of the business and the interdependence of the departments; besides, it might be difficult to keep him steadily employed in one subdepartment for five years. The clause relating to payment of apprentices is left blank, and may be filled in to suit the convenience of each separate trade, but it is recommended that the pay be increased by 50 cents per week every six months.

The clause authorizing the company to retain \$25 of each year's wages in hand is explained to be a clause for the employer's protection, to insure the faithful carrying out of the contract by the boy, and as a preventative check against those little acts of unfaithfulness and insubordination which are experienced continually under the present system. On the other hand, a clause is included which provides for a bonus for

faithful services and efficient work. It is recommended that the best method of giving the bonus is by a series of certificates which can only be realized upon when the articles are fully completed. One trade in Toronto has adopted a plan of issuing a bonus certificate for \$10 after each year of faithful work, but it may be withheld for misconduct or other default, and for flagrant misconduct or disobedience the certificates already given may be cancelled.

The apprenticeship articles, it is reported, have been received with great favor by all classes of trade in the city and have been already put in force by several actions, and also by a large number of individual firms. The general opinion expressed has been that it fills a long felt want as a method for insuring the proper education of the future workmen of Canada.

EDITORIAL NOTES.

A special and one of the most important features of the general business department of this journal has been for a long time, the classified index in which the various lines of products manufactured by our advertising friends, are mentioned, their names being found under each appropriate heading. This index is now being thoroughly revised, and, in its revised form will be published in our next issue, and will, of course, be amended from time to time as occasion may require.

One of the oldest, largest and most reliable manufacturers in Canada, writing us re the Assessment Bill now under consideration in the Ontario Legislature, expresses the opinion that the Government should turn their attention to vacant lands inside of municipalities as suitable property upon which to levy taxes, and thus relieve the long-suffering owners of houses and lots; and cease increasing the onerous burdens the manufacturers now have to bear. There cannot be anything more iniquitous, he says, than a five to forty dollar assessment on acre property inside of towns and other municipalities than the present assessment law, and that any further burden placed upon them will be a most serious handicap to their business.

An interesting judgment of international importance has been given by Judge McTavish at Ottawa a few days ago. It was in the case of Mann v. The International School of Correspondence. The plaintiff, W. E. B. Mann, was assistant superintendent for the Ottawa district for the defendant company, which has its head offices in Scranton, Pa. He lost his position, and accordingly took action in the County Court to recover \$200 for alleged wrongful dismissal. In connection with the case, a writ was served upon the representatives of the defendant company, but a motion was made on behalf of the latter to set aside such service. Defendants claimed that they did not come under the jurisdiction of the Canadian courts, as they were not resident in Canada, and only did business here along the lines followed by commercial travellers. Judge McTavish ruled otherwise, however, and stated that, as the defendant company had Canadian headquarters and representatives doing business in Canada, it must be recognized as resident, not non-resident, and accordingly amenable to the Canadian law. On this judgment plaintiff can proceed in the County Court with his original action. The judgment will likely be established as a precedent, for instance, in the legal relations between Canadian customers and American concerns. Were it otherwise, a Canadian desiring to bring action against an American concern would have to take his case to the American courts.

BLAST HEATING SYSTEM OF THE MONTREAL LIGHT, HEAT & POWER CO.

The rapid improvements being made in modern manufacturing methods and the necessary care that must be taken to decrease the cost of production has caused greater care to be taken for the comfort of employees. Increased space, better sanitary arrangements and proper light all facilitate the mechanic in his work, but a warm and healthy atmosphere is an

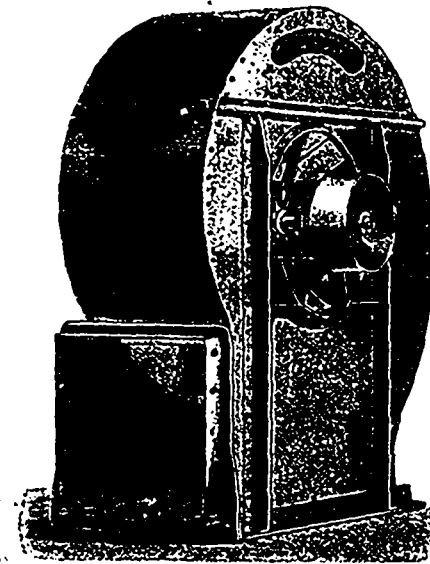


Fig. 1.—Heater and Fan as used for Factory Heating.

absolute necessity, especially in winter when the problem of ventilation must be solved, owing to the vitiation of the air caused by overcrowding, and by many processes of manufacturing. The arrangement of coils of pipe hung on the walls of a building or suspended from the ceiling is very wasteful as the heat all rises to the ceiling while the floor remains cold and draughty, besides which it provides no means for the inlet of fresh air.

The fan or blast system of heating and ventilating, besides providing any desired quantity of fresh air, maintains an even temperature throughout the building, and ensures a positive and imperceptible circulation of warm air throughout the space to be heated.

The blast heating system erected in the buildings of the Montreal Light, Heat & Power Co. at Montreal, is described here, not because it is anything out of the ordinary practice of heating and ventilating engineering, but because it has proved to be, from the time of its installation, one of the most successful and satisfactory systems of its kind. The building in which the system is installed, situated on the corner of Dalhousie and Ottawa Streets, is 300 feet long by 80 feet wide, two stories high. The heating system consists of a fan or blower of the centrifugal type, enclosed in a steel plate housing, so arranged as to draw the air through a steam heating coil with pipes

closely spaced. From the fan the air is forced to the desired points within the building. The heater is made up in sections each consisting of a cast iron base into which one-inch steam pipe is screwed, and in such a manner that the steam, admitted at one end of the base, passes up over and down a series of steam pipes, and finally escapes in the form of water of condensation from a chamber in the base immediately below the place of admittance. This heater contains 5,500 lineal feet of one-inch steam pipe, and is made up in five sections, which, being enclosed in a steel casing, are joined together at one end by means of flanges and a cast iron head.

The heater casing is connected to the inlet of a 140-inch steel plate fan with a three-quarter housing. This fan has a wheel 7 feet in diameter by 4½ feet wide, and discharges its air in an upward direction into a system of galvanized iron distributing ducts. The fan is made with an extra wide wheel so as to deliver a large volume of air when operated at a comparatively low speed. As the air in the building is changed by the fan once every twenty minutes, ample ventilation is provided, and the temperature can be controlled either by shutting off the steam from one or more sections of the heater, or by admitting more or less cold fresh air from the outside, to the heater.

The air ducts from the outlet of the fan are so arranged and proportioned that no perceptible air currents or draughts can be felt by the occupants of the building. These air ducts are made of galvanized iron of suitable gauges, all outlets being provided with dampers to permit of the different compartments being kept at even temperatures throughout. Allowance is made at all turns and branches for the resistance imposed on the moving air, and the aggregate area of the outlets ranges from 25 per cent. to 40 per cent. in excess of the area of the outlet of the fan.

This heating system is giving the best of satisfaction and requires no attention beyond turning on the steam and starting the motor which operates the fan.

The fan is furnished with self-oiling

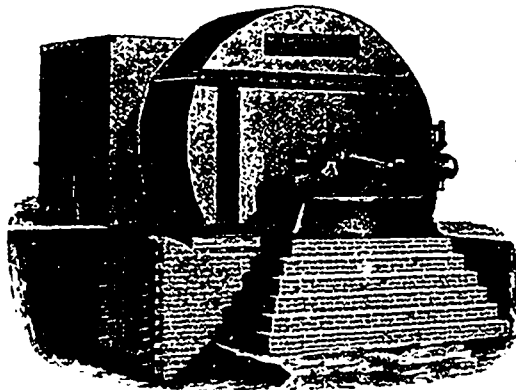


Fig. 2.—Centrifugal Fan, as used for Ventilating and Heating.

bearings, and is capable of continuous operation without undue heating. The air change is rapid yet imperceptible, and so positive is the action of the fan that a perfect circulation of air is ensured under all conditions. The galvanized iron ducts deliver the air to all parts of the building

proportionately, and deliver the air so as to keep the temperature the same throughout the different compartments.

The above system was installed in November, 1902, by the Laurie Engine Co. of Montreal, acting agents for the McEachren Heating & Ventilating Co. of Galt, Ont. The last mentioned firm has lately changed its name and is now manufacturing blast heating apparatus, fans, blowers, etc., under the firm name of Sheldon & Sheldon, at Galt, Ont.

THE GLOBE IMPROVED TUMBLING BARREL.

The Improved Oblique Tilting Tumbling Barrels manufactured and placed on the market by the Globe Machine & Stamping Co., of Cleveland, O., are meeting with the approval and commendation of a large number of manu-



The Globe Improved Tumbling Barrel.

facturers who have recently purchased these machines. These tilting tumblers are adapted to clean, smooth, brighten or polish sheet metal stampings, small iron or brass castings, drop forgings, rods, rivets, pins, washers, screw blanks, etc., giving, it is claimed, a much finer finish to the work than can be obtained by the use of the ordinary horizontal type of tumblers. The tilting tumblers can be used for either wet or dry tumbling. Many advantages are claimed for the oblique tilting tumbler over the horizontal barrels; for instance, if desired, the work can be seen during the process of tumbling, and samples of the parts in work may be taken out during the operation without stopping the machine, and progress of the finish may thus be inspected.

A ratchet and pawl on the hand wheel shaft holds the barrel in any desired position, and by means of the hand wheel the elevation or angle at which it is desired to operate the barrel may be adjusted to suit the requirements of the parts to be operated upon.

It is sometimes desirable to use sawdust or ground leather in finishing parts in these machines, and in such case, after the parts have been sufficiently operated upon, a sieve cap is fitted to the open end of the barrel, replacing the steel cap referred to above. The barrel is then lowered as far as possible, allowing it to run as usual, and the sawdust or ground leather will then work out through the sieve cap in a few moments, leaving the tumbled parts in the machine, bright, clean and free from dirt or dust. The

sieve cap is then removed and the parts will slide out into a suitable receptacle placed in front of the barrel to receive them.

A heavily made oakwood barrel is furnished on these machines, instead of steel barrels, when preferred by purchasers. The No. 16 Oblique Tumbler weighs about 425 pounds. The barrel is 22 inches diameter at the large end, 16 inches diameter at the small end, and about 24 inches deep. They run at about 40 revolutions per minute. They have tight and loose pulleys. The Globe Machine & Stamping Co. issue a neat little special circular describing these tumblers.

THE TRENT VALLEY CANAL.

"The Trent Valley Canal and the Development of Canadian Waterways," was the subject of a paper read by Mr. J. Alexander Culverwell, before the Canadian Institute, Toronto, on the evening of February 6. The address was illustrated with some forty lantern views, showing topographical maps, structures and scenes of the Trent Valley, the Soo, the Welland, the St. Lawrence, the proposed new enlarged Erie, and the Dortmund-Ems German canals, and an interesting and lucid description was given of all these systems.

Mr. Culverwell argued that in the Trent Valley Canal, we were following out the same method adopted in the one hundred million dollar modern German canal, which, by means of canalized rivers connected the coal and steel districts of Germany with the North Sea, namely, length and breadth of lock rather than depth. It was recognized that bulk of barge could be accommodated more cheaply in that method of construction, effecting also a cheaper means of transportation. The draught of each system will be eight feet, the locks of the Trent being wider in fact, but not so long.

The present Erie Canal locks accommodate barges of 250 tons capacity.

The enlarged Erie Canal when completed will accommodate barges of one thousand tons capacity with dimensions of 150x25 feet wide, with ten feet draught, and the canal is to cost over one hundred million dollars, whereas the Trent Valley Canal will accommodate barges of 800 tons capacity. The dimensions of the Trent locks are 134x33 feet wide with 8 feet draught, and the total cost will be only about nine million dollars, four millions of which is already spent on the inside section. This section, which will give 160 miles of navigation between Lake Couchiching, an arm of Lake Simcoe, on the north, and Rice Lake on the south, will be completed this coming summer. The balance, of five million dollars, will open up the two outlets, viz:—the north outlet between Midland on Georgian Bay, and Orillia on Lake Simcoe, and the south outlet between Rice Lake and Lake Ontario, either at Port Hope or Trenton. This waterway would then open up 1,000 miles of inland shore line, many of the lakes and rivers lying transversely to the line of canal.

The speaker explained that the pur-

pose of the Trent Valley Canal, or as he termed it, "Nature's Short Route Grain-Carrying Water Way," is to connect the Upper Lakes at Midland, on Georgian Bay with the Trent Valley canal where the great ocean-like steamers will discharge the grain into canal barges, and after passing through this canal and waterway, via Peterboro, "The Water-power City," where the greatest hydraulic lift lock in the world is located, will at its eastern end enter Lake Ontario either at Port Hope or Trenton, the route thence proceeding via the St. Lawrence canals to Montreal, where the barges will discharge direct, by means of floating elevators, into the ocean-carriers for Europe, having been hauled, several in consort, by steam from Georgian Bay to Montreal.

This route, which should be called a waterway and not a canal as only eighteen out of the 200 miles of its length will be actual canal, compared with the 257 miles of the Erie Canal, brings out its natural advantages in a most noticeable manner.

The route will be 730 miles shorter between the Soo and Liverpool than by the Erie route, and will be one day shorter than the Welland route between the Soo and Montreal.

Views were shown of the immense double hydraulic lift lock at Peterboro, and its method of operation was explained, as also the fact that the five hydraulic locks to be used on the canal will save six hours over the ordinary system of lockage. Views were also shown of similar locks in Europe, which the speaker demonstrated have revolutionized canal methods there.

The enlarged Erie Canal will—the New York State Commission reported—reduce the grain freight rate from Buffalo to New York City by two-thirds as also completely underbid the New York railroad rate possibilities.

The Dominion Marine Association is now asking the Government to enlarge the Welland Canal from a 2,000 ton boat capacity and a draught of fourteen feet to a capacity of lock to pass their 6,000 ton boats on to Kingston, making necessary a 21 foot channel, and doubling the length of locks, the idea being to discharge at Kingston into 2,000 ton barges to pass through the St. Lawrence canals. This request is urged just after an expenditure of forty million dollars for enlarging that system.

Mr. Culverwell advocated, first, the expenditure by the Dominion Government of the five million dollars necessary to complete the outlets of the Trent Canal, thus giving an international grain route as well as communication by water between Peterboro, Lindsay, Orillia and such points with Toronto, Hamilton and other ports on Lake Ontario. He also pointed out that American marine journals have repeatedly stated that the only Canadian route that they feared was the barge route through the Trent Valley, which as they expressed it, was simply a connecting up of our interior lakes and rivers. The speaker remarked that it was fashionable to talk ship canal instead of a barge system, but

the leading American and German engineers had advised a barge system upon which two hundred million dollars is now being expended in Germany and in New York State.

Mr. Culverwell also recently read a paper on "The Enlarged Erie Canal and its relation to Canadian Waterways," before the Engineers Club of Toronto, of which he is an officer.

PROFITABLE ADVERTISING.

Among the Canadian industrial concerns who employ advertising experts to handle their publicity department is the well known Goldie & McCulloch Co., Galt, Ont., prominent in many ways in the various lines of the machinery industry. Mr. F. B. Utley has been in charge of the advertising of this concern for a number of years during which he has worked out many original ideas in circular and catalogue work as well as in the regular advertising of the firm, and his work along these lines present an apt illustration of profitable publicity following



F. B. UTLEY.

as the result of properly directed efforts. The Goldie & McCulloch Co. have been issuing very high class catalogues and many very clever booklets and mailing cards. The high grade half tone illustrations which appear in their literature are from photographs made by Mr. Utley, himself, who has won a number of prizes in advertising contests, among them the Dunlop prize. Mr. Utley makes it a point to conduct visitors through the big plant of the company recognizing this to be a profitable source of publicity. He is a thoroughly up-to-date advertising man who loses no opportunity to give his firm publicity, and who writes advertising that pays.

The Enoch James Roofing Co., Montreal, have been incorporated with a capital of \$50,000, to acquire the patents of Enoch James and to manufacture James' patent roofing, contractors' supplies, etc. The provisional directors include Enoch James, A. G. F. Ross and J. J. Jackson, Montreal.

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. Bickle, Anderson & Co., Toronto, have just installed a complete plant for the manufacture of moulding, etc.

The Windsor Hotel at Fort William, Ont., was destroyed by fire February 25. Loss about \$10,000.

The Chicago Pneumatic Tool Co., for which Mr. J. B. Wilson, Temple Building, Toronto, is Canadian manager, have recently installed a number of their tools in the plant of the Bertram Engine Works, Toronto.

The Imperial Vise Co., Galt, Ont., have recently moved into their new factory building and installed additional machinery. The new building is of brick, 80 x 60 feet. Among the new equipment is a Cincinnati milling machine purchased from H. W. Petrie, Toronto.

Messrs. Reed & Kilmer, Hamilton, Ont., have installed two 400 k.w. generators in the plant of the Colonial Cement Co., Warton, Ont.

The Canadian Corundum Wheel Co., Hamilton, Ont., are now occupying their new works in that city. Their output has been increasing very rapidly and in their new quarters they are well equipped to handle all contracts promptly.

Messrs. Williams Bros., architects, Windsor, Ont., are preparing plans for a Roman Catholic church to be erected in that city at a cost of about \$30,000.

The smelting works of the Canadian Copper Co. at Copper Cliff, Ont., was destroyed by fire February 19. Loss about \$150,000. The company will use the Mond Smelter at Victoria Mines, Ont., until the works are rebuilt.

William Thompson, Youngstown, Ohio, has made an offer to the city of London, Ont., to establish a large china factory there on condition that the city will successfully endeavor to get a duty of from 30 to 70 per cent. against china put in the tariff.

The Ottawa Lumber Co., Ottawa, Ont., have purchased the Malloch mill property in Arnprior, Ont., which has been operated by Messrs. J. T. Gillies, and has a sawing capacity of about 60,000 feet per day.

The Gutta Percha & Rubber Mfg. Co., Toronto, are erecting a storage house for coal, which will cost about \$8,400.

The Geigy Aniline & Extract Co., New York City, have been licensed to manufacture anilines, dye-stuffs, chemicals, etc., in Ontario, with a capital of \$40,000. T. D. Wardlaw, Toronto, is their attorney.

The warehouse of the Essex flax mill at Essex, Ont., was destroyed by fire February 22. Loss about \$10,000.

The building occupied by the Turnbull, Elevator Mfg. Co., and Geo. R. Burt, piano manufacturer, Toronto, was damaged by fire February 18. Loss about \$7,000.

The flax mill of the Ripley Flax Co. at Ripley, Ont., was destroyed by fire February 19. Loss about \$3,500.

The Barnett & Record Co., a United States incorporation, have been licensed to do a contracting business in Ontario, with a capital of \$125,000. W. H. Nelson, Port Arthur, Ont., is their attorney.

The National Cash Register Co., a United States incorporation, have been licensed to manufacture cash registers, etc., in Ontario, with a capital of \$40,000. F. E. Mutton, Toronto, is their attorney.

Messrs. Westinghouse, Church & Kerr, incorporated under the laws of United States, have been licensed to manufacture engines, boilers, etc. in Ontario, with a capital of \$40,000. H. S. Stinson, Hamilton, Ont., is their attorney.

The Walthausen Hat Mfg. Co., composed of American capitalists, will erect a three story factory 150 x 150 feet at Cornwall, Ont., for the manufacture of felt hats, etc., and will employ about 150 men. The town council have granted them a free site and a bonus of \$20,000.

The town of Collingwood, Ont., is applying to the Legislature for authorization of an agreement reached with the Cramp Steel Co., which alters a former agreement whereby the town was to give a bonus of \$115,000 to the company on condition that they erect smelting works and a steel furnace, to be in operation by July 1 next. The steel plant is now ready for operation, having been erected at a cost of \$400,000, but the company seek to be relieved of the obligation to erect a smelting plant. They do not intend to abandon the smelter part of the industry, but wish not to be obliged to erect it by July 1 next, nor until the steel plant has been

well established. The town has agreed to this on condition of the bonus being reduced to \$60,000.

The water will be drawn out of the Cornwall canal on April 1, and will not be remitted into it before May 1 next.

The Menzie Mfg. Co.'s warehouse, shipping and finishing rooms, Toronto, were destroyed by fire February 24. Loss about \$30,000.

The Grand Trunk Railway station at Swansea, Ont., was destroyed by fire February 21. Loss about \$1,500.

The cold storage warehouse owned by the Apple and Produce Cold Storage and Forwarding Co. at Trenton, Ont., was destroyed by fire February 20. Loss about \$60,000.

The Carter-Crume Co., Toronto, have increased their capital from \$1,975,000 to \$2,050,000.

The plumbing and drainage system of the Toronto jail is to be remodeled.

The Toronto University authorities are applying to the Ontario Government for an appropriation for a new physics building.

Henry New has sold out his interest in the Hamilton and Toronto Sewer Pipe Co., to his brother, J. H. New, who will conduct the business.

The town council of Toronto Junction are considering the erection of a produce market, also an isolation hospital.

The Canadian Bridge Co., Walkerville, Ont., have increased their capital from \$250,000 to \$400,000.

The John Goodison Thresher Co., Sarnia, Ont., have increased their capital from \$99,000 to \$300,000.

The Tuf Sole Shoe Co., Toronto, have been incorporated with a capital of \$50,000, to manufacture boots, shoes, leather, etc., and to acquire the business of B. L. Kennedy Boot & Shoe Co. The provisional directors include B. L. Kennedy, P. M. Goff and J. W. Phillips, Toronto.

A. B. Ormsby, Limited, Toronto, have been incorporated with a capital of \$100,000, to carry on the business of a building contractor and engineer. The provisional directors include A. B. Ormsby, T. A. Rowan and N. Sommerville, Toronto.

The Deep Oil & Gas Co., London, Ont., have been incorporated with a capital of \$100,000, to manufacture petroleum oil, and to erect refineries, etc. The provisional directors include L. Teskey, Toronto, C. E. J. Smith, London, and M. Elliott, Otterville, Ont.

The Cement, Stone & Building Co., Toronto, have been incorporated with a capital of \$50,000, to manufacture building materials, builders' supplies, etc. The provisional directors include W. D. McVey, H. H. Thompson and Robt. Taggart, Toronto.

The Double Use Mitten Co., Dundas, Ont., have been incorporated with a capital of \$100,000, to manufacture gloves, mittens, etc. The provisional directors include H. G. Smith, C. H. Frost and H. C. Gwyn, Dundas.

The Toronto Furniture & Supply Co., Toronto, have been incorporated with a

capital of \$100,000, to manufacture furniture, etc. The provisional directors include Thos. Clark, Thos. Walker and W. H. George, Toronto.

The National Typewriter Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture typewriting machines, office supplies, etc. The provisional directors include F. H. Hurlburt, W. A. Mills and Wm. York, Toronto.

Plans have been received for the new turbine steamers to be operated on the great lakes between Toronto and Port Arthur, on an eight-day schedule for the round trip. The boats, according to present plans, are to be operated by a company to consist of the stockholders of the old Georgian Bay Navigation Co., which owned the steamer Pittsburg, and new capital. The plans were made by the Walker shipyards at Newcastle-on-Tyne, England. They call for turbine boats, 250 feet over all, 240 feet keel and 41 feet beam. The carrying capacity for each is to be 242 passengers, and 1,000 tons of package freight, on twelve feet draft. The contract speed will be sixteen knots an hour. The plan of the new company is to coast between Toronto and Port Arthur, making the round trip in eight days, and carry aside from the passengers, package freight up and flour down. The estimated cost of each of the new steamers is \$250,000.

The Nottawa Flour and Grist Mill at Collingwood, Ont., owned by John Breckenridge, was destroyed by fire February 27. Loss about \$10,000.

The Craig Mining Co., a United States incorporation, have been licensed to do a mining and milling business in Ontario with a capital of \$50,000. W. A. Hungerford of Belleville, Ont., is their attorney.

The Kingston Locomotive Works, Kingston, Ont., will build ten engines for the Canadian Pacific Railway and twenty-five for the Intercolonial Railway.

The Dodge Mfg. Co., Toronto, have completed their undertaking of furnishing special machinery and castings for the Harbor Commissioners' million bushel elevator at Montreal. Some 250 tons of machinery and castings from the company's plant at Toronto Junction have been supplied and the work has been executed in a manner thoroughly satisfactory to the contractors, Government inspectors and engineers, and which does credit to the Dodge Co. The huge steel marine log has been successfully hung in position in the tower and is said to be the largest in Canada. It was with a peculiar view of meeting the demands of jobs like this that extensive additions were made to the company's plant, which with their modern foundry of 15 tons per hour cupola capacity, travelling cranes, etc., the up-to-date machine shops and tool room, pattern shop and modern offices and engineering departments, are worthy of a visit.

The Map & School Supply Co., Toronto, will change their name to The Central Electric & School Supply Co.

Messrs. E. Van Allen & Co., Limited, Hamilton, Ont., have been incorporated

with a capital of \$100,000, to acquire the business of E. Van Allen & Co., and to manufacture shirts, collars, cuffs, etc. The provisional directors include E. Van Allen, Wm. Southam and C. S. Scott, Hamilton.

The Castile & Mill Soap Co., Preston, Ont., will change their name to The McDermott Walsh Soap Co.

The W. H. Wilson Co., Tilsonburg, Ont., have been incorporated with a capital of \$40,000, to manufacture vinegar, cider, jellies, etc. The provisional directors include Wm. H. Wilson and Geo. H. Buckrell, South Norwich, Ont., and J. E. Weston, Tilsonburg.

The Brantford Hosiery Co., Brantford, Ont., have been incorporated with a capital of \$75,000, to manufacture hosiery and underwear. The provisional directors include F. Cockshutt, R. J. Strauss and J. H. Hines, Brantford.

A syndicate in which Mr. J. J. Warren Toronto, is interested, are considering the establishment of a large pulp mill at a cost of \$200,000, at North Bay, Ont. The town has voted a bonus of \$15,000, toward the enterprise.

A paper box company is being organized at Stratford, Ont. C. A. Somerville, of London, Ont., is interested.

The Lac Seul, Rat Portage & Keewatin Railway Co., are asking for an amendment to their charter to enable them to build a branch from Rat Portage to connect with the Grand Trunk Pacific Railway Co. The Irondale Bancroft & Ottawa Railway are asking for legislation to amalgamate with the James Bay Railway.

Mr. John Knight, superintendent of the "Royal Dominion" flour mills, Toronto, writing to the Rossendale Belting Co., Toronto, says:—We have been using your belting for over five months working night and day. Some of our drives have been very difficult (quarter twist), and we find that they have not needed any attention up to date. We never were able to get any other belting to do the work which your belts have done, and take this opportunity of informing you of the fact.

The Consumers' Gas Co., Toronto, propose erecting a new gas holder at a cost of about \$500,000.

Chas. Gordon, chairman House of Refuge Committee, Owen Sound, Ont., is inviting tenders for supplies of furniture, implements and general equipment for the Industrial Farm at Markdale, Ont.

The Keewatin Lumber Co., Keewatin, Ont., have a contract with the Canadian Pacific Railway to supply 250,000 railway ties or as many more as they can during the coming summer. Their new tie mill will have a capacity of 4,000 ties per day.

The Guelph Foundry Co., Guelph Ont., will have a four story extension added to their works. Messrs. McPhee & Mahoney of Guelph, are the architects.

On the first day of February the Newmarket, Ont., factory of United Factories, Limited, resumed operations at full capacity. The four old boilers which were of a combined capacity of 400 h.p., have been

replaced with Babcock & Wilcox water-tube boilers of latest pattern, and with a capacity of 750 h.p.

The Hamilton Gas Light Co., Hamilton, Ont., have awarded to the Economical Gas Apparatus Construction Co., Toronto, a contract for the installation of one large set of carburetted water gas apparatus, complete with oil tank and tar separator.

The Smith's Falls, Ont., water commissioners have bought from John McDougall Co., Montreal, three new pumps for the pumping station. One is to be a steam power pump with a capacity of 1,000 gallons a minute; one is to be a water power pump with a capacity of 600 gallons a minute, and the other is to be an electric pump with a capacity of 600 gallons a minute. The new pumps are to be in place by May 1.

The Perth Flax & Cordage Co., Stratford, Ont., will enlarge their factory, making the output three times its present capacity. Manager Holmes has recently returned from a machinery purchasing trip to England.

The Grand Trunk Railway Station at Air Line Junction, Ont., was destroyed by fire March 1.

The Imperial Paper Co., Sturgeon Falls, Ont., are now making from 40 to 50 tons of paper daily and will probably increase the capacity to 120 tons. They have plenty of pulp limits and water power and now require additional buildings and machinery which will cost about \$1,000,000.

The Toronto Industrial School Board will erect a new building at a cost of about \$15,000.

Mr. H. Murton's oatmeal mill at Guelph, Ont., was destroyed by fire March 1.

Contractor M. A. Pigott, Hamilton, Ont., has finished his contract for the International Harvester Co., Deering Division, that city, the aggregate cost of which is said to have been about \$250,000. The contract was begun early last May, and included the erection of a warehouse, 450 feet long by 130 feet wide; paint shop, knife and bar building; addition to the forge building 400 x 90 feet; wood room extension; extension of the grey iron foundry, 450 x 90 feet; mill room, and twelve large ovens of firebrick. The company are considering the advisability of having more buildings erected, although they have spent about a million dollars already. When the Cataract Power Co. have their new generators installed at DeCew Falls it is anticipated that the International Harvester Co. will be supplied by them with all the power they require for their immense factory.

The Vokes Hardware Co., Toronto, are considering the erection of an iron foundry.

The Berlin, Ont., Light Commissioners are making rapid progress with the installation of new plant and machinery both in the gas and electric light departments. Four Westinghouse gas engines are now being installed to operate the electric plant, and the Economical Gas Apparatus Construction Co. have commenced work upon the installation of coal gas benches and other apparatus of spec-

ial type. Under the efficient management of Mr. W. H. Cone, the Berlin gas and electric plants are proving a splendid investment for that town.

The entire plant, buildings and land owned by the James Cooper Mfg. Co., at Rockfield, near Montreal, have been sold to a syndicate to be known as the Canadian Engineering Co., composed for the greater part, of shareholders of the Canadian Bullock Electric Mfg. Co., the price paid being, it is said, in the neighborhood of \$200,000. The plant was considered to be one of the most complete for manufacturing mining machinery in Canada. The buildings have been but a very short time in use. The company will engage in the manufacture of machinery for the Canadian Bullock Electric Mfg. Co., and the Lidgerwood Hoist & Cable Co. Mr. R. W. Chapin, of New York, formerly manager for the Ingersoll Rock Drill Co., has been appointed manager for the new concern.

The Canadian Pacific Railway Co.'s mechanical department, Montreal, are inviting tenders for the machinery to equip their new shops at Winnipeg, Man. The value of the machinery to be tendered for will be about \$40,000.

The Belgo Pulp & Paper Co., Shawinigan Falls, Que., have commenced the manufacture of paper.

The West Canadian Collieries, Limited, capital \$1,000,000, will apply to the Dominion Parliament for powers necessary to the development of mining property.

The Orford Mountain Railway station at Valcourt, Que., was destroyed by fire February 8. It will be rebuilt at once.

The council of Ste. Cunegonde, Que., have accepted the plans of Messrs. C. Dufort & A. Piche, architects, for the erection of a new City Hall, at a cost of about \$50,000.

The Ogilvie Flour Mills Co., Montreal, have closed a contract for the construction of a new steel elevator at Fort William, Ont., with a capacity of 500,000 bushels. The contractors are the Macdonald Engineering Co., Chicago, Ill.

D. A. Ansell, Mexican Consul-General at Montreal, is conferring with government officials at Mexico regarding the project to establish a line of steamships to ply between the ports of Canada and Mexico. Both the Canadian and Mexican governments will grant the new line liberal subsidies in order to build up the trade between the two countries.

J. Lumsden, of Lumsden's Mills, Que., has recently put into operation a large sawmill at that place.

The Dominion Government are inviting tenders for the construction of a pier at Douglstown, Que.

The Macdonell Construction Co., Montreal, have been incorporated with a capital of \$500,000, to carry on a general contracting business, etc. The provisional directors include Jas. A. Macdonell, Fernie, B.C., N. G. Guthrie and C. Pringle, Ottawa, Ont.

The Montreal Carriage Leather Co., Limited, St. Henri, Que., have been in-

corporated with a capital of \$250,000, to acquire the business of the Montreal Carriage Leather Co., and to manufacture carriage and other leathers, etc. The provisional directors include J. A. Stevenson, A. W. Stevenson and R. G. Stevenson, Montreal.

The Elite Costume Co., Limited, Montreal, have been incorporated with a capital of \$40,000, to acquire the business of the Elite Costume Co., and to manufacture ladies' garments, etc. The provisional directors include H. Wener, S. Wener and A. R. Oughtred, Montreal.

The water committee of the Montreal city council have recommended the purchase of a new 12,000,000 gallon pump to cost about \$75,000.

A water purifying plant will be installed at Bridgeport, N.S., in the spring. The plant will consist of two large tanks, much like railway tanks. The capacity of each tank is over 2,000 cubic feet, and pumps will fill one every hour.

The new drill hall about being erected in St. John, N.B., will cost between \$75,000 and \$100,000. Col. White, D.O.C., who has received the plans will supervise the building operations.

Messrs. W. A. McKay & Co., have been awarded the contract for installing the electric light system at Sydney Mines, N.S. The town will have 100 arc lights, and there will be about 2,000 house lights. The system will be completed in July next.

The Roman Catholic church of St. Anne, at French Village, N.B., was destroyed by fire March 1. Loss about \$2,500.

A syndicate of Canadian and American capitalists of Boston, has been formed to develop and operate the extensive submarine coal areas at South Head, Nova Scotia. These areas comprise no less than twenty-seven miles, and it is estimated contain 240,000,000 tons of coal. The exploitation of this vast deposit of coal marks the largest submarine project in the world, and if the plan of the syndicate are carried out will mark the inauguration of a new era in the coal industry of the province.

The Intercolonial Railway have awarded to Rhodes, Curry & Co., Amherst, N. S., a contract for 175 box and flat cars.

The Dominion Coal Co., Sydney, N.S., will erect 200 houses for miners and employees at their newly established pit at Big Glace Bay, N.S.

In the course of a few months the Dominion Coal Co., Sydney, N.S. will establish another large colliery, at Low Point, near Sydney.

Work has been commenced on the construction of the coal washing plant, for the Dominion Iron & Steel Co., at Sydney, N.S. The plant will be as large as the largest in the Pennsylvania coal districts, and will cost about \$400,000. The building will have a concrete foundation 24 feet high, with steel frame and brick walls on top about 50 feet high. The plant will have a capacity of over a thousand tons per day, and will be equipped with all the latest designs in machinery for the washing of coal. The con-

struction work will be superintended by P. A. Von Aueberg, representing Messrs. Heyl & Patterson, Pittsburg, Pa., the contractors.

The Dominion Coal Co., Sydney, N.S. will open up two pits, one at Glace Bay and the other at Victoria, N.S.

A new fog alarm has been erected on Tiner's Point, near Pisarinco, N.B. It was built by Messrs. Bates & Flood, St. John, N.B., and the plant was put in by Robert Simmons, Ottawa Ont. The alarm is a diaphone whistle, operated by compressed air, run by oil engines.

The Charlottetown Condensed Milk Factory, Charlottetown, N.B. have received a large order from Yokohama, Japan, for condensed milk for the Japanese Government.

A dividend of 40 per cent. was declared at a recent meeting of the Newfoundland Whaling Co., operating at Chaleur and Rosarue. The company also carried to their reserve account a sum equal to another 20 per cent. Two hundred and sixty whales were killed by the ship Puma.

Mr. John F. Miller, Vernon River, P.E.I., has recently installed in his flour mill the latest improved machinery.

The Helen Shipping Co., Yarmouth, N.S., have been incorporated with a capital of \$12,000, to carry on a general shipping business, etc. The provisional directors include B. Davis, F. L. Davis and C. S. P. Robbins, Yarmouth, N.S.

Messrs C. T. Daykin, C. E. Morris and D. McDonald, Winnipeg, Man., are interested in a syndicate which is being formed at Lacombe, Man., for the manufacture of bricks.

The Winnipeg, Man. Exhibition Association have the plans out for the projected new buildings, necessary for this year's show. The proposed buildings will cost \$50,000. The plans as presented call for a main building 400 by 300 feet, costing \$33,000; ornamental front for the industrial, live stock and other buildings, \$4,000; moving the present buildings, \$6,000; sundries, such as fences, walks, drains, etc., \$7,000.

The trustees of Zion church, Winnipeg, Man., are inviting tenders for the erection of a new church building.

The Great Lakes & Northwest Transportation Co. will apply for a charter to construct canals and improve the navigation between Lake Superior and Red River near the City of Winnipeg, and thence north and west through Lake Winnipeg to the Saskatchewan River, and the North-West; to improve the navigation of the Saskatchewan River and its tributaries; to construct a transportation route by water from the headwaters of the Saskatchewan River to Lake Superior.

The Winnipeg Safe Works, Winnipeg, Man., a new company, have opened up for business and will manufacture safes, vault doors, etc.

The C. R. Steel Furniture Co., Winnipeg, Man., will apply for permission to change their name to The Royal Furniture Co. Limited.

The Waterous Engine Works Co., Winnipeg, Man., have shipped to the town of Lacombe, Alta., one of their No. 2 gasoline fire engines with one village hook and ladder truck, hose reel and hose, giving that town a complete up-to-date fire equipment.

A company is being organized to take over the woolen mill business of Mr. Schneider at Morden, Man. It is proposed to raise a capital of \$30,000.

Messrs. Gordon, Ironside & Fares, Winnipeg, Man., have stated their intention of building a large abattoir at Port Arthur, Ont.

The Waterous Engine Works, Winnipeg, Man., have received an order from the town of Dauphin, Man., for a No. 7 gasoline fire engine, 13 h.p. hose cart, fire hooks and 500 feet of hose.

A magnificent Roman Catholic Cathedral will be erected at St. Boniface, Man. It will be 263 feet long by 85 feet wide. Messrs. Marchand & Haskell, Montreal, are the architects.

Messrs. John Love, of the Winnipeg Elevator Co., and W. H. McWilliams, of the Canadian Elevator Co., Winnipeg, Man., were recently at Fort William, Ont., where they held a meeting with the town council to consider the proposition of the Dominion, Northern, Winnipeg and Canadian Elevator Companies to construct a large modern terminal elevator with a capacity of 1,500,000 bushels there. It was decided to give the company exemption from general taxation for 20 years. The Barnett & Record Co., Port Arthur, Ont., are the contractors.

Winnipeg, Man., is applying to the Dominion Government for a new federal building.

Messrs. D. E. Holston & Co., of Duluth, Minn., are erecting a sash and door factory in Winnipeg, Man. A 40 h.p. engine and other machinery will be installed. Mr. E. A. Holston will be manager.

The Morden Roller Flour Mill at Morden, Man., was destroyed by fire February 19. Loss about \$14,000.

Edward Boyce, carriage maker, Winnipeg, Man., will erect a five story brick building at a cost of about \$30,000.

The secretary-treasurer of the municipality of Whitewater, Man., is inviting tenders for the construction of a bridge over the Souris River. The bridge will consist of two Howe Truss Spans, one of 100 and one of 70 feet, together with pile approaches.

One of the officials of the Lac du Bonnet Mining Development Co., Winnipeg, Man., stated that that company intend making many improvements and enlargements in the spring. It will supply all the brick for the new Union Bank building at Winnipeg, which will require for the outside alone in pressed brick about 1,500,000.

Alex. Allan, Collector of Customs at Calgary, N.W.T. will erect a business block in that city at a cost of about \$20,000.

Moose Jaw, N.W.T., now an incorporated city, is submitting a by-law to

authorize the raising of \$10,000 for building a city hall, fire hall and market building.

J. M. McRoberts, W. H. McRoberts and H. M. McRoberts, have purchased the Ottawa hotel estate at Moose Jaw, N.W.T., and will erect an up-to-date hotel costing \$20,000.

The Canadian Pacific Railway Telegraph Co. will erect about 400 miles of new pole line in Manitoba and the North West Territories. Another copper wire will be placed between Montreal and Winnipeg which will be used as a third duplex between these points, and an additional copper wire will be put up between Montreal and Quebec.

Tenders are being invited for the erection of a Presbyterian church at Regina, N.W.T.

The Edmonton, Athabasca, and Mackenzie River Railway Co. will apply for incorporation, to construct and operate a line of railway from Edmonton, N.W.T. to the Hay River, on the south-west shore of Great Slave Lake.

Edmonton Council N.W.T. have accepted the plans of W. G. Tretheway, promoter, of Montreal, for an electric street railway.

C. J. Stewart, secretary of Reston, Man., is inviting tenders for the erection of a public school building in that town.

The Imperial Implement Co., Winnipeg, Man., have been incorporated with a capital of \$100,000, to manufacture machinery accessories, supplies, etc. The provisional directors include J. F. Templeton, John Persee and C. W. Clark, Winnipeg.

Mr. W. V. Stevenson is interested in the establishment of a large grist mill at Bradwardine, near Brandon, Man.

The Medicine Hat Woolen Mills Co., Medicine Hat, N.W.T., will have their new mill in operation shortly, the machinery for which is now being installed, also an electric lighting plant. Mr. Philip Whelen will be manager.

The Richard III Mining Co., have been incorporated at Victoria, B.C., with a capital of \$650,000, to carry on a mining, milling and reduction business.

The Spruce Creek Power Co., have been incorporated at Victoria, B.C., with a capital of \$150,000, to operate water powers for hydraulic mining purposes, milling and manufacturing purposes, etc.

The Times Printing & Publishing Co., Victoria, B.C., have been incorporated with a capital of \$100,000, to acquire the business of The Victoria Times & Publishing Co., and to carry on a general printing and lithographing business.

The Spy Glass Mining & Development Co., have been incorporated at Victoria, B.C., with a capital of \$500,000, to develop and refine minerals, etc.

The Queen-Dominion Mining Co., have been incorporated at Victoria, B.C., with a capital of \$500,000, to carry on a mining, milling and reduction business.

The Great West Optical Mfg. & Supply Co., Vancouver, B.C., have been incor-

porated with a capital of \$100,000, to acquire the business of the Jordan Optical Institute and to manufacture optical goods and supplies.

The Butler Freighting & Towing Co., have been incorporated at Victoria B.C. with a capital of \$25,000, to build ships, vessels, barges, etc.

The Vancouver Clear Cedar Mill Co., Vancouver, B.C., have been incorporated with a capital of \$25,000, to manufacture lumber, etc.

The Cascade Steam Laundry Co., Vancouver, B.C., have been incorporated with a capital of \$10,000, to carry on a general steam laundry business, etc.

The Crawford Double Rope Aerial Tramway System, Limited, Nelson, B.C., have been incorporated with a capital of \$10,000, to manufacture aerial tramways, etc.

The Camp Creek Hydraulic Placer Mines, have been incorporated at Victoria, B.C., with a capital of \$125,000, to carry on a mining, milling and reduction business.

The Cascade Power Co., have been incorporated at Victoria, B.C., with a capital of \$50,000, to carry on the business of a power company.

The Fort Steele Brewing & Malting Co., Fernie, B.C., have been incorporated with a capital of \$150,000, to acquire the business of the Fort Steele Brewing Co., and to carry on the business of brewers and malsters, etc.

The Yoho Bath Heater Co., have been incorporated at Victoria, B.C., with a capital of \$50,000, to manufacture a bath heating apparatus, etc.

An order in Council has been passed providing that no mining regulations or other regulations for the sale or disposal of Government lands shall apply to the 50,000 acres of coal-bearing lands in the Crow's Nest Pass district selected by the Government. These lands are only to be disposed of as specially authorized by order in Council.

The output of the Crow's Nest Pass Coal Co., at Fernie, B.C., in 1903, was as follows:

	Coal.	1902.	1903.
Coal Creek.....		267,429	242,673
Michel.....		127,515	263,590
Morrissey.....		46,292	154,855
Total.....		441,236	661,118
Increase, 219,882 tons.			
	Coke.	1902.	1903.
Coal Creek.....		87,909	94,441
Michel.....		32,868	72,598
Morrissey.....		700
Total.....		120,777	167,739
Increase, 46,962 tons.			

There were 42½ coke ovens in operation at Coal Creek, 341 at Michel, and 143 at Morrissey. The company have under construction 123 new coke ovens at Michel and 92 at Morrissey, making a grand total of 1,123 ovens. The average number of men employed at the mines was 1,450, or 466 more than in 1902.

Bulletin 18, issued by the Bureau of Information for British Columbia, supplies some interesting statistics regarding that province for last year. Although the mining centres were seriously affected by the disastrous strikes of the miners, which continued during the spring and summer, recovery has been very rapid and the industry is now believed to have attained a stability and to promise greater success than ever before. There has been a general revival throughout the province, production has materially increased and the outlook is described as very promising. A careful estimate gives the total output of metalliferous mines at 1,276,000 tons and of coal mines as 1,686,149 tons, the total value being \$19,200,000. Gold both placer and lode, is responsible for \$6,900,000 of this total; coal and coke, \$5,250,000 and copper \$4,500,000.

Some considerable quantity of New Zealand flax is now used in Canada for the manufacture of binder twine. Up till recently the fibre has been going to Canada by way of London, but owing to the low freights now quoted by the Canadian railway companies and the steamers trading to Vancouver, B.C., from Australia, most of the material is being sent to Vancouver by way of the South Pacific. Recently a firm shipped from Wellington 450 bales to Sydney for trans-shipment to the next steamer for British Columbia, and a week later the same firm despatched another lot via Auckland and Fiji to catch the same steamer.—Textile Mercury, Manchester, England.

J. J. Nickson & Co., Vancouver, B.C., have been awarded a three million dollar contract by the Canadian Pacific Railway for the construction of an irrigation canal near Calgary, N.W.T. This contract will require two years to complete, and will be commenced in the spring. It will consist of twenty miles of canal. The railway company are proposing to build four hundred miles of canal for irrigation purposes along the Bow River to carry water to the great wheat lands adjacent to their railway.

A syndicate in which Mr. J. J. Hill, president of the Great Northern Railway Co., is interested, have secured control of the Stave River Falls, B.C., for power purposes, and the work of building pen stocks, etc., will be commenced in the spring. These falls are about thirty miles from Vancouver, B.C., and the power generated will be transmitted to Vancouver and New Westminster. It is stated that Mr. Hill's intention is to use electric locomotives on the ten-mile line between these two cities. Ultimately the whole line between Vancouver and Seattle will be covered by the electric locomotives for hauling purposes when the State River is hooked up with that of Snoqualmie Falls. The cost will be about \$400,000.

The Daily News of Nelson, B.C., gives a description of the Kootenay Engineering Works of that city, of which Mr. B. C. Travis is manager. The foundry consists of a main building 100x40 feet, two and a half stories high at the western end. To the north is an office 12x8 feet, and to the

east a store-room 30x30 feet. In the upper story on one side is a pattern shop with a drafting room opposite and a pattern loft above both. On the main floor is a well filled up tool room 20x10 feet. The main building contains a machineshop, foundry, blacksmith shop and pattern shop and the building has been erected with a view which admits of a travelling crane reaching to all points in the machine shop and foundry. In the machine shop is a lathe 23 feet long, capable of turning a six-foot pulley. Two smaller lathes for lighter work, a heavy planing machine, a bolt threader, cutting-off saw and a heavy double punch and shears are also installed. In the pattern shop is a band saw, a wood turning lathe, a buzz planer and a box trimmer. The blacksmith shop is fully equipped for the work contemplated, and the foundry has a 30 inch cupola, brass furnace and core ovens capable of turning out castings up to one and a half or two tons. The driving power for the new plant is electricity, supplied by the West Kootenay Power Co., and the building throughout is lighted by electricity. Mr. Travis has plenty of orders on hand to start with and is well prepared for all the work that will come his way.

The boiler plant of the B. F. Sturtevant Co.'s, new works at Hyde Park, Mass., is now in full operation. This plant comprises three 250 h.p. Stirling boilers equipped with Jones under-feed stokers, air for which is furnished by a 6'x28" Sturtevant steam fan operating at 2½ oz. pressure, a 9'x1½" Sturtevant induced draft steam fan, and an economizer (to be installed later) of their own make. The maximum steam pressure carried will be 150 pounds. Fire was started under these boilers on December 23. This company has in process of construction a 400 h.p. vertical compound engine with direct-connected 250 k.w. generating set, which will be the first of several units to be installed in the engine room.

Work is progressing rapidly on the improvements at the Tacoma smelter. These comprise additions to the lead refining plant, a three-story brick bag house and a large steel blast furnace. The bag house building, which is 110x60 feet, is practically completed and the apparatus is being installed. It includes 1,000 bags, each 25 feet in length by two in diameter. The cost of the furnace is estimated at \$10,000, while the bag house will cost about \$50,000. These improvements when completed will materially increase the capacity of the smelter. The new blast furnace will nearly double the capacity of the lead plant. The total capacity of the smelter will be to smelt about 300 tons of copper ore and 500 tons of lead ore daily.

The machinery to be installed at the Iron Mask mine, Kamloops, B.C., will consist of a large double-drum hoist, capable of lifting a four-ton skip 600 feet per minute; a tandem Corliss condensing engine capable of developing about 250 h.p., with all modern improvements, such as the super-heating of steam between high and low pressure cylinders; a ten-

drill two-stage air compressor; a 300-light electric light plant; a sawmill and timber framing machinery; two 125 h.p. steam boilers of 150 pounds working pressure have also been ordered from the Vancouver Engineering Works, Vancouver, B.C. The concentrating plant will be capable of treating 200 tons per day.

The Canadian Westinghouse Co., Hamilton, Ont., will open an office and warehouse in Vancouver, B.C., for the sale of their electrical goods. Mr. Scribner, of the Seattle office, will be in charge.

The Slocan Star concentrator is being remodelled, and additional machinery, including six Wilfley tables, installed. The company have also in view the installation of a zinc magnetic separator plant.

It is the intention of the Granby Co. to increase the capacity of the smelter at Grand Forks, B.C., by the addition of six additional furnaces.

A 20-h.p. Westinghouse electric motor has been installed at the Granby Co.'s mines machine shop, Grand Forks, B.C. The company have also received another small locomotive for mine haulage work, manufactured by the Davenport Machine Works.

A 20-drill compressor and a 150 h.p. hoist have been installed at the White Bear mine, Rossland, B.C.

One of the most important processes in coated and wall paper making is the drying operation. For this the paper is hung in festoons passing over rollers a horizontal distance of about 150 feet; hot air is blown against the paper in such a way that distribution is uniform over the entire surface of the paper. The air must enter the room at a certain temperature and must be free from all particles of dirt and dust to keep the paper perfectly clean. The air is drawn from outside by means of a fan, screened, passed over steam coils enclosed in a steel plate fire-proof casing, and distributed through galvanized iron ducts to the desired places for drying. Exhaust fans for removing the moisture-laden air keep the atmosphere within the room dry, pure and healthy. With the fan system, light coated paper and light weights will dry in one-third the time required to dry by means of steam coils placed under the festoons of paper. Recent installations for drying paper by the Sturtevant fan system are those at the Merrimac Paper Co., Lawrence, Mass., the Whitmore Mfg. Co., Holyoke, Mass., and the Dill & Collins Co., Philadelphia, Pa. The complete outfit for these installations was furnished by the B. F. Sturtevant Co., Boston, Mass.

The Burt Mfg. Co., Akron, Ohio., have sold the Jones & Laughlin Steel Co. a 30-inch exhaust head for their plant at Pittsburg; and to a large plate glass factory at Alexandria, Ind., three 16-inch exhaust heads. They are in receipt of a second order for Cross oil filters from the American Ship Building Co., for their yards at Lorain, Ohio; and a cable order from Paris, France, calls for a large shipment of Cross oil filters.

PERSONAL.

Mr. W. F. Goodnow, representing Messrs. Sheldon & Sheldon, Galt, Ont., manufacturers of heating and ventilating machinery, etc., was in this office last week.

At the last regular meeting of the Canadian Railway Club, of Montreal, of which Mr. W. H. Rosevear, Jr., is secretary, an invitation was accepted from Dean Rovey, of McGill University, to visit the engineering buildings of that institution.

Mr. H. H. Gildersleeve, manager of the Bay of Quinte Navigation Co., has been appointed manager of the Northern Navigation Co., with headquarters at Collingwood, Ont. He will be succeeded by Edward E. Horsey, late freight agent, who has been associated with the line for ten years.

The annual meeting of the stockholders of the Pittsburg Coal Co., was held a few days ago in Jersey City, N. J. The annual statement showed that the company had earned net profits of \$6,751,023.20 during the past year, the largest since its organization in 1899. The Pittsburg Coal Co. is a combination of several companies, and is capitalized at \$64,000,000.

At the annual meeting of the stockholders of the Harbison-Walker Refractories Co., held in Pittsburg, Pa., January 18, the following officers were elected: S. C. Walker, president; H. W. Croft, first vice-president; J. B. Cullom, second vice-president; and W. A. Stanton, third vice-president; G. W. Reese, fourth vice-president; and Hamilton Stewart, secretary and treasurer.

At a meeting of the Eastern Ontario section of the Canadian Mining Institute, held in the School of Mining buildings, February 9, Dr. Godwin, president, called upon W. Baker, B.A., to read a paper on "Corundum." Mr. Baker in a very able manner reviewed the history of corundum from its first reported occurrence in Ontario to the present time, showing what an important part Ontario is playing in the abrasive market of the world, in fact supplying it.

The Cassella Color Co., 182 Front Street, New York, have recently issued their publications as follows: Garment Dyeing,—a very elaborate color card which could more properly be styled a treatise on garment dyeing. It is freely illustrated with samples of the dyed goods and includes wool, union goods, silk, cotton, linen, china grass, jute, cocoon fibre, straw, chip, feathers, skins and rugs. A very useful handbook to all dyers engaged in any of these branches of dyeing. Half-Wool Shoddies,—a card which shows three shades dyed on cotton and shoddy mixed goods. The wool stock is first dyed in an acid bath and subsequently cotton-dyed with Diamine Black R M W. Dyeings on Wool and Fur Felt—sixteen shades dyed on wool and fur felt for which full directions are given. Immedial Brilliant Black B—is distinguished for its full and bloomy bluish-black shade, and supplements most satisfactorily the company's group of Immedial Blacks, possessing the same good properties of fastness. Very valuable for all purposes in cotton dyeing, and is especially well adapted for produc-

ing bloomy black shades on mercerised cotton yarns and cotton cloths and is also excellently adapted for machine-dyeing.

At the annual meeting of the Toronto Industrial Exhibition Association, held February 23, the following directors were elected:—Geo. Booth, S. E. Briggs, Hon. John Dryden, R. Y. Ellis, H. R. Frankland, W. K. George, Geo. H. Gooderham, J. K. Leslie, Col. Lessard, A. F. McLaren, M.P. (Stratford), S. McBride, Lieut.-Col. John A. McGillivray, W. K. McNaught, Robert Miller (Stouffville), Joseph Oliver, W. H. Pugsley, (Richmond Hill), ex-Ald. Score, Ald. Sheppard, Dr. Andrew Smith and W. E. Wellington. The new members are Mr. Geo. H. Gooderham, Chairman of the Board of Education, and Mr. Sam McBride, President of the Gentlemen's Driving Club. They replace ex-Ald. E. S. Cox and Ald. Lynd. The board will meet in a few days to elect the president, vice-president and other officers.

Messrs. E. Von der Osten & Co., consulting engineers, have recently opened offices in the Manning Arcade, Toronto. Mr. E. Von der Osten, the head of the new firm is a graduate of the University of Berlin, Germany, and was for a number of years connected with the German Government. He has spent five years with various American concerns having been Chief of Construction for the United States Garbage Reduction Co., of Lynn, Mass., and Superintendent of the Freeport Granite Co., Freeport, Me. He has also had much experience in municipal and sanitary engineering.

The Buffalo Forge Co. and Buffalo Steam Pump Co. have since the first of the year been represented in Canada by Mr. Allan G. McAvity, 3 Queen's Park, Toronto, Ont. Mr. McAvity is from St. John, N.B.

Mr. B. T. A. Bell, editor of the Mining Review, Ottawa, who accidentally fell down an elevator shaft in that city a few days before, by which he sustained a fracture of his skull, died therefrom March 1. He was born in Edinburgh, Scotland, 52 years ago and came to Canada when a young man, drifted into journalism, being on the reportorial staff of The Ottawa Citizen; and subsequently became editor of The Mining Review. At the time of the accident he was preparing his report, with Judge Britton, on the Yukon investigation. He was Secretary of the Canadian Mining Institute, now in session in Toronto. He was a recognized authority on all questions pertaining to mining and the mineral resources of Canada.

The twelfth annual meeting of the Ontario Land Surveyors was held in Toronto last week. During the various sessions a number of interesting papers were read and discussed. An interesting feature was the illustrated lecture on the Canadian North by Mr. J. W. Tyrrell, who has been connected with the government surveying in the far north during the last ten or fifteen years.

The collection business formerly conducted by the Ontario Collection Association, Limited, Toronto, has been purchased by H. D. Petrie, Spectator Building,

Hamilton, Ont. We desire to call the attention of persons interested in this line of work, to card appearing on page 9 of this issue.

INDUSTRIAL PUBLICATIONS.

The Constructions, Limited, Toronto, have issued a prospectus setting forth the various properties controlled by them.

H. W. Petrie, Toronto, has issued a new stock list of new and second hand iron and wood-working machinery.

The American Lubricator Co., Detroit, Mich., have issued an illustrated catalogue on lubricators and other brass goods which they manufacture.

The 1904 Export Merchant Shippers' Directory, an advance copy of which is before us, is a book that should be of great value to Canadian manufacturers, importers and exporters in every branch of trade. The export section gives a complete list of exporters in Great Britain, classified in towns; the trade mark section is alphabetically arranged under special headings, showing at a glance the owner of any trade mark or brand; and there are lists of Lloyds' Signal Stations of the United Kingdom and abroad, and of Lloyds' agents throughout the world. This is the thirty-ninth year of publication of this valuable Directory, the general arrangement of it remaining unaltered, the present form having been found most convenient for ready reference. Published by the Export Merchants' Shippers' Directory, 160 a, Fleet Street, London, E.C., London, Eng.

The American Steam Pump Co., Battle Creek, Mich., whose Canadian agents are the A. R. Williams Machinery Co., Toronto, have issued a complete catalogue of Marsh steam pumps, air compressors, etc. Complete directions for setting up and running these pumps are also given. Copies of the catalogue can be had from either company mentioned above.

The Borden & Selleck Co., Chicago, Ill., have sent us a very handsome booklet, No. 6, just issued, having reference to the conveying and elevating machinery built by them. The book abounds in illustrations of plants erected by them and now in active and satisfactory operation. Some of the purposes to which the Borden & Selleck machinery is put are: for handling freight, packages, barrels, boxes, sacks, bales, merchandise of all kinds, or material in bulk, such as coals, ashes, coke, ores, stone, crushed rock etc.; mill products such as billets, rods, pig iron, scale or any material that requires to be transferred in warehouses; freight-houses, power-houses, boiler-houses, mills, and to or from storage on marine docks, railroads, etc., horizontally, vertically, or on an incline; steel bar chains with steel bushed joints; self-oiling rollers, malleable buckets for coal and ashes; sprockets, gears, chain belt, rope drives, friction clutches, eccentric reversing drum shovel machines; automatic unloading machines, coal screens, coal and coke crushers, complete conveyor and elevator equipments, self-dumping coal tubs, etc.

"Twist Drills, their Uses and Abuses," is a pamphlet prepared by the Cleveland Twist Drill Co., of Cleveland, Ohio, for general distribution. The text has a number of line cuts and is a practical treatise on increased cutting capacity and greater drill durability. The information is of common utility in shops and will be valuable in connection with any make of twist drill.

The recent disastrous Baltimore fire has brought out most prominently, not the importance of fireproof or fire-resisting structures, as might, at first thought, be supposed, but the tremendous significance of a generous water supply for city fire service. Systems of separate water mains, for such service only, with independent pumping stations, taking water from rivers flowing by, or through towns or from adjoining lakes, have thus suddenly become things of absorbing interest in many different places, and preliminary measures have already been taken for installing such systems in some cities where they are now lacking. One plant of this kind, the latest and best existing example, is the one completed for the city of Philadelphia a few months ago and illustrated and described in the leading article in Cassier's Magazine for March. Gas engines were determined upon as prime movers in this case, coupled on to large triplex pumps, and the plant, as it stands, is admirably suggestive of what other large cities might find it profitable to duplicate.

Willis Shaw, general dealer in machinery, 171 La Salle street, Chicago, Ill., has just issued an emergency list of some special bargains in machinery for sale by him, which includes dump cars, hoisting engines, rock drills, steam shovels, steam engines, concrete mixers, etc.

The Pittsburg Shafting Co., Detroit, have issued a catalogue on power transmission machinery, embodying the Hyatt Roller Bearing Co.

The Sunbeam Incandescent Lamp Co., Toronto, are presenting their customers with a neat, gold-plated miniature incandescent lamp, which can be used as a watch charm. It will be sent to users of sunbeam lamps, or upon mention of this paper.

Messrs. G. A. Crosby & Co., Point Edward, Ont., have issued a handsome catalogue which describes and illustrates the lines of lathes, planers, shapers, drills and other machine tools, which they manufacture. This catalogue of Canadian made tools will interest many manufacturers.

The Ashton Valve Co., Boston, Mass., have issued a pamphlet on water relief valves for pumps and water works, cylinder relief valves for steam engines and pressure and vacuum gauges for general purposes and of many forms.

We have received from the Composite Pulley & Clutch Co., Boston, Mass., a catalogue showing their method of applying cork inserts to pulleys and clutches for the purpose of increasing the friction.

The Jenckes Machine Co., Sherbrooke, Que., have issued a sixty page catalogue

on the Farrel ore and rock crusher. The catalogue is printed on the finest paper, and contains many illustrations of this line of machinery, also a view of the company's plant. Description and specifications of the different machines, and a number of testimonials from users are given.

The American Steam Packing Co., Boston, Mass., have issued a catalogue devoted to steam packings. It is convenient, and is carefully indexed.

"The Patternmaker" is the latest contribution to American trade journalism that has reached this office, the initial number of which has just appeared. As any trade becomes specialized there is need for some medium that will keep all those who are interested posted as to what is being done along different lines of it; and most specialized trades have more or less literature connected with it, and one or more journals to fill this need, and this is the reason for the existence of the Patternmaker. It is published monthly by the Iron & Steel Press Co., Cleveland, Ohio, which fact is a guarantee for its success. Mr. Henry M. Lane is editor, and the subscription price \$1.00 per year.

The thirteenth edition of Hendricks' Commercial Register of the United States lately issued classifies 350,000 names of concerns in that country engaged in the iron and steel and allied industries, engineering, construction, etc. The work gives the names and addresses of manufacturers in all lines, making it of great value to buyers and sellers alike, and for sending out circulars, etc. It contains 1,300 pages, is substantially bound and will be forwarded, express prepaid, on receipt of \$6.00 to S. E. Hendricks Co., Publishers, 76 Elm St., New York City.

"Why Coated Paper is Used" is the title of a dainty and beautiful little brochure just sent us by Ritchie & Ramsay, Toronto, and is a miniature reproduction of some of the pages of the Christmas Globe number. It is a purely Canadian production, printed on coated paper made by Ritchie & Ramsay; and we are told that their trade mark, which is shown, was designed in 1896 and was the pioneer in use of the motto "Made in Canada."

OPPORTUNITIES.

The following enquiries have been received at the offices of the High Commissioner for Canada in London, and at the Canadian Section of the Imperial Institute, London, England.

NOTE.—Those who may wish to correspond with any of these enquirers can obtain the names and addresses by applying to the CANADIAN MANUFACTURER, Toronto. No charge for giving information. When writing refer to the numerals opposite the enquiries, and enclose 2c. postage stamp for reply.

1204. The manufacturers of decorated wall paper and fabric specialties wish to introduce their goods into Canada and would like to hear from Canadian firms interested.

1205. A firm of merchants and exporters in the Midlands possessing a

large connection invites correspondence from Canadian firms seeking buying or selling agents.

1206. A firm manufacturing high class confectionery and chocolate is open to appoint representatives in the principal Canadian cities.

1207. A firm of general agents who claim good connection among the grocery and provision trade, invites offers from Canadian shippers either upon a commission basis or as actual buyers.

1208. A company manufacturing ochres, oxides and colors wish to hear from Canadian importers.

1209. The manufacturers and shippers of oils of various kinds and greases, would like to obtain a share of Canadian trade.

1210. The manufacturers of guns and rifle cases, cartridge magazines and bags and similar goods are prepared to arrange with a suitable Canadian firm to represent their interests.

1211. A well known ropework company are open to appoint a firm to represent them for the sale of their goods throughout Canada.

1212. A gentleman with experience of the African market is seeking the agency for the United Kingdom of a Canadian shipper of wood work for building construction.

1213. Enquiry comes from Russia for the addresses of some good Canadian firms exporting frozen salmon and lard.

1214. A Dutch manufacturer of household and toilet soaps desires to get into touch with importers in Canada, and would reserve to reliable buyers the monopoly of various brands.

1215. A Colonial produce merchant in London, with good connections, is desirous of opening up business relations with Canadian exporters of eggs, butter, cheese, bacon, etc., who are not already represented in England.

1216. A provision merchant covering a fairly large district in the north of England is open to take up agencies for canned fruits, etc. from Canada.

1217. A firm of catsup and sauce manufacturers require responsible agents in Canada to push the sale of their goods.

1218. A gentleman with experience of the poultry trade is anxious to connect himself with one or more large Canadian exporters of fowls, and offers good references.

1219. A French firm desires to get into touch with Canadian houses engaged in the sale of hosiery.

ROSSENDALE BELTING.

Mr. L. J. Rowland, Toronto manager of the Rosendale Belting Co., is in receipt of a number of most flattering testimonials regarding the merits of Rosendale belting, one of which, from Mr. R. P. Butchart, manager of the Owen Sound Portland Cement Co., of Shallow Lake, Ont., says: "We have used your M.A.Y. Belt for the last three or four years, and have pleasure in stating that it has given us the most excellent satisfaction, as evi-

denced by the number of repeat orders we have sent you. The writer is about to build a Portland Cement Works on Vancouver Island, B.C., and will equip same with your belting."

This letter speaks well for Rossendale belting.

Mr. Rowland informs us that he now has orders booked for belting up to 48 inches wide, and has users of it in every province of the Dominion. At present Mr. Rowland's company do not manufacture belting in Canada, but they propose to do so in the near future, which will be an important addition to our Canadian manufacturing industries. The headquarters and factories of the Rossendale Belting Co. are at Manchester, England; and we are informed that the works are now being operated overtime to fill existing orders.

ELEVATOR "E" AT FORT WILLIAM, ONT.

The Canadian Pacific Railway Co's elevator "E," recently completed at Fort William, Ont., is constructed entirely of steel above the foundation, the bins being arranged on Macdonald's patent system of steel bin construction. The house is divided into 110 separate bins having a combined capacity of two million bushels. All grain is received from cars in elevator "B," one of the old wooden buildings, and transferred to the new storage, elevator "E," by means of a belt conveyor running underground between the two buildings. This conveyor is 40 inches wide and 600 feet in length and traverses the entire length of elevator "B" and is arranged so that two-thirds of the bins in elevator "B" are reached by direct spouting and the contents delivered to the legs in elevator "E." The general arrangement and equipment of machinery in elevator "E" consists of two legs of 15,000 bushels capacity each, which receive the grain as it comes from elevator "B" and elevates it to two scales and garners in the cupola. The scales and garners have a capacity of 12,000 bushels each and discharge to two belt conveyors, running the entire length of the building, each one of which reaches all the bins in the elevator so that they may be filled by either conveyor. The tested capacity of these conveyors is each 25,000 bushels per hour. Four of the bins on the dock side of the elevator are reserved for shippers and are fitted with large telescoping shipping spouts, having a delivering capacity of 40,000 bushels per hour each. While elevator "E" is primarily designed as a marine shipping elevator and annex storage to elevator "B," arrangements have been provided that grain may be received from and delivered to cars if the circumstances should demand.

The machinery is driven by an independent power plant generating its own electricity. The electrical equipment, furnished by the Westinghouse Electric & Mfg. Co., Pittsburg, Pa., consists of one 250-K.W. generator and seven motors of the induction type, ranging from 5 to 100 h.p. each, all of which are connected to the machinery by rope

drives and friction clutches. The power plant consists of a 400-h.p. automatic engine and a battery of two boilers furnished by the Robb Engineering Co., Amherst, N.S. Four belt conveyors in the basement under the bins, running the entire length of the building, are used to empty the grain from the bins to the elevator legs at the rate of 15,000 bushels per hour each. The electric lighting of the entire building and tunnels is taken from the power current by means of transformers, reducing the current from 440 to 110 volts and distributing it in steel conduits to all parts of the building and docks.

There are two exterior stairways, one on the west end containing a passenger elevator, and one on the east end containing a spiral stairway giving access to the cupola and upper machinery.

The bins are all made of steel tank-plates, cylindrical in shape, twenty-one feet in diameter and eighty-five feet deep. The plates of the cylinders are all interlocked at points of contact, and the triangular interspaces between are incorporated into the main cylinders of the storage, so that there is no space lost in the building. The floors are all of armored concrete. The superstructure above the bin storey is all steel, the outside walls and roofs being covered with heavy galvanized corrugated iron. The hopper bottoms and basement storey are all of concrete, and no combustible material of any kind is left in the building excepting the window sash.

Work was begun on the foundation of this great plant in June, 1902, and was prosecuted continuously until completion in September, 1903. A unique feature of the construction was that the total shipment of steel, about 4,000 tons, was bought in Scotland and shipped direct to the job, where it was fabricated by the contractors in a temporary ship, built after their own plans, and erected as manufactured. The transmission machinery was furnished by the Webster Mfg. Co., Chicago, Ill.

ELECTRIC POWER AT FORT FRANCES.

An agreement has been concluded between the Ontario Government and the syndicate represented by Mr. E. W. Backus, of Minneapolis, with regard to the sale to the latter of the water-power on the Rainy River at Fort Frances. The agreement provides that Mr. Backus and his associates, who are owners of the water-power on the American side at the same point, shall develop the water-power to its full capacity by the construction of a dam, and shall render permanently available on the Canadian side one-half of the whole capacity of the stream. The purchasers agree to supply power to Canadian users at a price to be fixed by the Government in case of disagreement, and not to charge more for power on the Canadian side than on the American side. Special provision is made for supplying power to the town of Fort Frances on favorable terms. The height of the water is to be subject to Governmental control, and the development is to be completed by May

1, 1906. Within nine months of the date of the agreement—February 17, 1904—\$50,000 is to be expended, failing which the sale may be cancelled. The purchase price is \$5,000, and the agreement is not to take effect unless within two months the purchasers enter into satisfactory arrangements for the erection of a flour mill at Fort Frances with a capacity of 1,000 barrels per day, or some other industry equally extensive. The report of Robt. Macallum, late engineer of the Public Works Department, was that there was about 16,000 horse-power capable of being developed at this point. The Canadian side will, therefore, have at least 8,000 horse-power. The decision of the Lieutenant-Governor-in-Council is to be binding in the matter of price if the company and its consumers cannot agree. The right is reserved to the Dominion Government to build and operate the canal at Fort Frances.

THE TEMISKAMING RAILWAY.

Hon. F. R. Latchford, Commissioner of Public Works, has introduced in the Ontario Legislature a bill to amend the Temiskaming and Northern Ontario Railway Act.

The measure provides for the extension of the new railway from its present terminus at New Liskeard, to the Abittibi River, or to some point in the townships adjacent to it. The commission supervising the construction of the line are given permission to issue debentures to the amount of \$30,000 per mile, instead of \$25,000, as at present.

Another important provision enables the commission to expropriate lands which have been disposed of by the Crown, along the railway for stations and town sites. The bill also stipulates that permission may be given to the Ontario Government to lend the commission \$2,000,000 on their bonds.

The length of the proposed extension is between 80 and 90 miles, according to the location of the terminus. It is claimed that there are no serious engineering difficulties along the route. For the greatest part of the way the land is level, and until the height of land is reached there are very few rocky places. It is estimated by Government engineers that the extension can be built somewhat cheaper than the first section of the line from North Bay to New Liskeard.

The bill enables the commission to construct the line so that it will intersect the proposed Grand Trunk Pacific, and continue for several miles northwards, but it is not known yet whether the line will stop at the Grand Trunk Pacific or whether it will be continued.

The Commissioner of Public Works has also given notice of the following necessary motion in connection with the bill: "That the Lieutenant-Governor-in-Council may from time to time transfer to the Temiskaming and Northern Ontario Railway Commission, by way of loan out of the consolidated revenue fund, a sum or sums not exceeding in all two million dollars, and may accept the bonds of the commission as security for the repayment of the said loan with interest at three and one-half per cent. per annum."

GRINDING AND POLISHING MATERIAL.

The Canada Corundum Co., Toronto, announce the completion of their new mill at Craigmount, Ont., which has a capacity to produce from 5,000 to 8,000 tons of ground corundum per year. They have entered the market to supply corundum for grinding and polishing purposes in all quantities and sizes and for all purposes. They are open to make contracts extending over from one to three years with manufacturers, jobbers, hardware dealers and other users of grinding and polishing materials.

G. A. CROSBY & CO.

Messrs. G. A. Crosby & Co., Point Edward, Ont., have begun the manufacture of a complete line of first-class machine tools. They are manufacturing several sizes of engine lathes, brass finishing lathes, tool-room lathes, planers, shapers, drills, water emery tool grinders, and other special machinery. The plant is a thoroughly equipped and modern one, no expense having been spared in any point. The foundry is equipped with compressed air hoists and chipping plant, and all machinery in the works is electrically driven. Excellent shipping facilities are provided by rail and water. Aside from the machine tools, etc., mentioned the company manufacture a complete line of can machinery, and are prepared to supply brass, copper, aluminum, and grey iron castings.

PROPOSED STRAIT OF CANSO BRIDGE.

About 35,000 tons of steel will be required for the construction of the proposed cantilever bridge across the Strait of Canso, for which Waddell & Hedrick, consulting engineers, Kausas City, Mo., are preparing complete plans. The Dominion Iron & Steel Co. expects to furnish the steel. The bridge as proposed will be the largest single span cantilever in the world. Its total length from abutment to abutment is to be 4,370 feet, and the length of the main span will be 1,800 feet, with anchorage span 600 feet long on the shore ends. It is estimated that the cost will be \$5,000,000. The floor of the bridge will be 150 feet above high water. The main piers will rest on steel caissons 40 feet in diameter, filled with concrete and sunk to a depth of 90 feet. The depth of the water in the middle of the channel at this point is 270 feet, which precludes any possibility of shortening the span by putting in a centre pier and making a less expensive structure. Some idea of the magnitude of the proposed structure can be had by comparing it with one or two of the world's largest bridges. The Fifth of Forth bridge is 8,296 feet long, with a 1,700-ft. main span and 88 feet of water at the main piers. The Wabash bridge over the Monongahela at Pittsburg is the largest cantilever bridge in the United States and is 1,504 feet long between anchor piers, with a clear channel span of 812 feet. The Blackwell's Island bridge over the East river, New York City, for

which contracts have been let, is 3,095 feet between anchorage piers and has two cantilever spans, one 1,182 feet and one 984 feet long.

TO REPAIR GUN CARRIAGES

It is reported that the Ottawa Car Co. are installing a most complete plant for the manufacture of gun carriage wheels, and the general repair of field guns. There is said to be at present no place in the Empire outside of Woolwich, England, where this work can be done. A broken gun carriage wheel must be replaced at Woolwich, and for anything in the nature of general repair the whole gun must be sent to the great Imperial arsenal.

The Ottawa Car Co. is one of the several enterprises founded by Ahern & Soper, of Ottawa. It has as vice-president and manager W. W. Wylie, one of the best practical master machinists in Canada, and under his supervision the installation of the new plant is said to have gone on to the great satisfaction of the Militia Headquarters Staff.

The nature of the agreement between the Militia Department and the Car Company is not ascertainable. It is possible that no such agreement exists, but the name of prominent artillerymen are mentioned in connection with the enterprise.

It is known that the plant has been inspected by several officers in the confidence of the Militia Department, and heartily approved, and it is possible that an official announcement will shortly be made of the establishment of a plant which will save a very considerable cost in the refitting of field guns in Canada.

CALIFORNIA-OREGON EXCURSION.

Every day in the year single and round trip excursions via the Chicago and Union Pacific and North Western Line. Through first-class Pullman and tourist sleeping cars daily, to points in California and Oregon. Personally conducted excursions from Chicago to San Francisco, Los Angeles and other Pacific Coast points, leaving Chicago on Tuesdays, Wednesdays, Thursdays and Fridays. Lowest rates, shortest time on the road. Finest scenery. For maps, illustrated folders and rates, wire B. H. Bennett, 2 King street East, Toronto.

BRITISH COLUMBIA MINERAL OUTPUT.

An attempt has been made by the Associated Boards of Trade of the Interior of British Columbia to estimate the value of the mineral produced from the mining districts of South Kootenay and Yale during the past year. The figures which should be very approximately accurate, are as follows:—Gold 204,147 ounces, value \$4,219,718.49; silver 3,471,421 ounces, value \$1,839,953.13; copper 24,866,977 pounds, value \$3,382,174.93; lead 10,168 tons, value \$489,792.56, or a total value of \$9,881,639.10. Tonnage is given as 1,034,830 tons, of which 42,867 tons was shipped to the Hall mines smelter, 330,000 tons to the Granby smelter,

170,000 tons to the British Columbia Copper Co's. smelter, 134,217 to the Montreal & Boston Copper Co's. smelter, 168,000 tons to the Canadian Smelting Works, 186,951 tons to the Northport smelter and 2,795 tons to smelters in the United States. Assuming the accuracy of these computations, the value of mineral and coal production from British Columbia in 1903 should be in the neighborhood of \$20,000,000, and the tonnage output from the metalliferous mines alone considerably over a million tons. The 1903 returns from the Crow's Nest Pass collieries are now available and disclose a very gratifying state of affairs. Coal produced during the year amounted to 652,000 tons, 166,000 tons of coke having also been manufactured during this period. Production from the collieries was divided as follows:—Coal Creek, 240,000 tons; Michel, 262,000 tons; Morrissey, 150,000 tons; the coke ovens at Fernie producing 96,000 tons and those at Michel 70,000 tons. Coal mining production from the Crow's Nest began in 1898, production for that year being under 9,000 tons of coal and rather over 350 tons of coke. In 1902 the output had increased to 442,049 tons of coal and 121,000 tons of coke, while as has been shown an advance on the last returns of about 50 per cent. was made in respect to coal production in 1903. The result is all the more gratifying in view of the suspension of coal-mining operations in the spring of the year consequent upon a labor strike lasting for seven weeks. Labor conditions

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being now settled and stable and the efficiency and equipment of the mines greatly improved, activity in 1904 should be even more pronounced, and a production this year of a million tons of coal is considered not at all improbable. During 1903 a sum aggregating two millions of dollars was paid out in wages and for supplies, while a further expenditure of approximately one million dollars was spent on improvements and in mine development.

THE DOMINION COAL COMPANY.
One of the most remarkable developments of the coal mining business in these days is illustrated at the vast plant of the Dominion Coal Co., at Cape Breton, N.S. The enterprise was established seventy odd years ago and had a long series of ups and downs, caused by the vacillating tariff policies of Canada and the United States. For some years the

best part of the coal markets of the Dominion were practically closed to Nova Scotia mines because of the low rate at which operators of American anthracite mines laid down coal in Toronto, Montreal and other important cities. Last year the Dominion Coal Co. shipped to Montreal more than a million tons of coal, and has the certainty of selling many more than that number of tons in that city this year. Air compressors, pneumatic and electric tools, colliery

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EMERY WHEELS and
GRINDING MACHINERY**

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HAMILTON, - ONT.**

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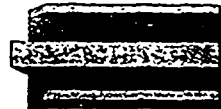
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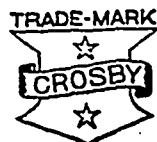


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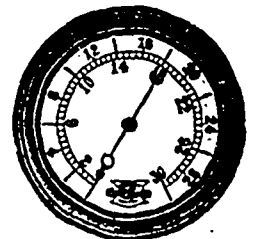
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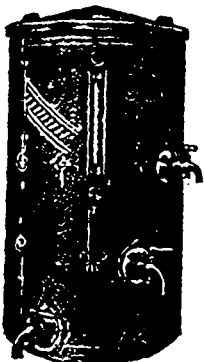
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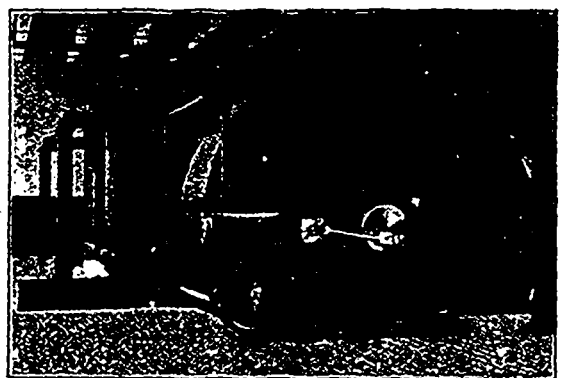
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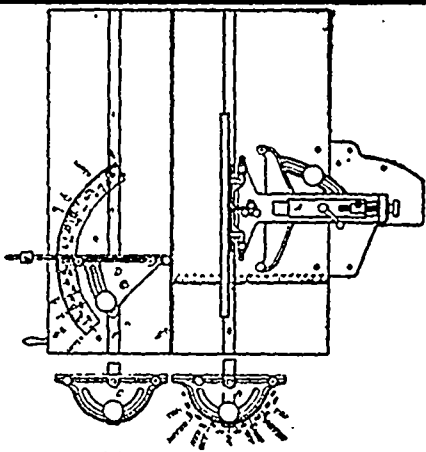
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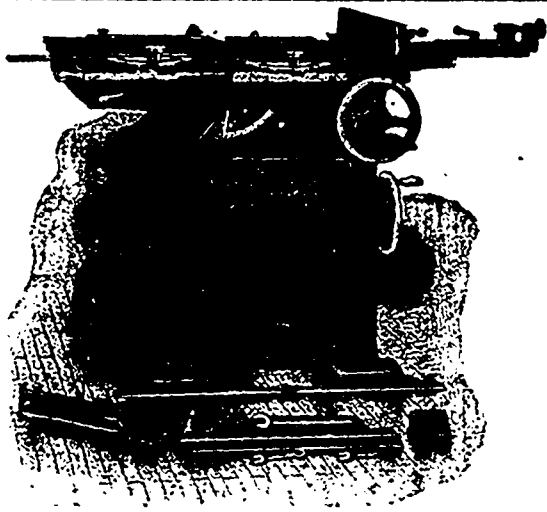
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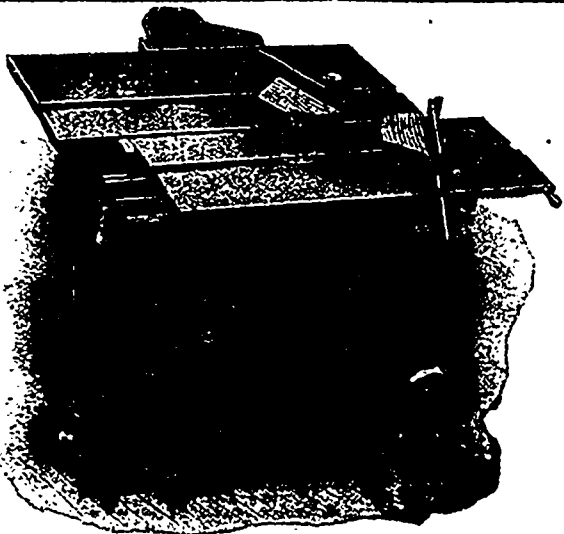
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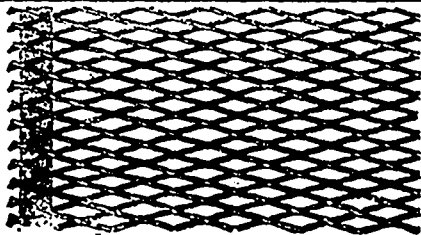
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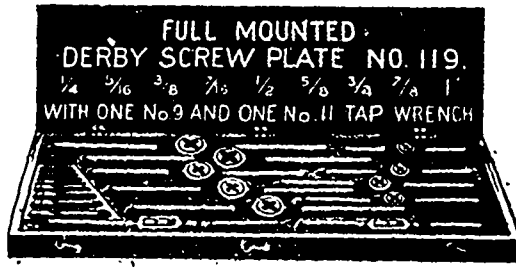


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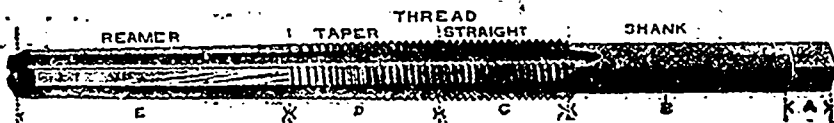


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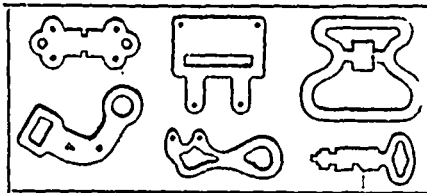
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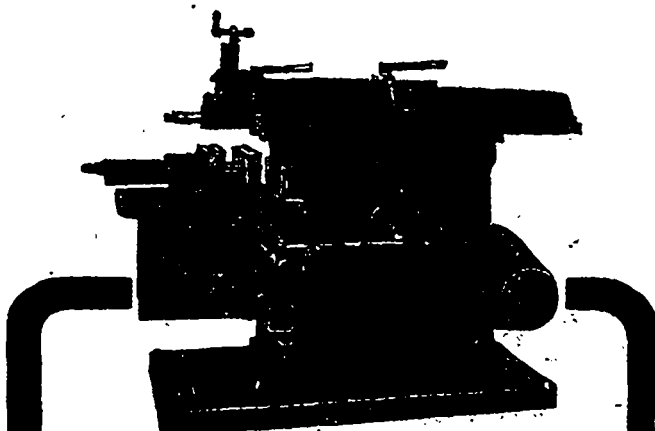
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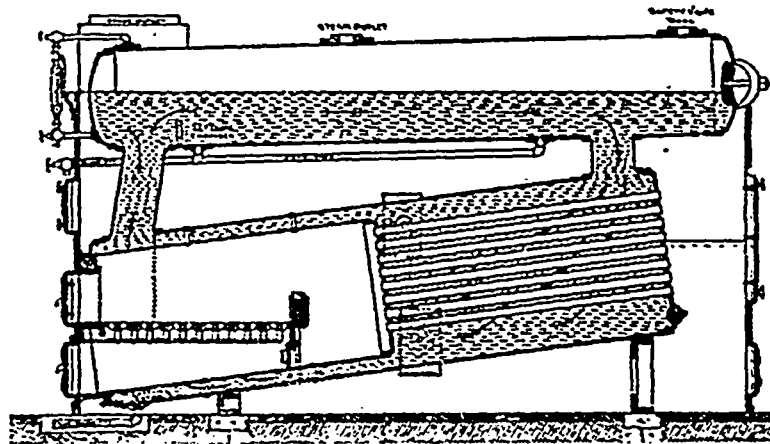
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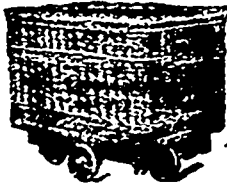
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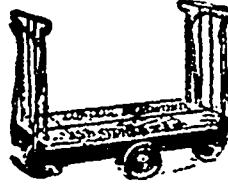


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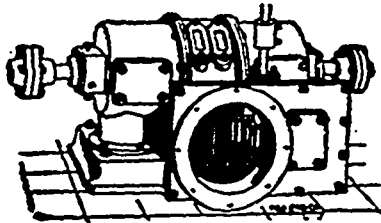
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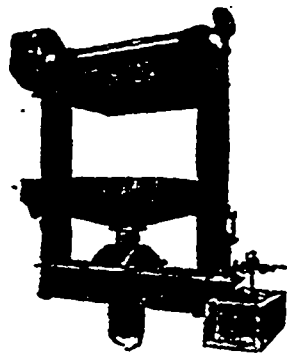
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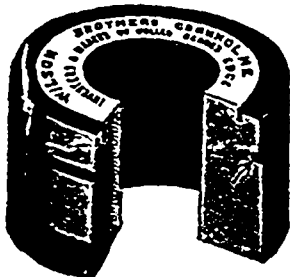


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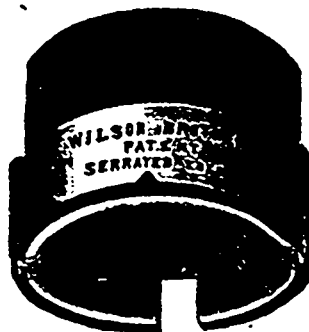
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CLASSIFIED INDEX.

(CONTINUED).

- Building Iron and Steel.**
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
- Builders' Materials**
Albert Mfg. Co., Hillsboro, Ont.
Canada Foundry Co., Toronto.
Canadian Otis Elevator Co., Toronto.
Canadian Portland Cement Co., Deseronto, Ont.
Dodgson Mfg. Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Gartshore, John J., Toronto.
Metallic Roofing Co., Toronto.
Owen Sound Portland Cement Co., Owen Sound Ont.
- Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Sheldon & Sheldon, Galt, Ont.
- Canada Plates**
Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
- Canoes**
Peterborough Canoe Co., Peterborough, Ont.
- Caps**
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
- Cast Iron Pipe**
Canada Foundry Co., Toronto.
Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
Rice Lewis & Son, Toronto.
Montreal Pipe Foundry Co., Montreal.
- Castings (Iron and Brass.)**
Toronto Iron & Brass Bedstead Co., Toronto.
- Cement**
Canadian Portland Cement Co., Deseronto, Ont.
Owen Sound Portland Cement Co., Owen Sound, Ont.
- Cement Machinery.**
Wentz, R. F. Engineering Co., Toronto.
- Chain Making Machinery (Welded Coil Chain)**
Turner, Vaughn & Taylor, Cuyahoga Falls, Ohio.
- Channels**
Bourne-Fuller Co., Cleveland, Ohio.
Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
- Charcoal Pig Iron**
Canada Iron Furnace Co., Montreal.
- Chemicals and Dye Stuffs**
Bellhouse, Dillon & Co., Montreal.
Henson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Casella Color Co., New York City.
Geiger Aniline & Extract Co., New York City.
Klipstein, A. & Co., New York City.
McArthur, Cornelle & Co., Montreal.
Winn & Holland, Montreal.
- Chemists**
Archbold, Dr. Geo., Prescott, Ont.
Heye, Thos. & Son, Toronto.
Wentz, R. F. Engineering Co., Toronto.
- Clay Working Machinery.**
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
- Coal and Coke**
Bourne-Fuller Co., Cleveland, Ohio.
Brownlee, J., Galt, Ont.
Hoffman, Jules G., Detroit, Mich.
Millner, James H. & Co., Toronto.
Pittsburgh Coal Co., Pittsburgh, Pa.
Shipman, O. W. Co., Detroit, Mich.
- Coal Cutting Machines**
Jeffrey Mfg. Co., Columbus, Ohio.
- Coal Tipples.**
Jeffrey Mfg. Co., Columbus, Ohio.
- Coil Chains.**
Greening, H. Wire Co., Hamilton, Ont.
Leslie, A. C. & Co., Montreal.
- Coke Oven Brick**
Dunbar Fire Brick Co., Pittsburgh, Pa.
- Collection Agency**
Petrie, H. D., Hamilton, Ont.
- Continuous Rolling Mills**
Morgan Construction Co., Worcester, Mass.
- Contractors' Machinery**
Carlin's, Thomas Sons Co., Allegheny Pa.
Shaw, Willis, Chicago, Ill.
- Contractor's Plants**
Shaw, Willis, Chicago, Ill.
Von der Osten, E. & Co., Toronto.

CLASSIFIED INDEX.

(CONTINUED).

Conveying Machinery

Buhl Malleable Co., Detroit, Mich.
Dodge Mfg. Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Perrin, William R. & Company, Limited, Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Stevens, Alfred J., Toronto.

Copper Materials

Greening, B., Wire Company, Hamilton, Ont.
Syracuse Smelting Works, Montreal.
Wire & Cable Co., Montreal.

Corundum.

Canada Corundum Co., Toronto.

Corundum Wheels.

Canadian Corundum Wheel Co., Hamilton, Ont.
Hart Corundum Wheel Co., Hamilton, Ont.
Rice Lewis & Son, Toronto.

Covers.

McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Crayons

Lowell Crayon Co., Lowell, Mass.

Crucibles

Dixon, Joseph, Crucible Co., Jersey City, N.J.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Syracuse Smelting Works, Montreal.

Crucible Caps and Nozzles

McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Crucible Covers and Stoppers

McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Dies

Globe Machine & Stamping Co., Cleveland, Ohio.
Hamilton Stamp & Stencil Works, Hamilton, Ont.

Dies (Socket, Sewer Pipe and Tile)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Directories

Kelly's Directories, Limited, Toronto.

Draw Benches (Wire)

Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Drills

Bertram, John, & Sons Co., Dundas, Ont.
Canadian Hand Drill Co., Sherbrooke, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
London Machine Tool Co., London, Ont.
Pittsburgh Shafting Co., Detroit, Mich.

Drop Forgings

Globe Machine & Stamping Co., Cleveland, Ohio.

Drop Forging Dies

Globe Machine & Stamping Co., Cleveland, Ohio.

Dry Kilns.

Sheldon & Sheldon, Galt, Ont.
Stevens, Alfred J., Toronto.
Sturtevant, B. F. Co., Boston, Mass.

Dust and Shavings Separators

Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Electric Mine Locomotives

Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.

Electrical Supplies

Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jones & Moore Electric Co., Toronto.
Packard Electric Co., St. Catharines, Ont.
Phillips, Eugene F., Electrical Works, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Worth & Martin, Toronto.

Elevators

Canadian Otis Elevator Co., Toronto.
Darling Bros., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.

Emery and Emery Wheels.

Canadian Corundum Wheel Co., Hamilton, Ont.
Forman, John, Montreal.
Hart Corundum Wheel Co., Hamilton, Ont.

Engineers (Cement)

Wentz, R. F., Engineering Co., Toronto.

Engineers (Chemical)

Heya, Thos. & Son, Toronto.
Hunt, Robert W. & Co., Chicago, Ill.

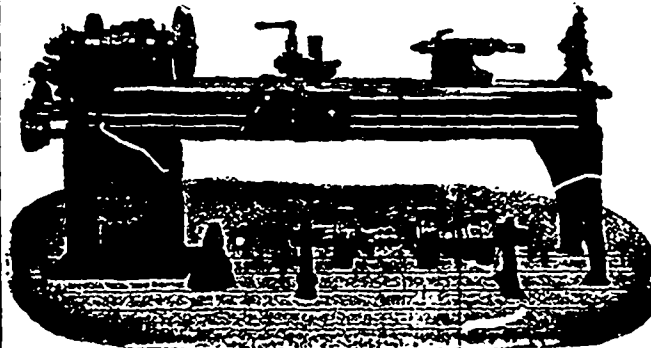
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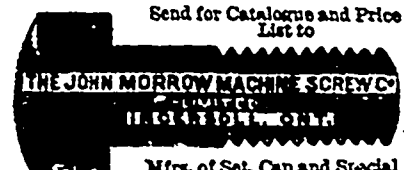
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(CONTINUED).

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Kelsch, R. S., Montreal.
Parko, R. J., Toronto.
Vogel, C. H., Ottawa.

Engineers (Consulting)

DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Hunt, Robert W. & Co., Chicago, Ill.
Kelsch, R. S., Montreal.
Morgan Construction Co., Worcester, Mass.
Parko, R. J., Toronto.
Perrin, William R. & Company, Limited, Toronto.
Simpson, T. T., Deschênes, Qua.
Vogel, C. H., Ottawa.
Von der Osten, E. & Co., Toronto.
Wentz, R. F. Engineering Co., Toronto.

Engineers (Contracting)

Darling Bros., Montreal.
Electrical Construction Co., London, Ont.

Engineers (Electrical)

Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Electric Engineering & Supply Co., Montreal.
Jones & Moore Electric Co., Toronto.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Worth & Martin, Toronto.

Engineers (Mechanical)

Buhl Malleable Co., Detroit, Mich.
Carrier, Laine & Co., Levis, Quebec.
Darling Bros., Montreal.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Hunt, Robert W. & Co., Chicago, Ill.
Kelsch, R. S., Montreal.
Kerr Engine Co., Walkerville, Ont.
Morgan Construction Co., Worcester, Mass.
Robb Engineering Co., Amherst, N.S.
Sheldon & Sheldon, Galt, Ont.
Wentz, R. F. Engineering Co., Toronto.

Engineers (Mill and Hydraulic)

Buhl Malleable Co., Detroit, Mich.
Vogel, C. H., Ottawa.

Engineers (Mining)

Buhl Malleable Co., Detroit, Mich.
Hays, Thos. & Son, Toronto.
Mills, S. D., Toronto.

Engineers (Municipal)

Von der Osten, E. & Co., Toronto.

Engineers and Contractors.

Buhl Malleable Co., Detroit, Mich.
Jeffrey Mfg. Co., Columbus, Ohio.

Engines and Boilers

Babcock & Wilcox, Limited, Montreal.
Canadian Heine Safety Boiler Co., Toronto.
Cowan & Co., Galt, Ont.
Goldie & McCulloch Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Hyde Bros. & Co., Pittsburg, Pa.
Leonard, E. & Sons, London, Ont.
Petrie, H. W., Toronto.
Petroleum Iron Works Co., Washington, Pa.
Pittsburgh Shafting Co., Detroit, Mich.
Robb Engineering Co., Amherst, N.S.
Williams, A. R., Machinery Co., Toronto.

Engravers

Canadian Manufacturer, Toronto.
Jones, J. L., Engraving Co., Toronto.

Exhaust Heads

Burt Mfg. Co., Akron, Ohio.
Darling Bros., Montreal.

Exporters

Canadian Export Co., Toronto.

Factory Sites

Central Ontario Power Co., Peterboro, Ont.

Files

Spence, R. & Co., Hamilton, Ont.

Financial

Bradstreet's, New York City.
Dun, R. G. & Co., Toronto.
Neff & Postelthwaite, Toronto.
Ontario Collection Association, Toronto.

Fitters

Burt Mfg. Co., Akron, Ohio.
Darling Bros., Montreal.
Perrin, William R. & Company, Limited, Toronto.

Fire Brick

Dunbar Fire Brick Co., Pittsburg, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Pennsylvania Fire Brick Co., Lock Haven, Pa.
Seloto Fire Brick Co., Selotoville, Ohio.
Wynn, J. H. & Co., West Decatur, Pa.

Founders

Canada Foundry Co., Toronto.
Cowan & Co., Galt, Ont.
Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Karch, H. W., Hespeler, Ont.

Foundry Facing

Hamilton Facing Mill Co., Hamilton, Ont.

Galvanizing

Ontario Wind Engine & Pump Co., Toronto.

Galvanizing and Tinning Machinery and
Furnaces (Wire)

Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls,
Ohio.

Gas and Gasoline Engines

Goldie & McCulloch Co., Galt, Ont.
Morrison, T. A. & Co., Montreal.

Gas Producers.

Morgan Construction Co., Worcester, Mass.

Generators

Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forzuan, John, Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Phillips, Eugene F., Electrical Works, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Government Notices

Factory Inspectors.
Minister of Agriculture.

Grease Cups

Penberthy Injector Co., Windsor, Ont.

Grinding Machinery

Canadian Corundum Wheel Co., Hamilton, Ont.
Hart Corundum Wheel Co., Hamilton, Ont.

Grinding Pans

Carlin's, Thomas Sons Co., Allegheny, Pa.

Hand Traveling Cranes

Morgan Construction Co., Worcester, Mass.

Hardware

Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cooper, James, Montreal.
Empire Machine & Metal Stamping Co., Toronto.
Gartshore, John J., Toronto.
Globe Machine & Stamping Co., Cleveland, Ohio.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Rice Lewis & Son, Toronto.
Ryall Machine Screw Co., Montreal.

Heating and Ventilating

Darling Bros., Montreal.
Leonard, E. & Sons, London, Ont.
Sheldon & Sheldon, Galt, Ont.
Stevens, Alfred J., Toronto.
Sturtevant, B. F., Co., Boston, Mass.

Hydraulic Accumulators

Morgan Construction Co., Worcester, Mass.

Hydraulic Cranes

Morgan Construction Co., Worcester, Mass.

Hydraulic Machinery

Darling Bros., Montreal.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Morgan Construction Co., Worcester, Mass.
Perrin, William R. & Company, Limited, Toronto.
Wilson, J. C. & Co., Glenora, Ont.

Industrial Plants

Von der Osten, E. & Co., Toronto.

Iron and Steel Specialties

Abbott, William, Montreal.
Armstrong Mfg. Co., Bridgeport, Conn.
Bourne-Fuller Co., Cleveland, Ohio.
Brown & Co., Paris, Ont.
Buhl Malleable Co., Detroit, Mich.
Cleveland Twist Drill Co., Cleveland, Ohio.
Dodgo Mfg. Co., Toronto.
Karch, H. W., Hespeler, Ont.
Leslie, A. C. & Co., Montreal.
Meadows, Geo. B. Wire, Iron & Brass Works Co.,
Toronto.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.
Petroleum Iron Works Co., Washington, Pa.
Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Ryall Machine Screw Co., Montreal.

Injectors

Canada Foundry Co., Toronto.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Penberthy Injector Co., Windsor, Ont.
Williams, A. R. Machinery Co., Toronto.

Iron and Steel Inspection

Hunt, R. W. & Co., Chicago, Ill.

Lamps-Electric

Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Forzuan, John, Montreal.
Packard Electric Co., St. Catharines, Ont.

CLASSIFIED INDEX.

(CONTINUED).

Lathes
Bertram, John, & Sons Co., Dundas, Ont.
London Machine Tool Co., London, Ont.
Williams, A. R., & Co., Toronto.

Leather Belting
Canadian Oak Belting Co., Brockville, Ont.
Fleming, W. A. & Co., Montreal.
McLaren, D. K., Montreal.
Pittsburgh Shafting Co., Detroit, Mich.
Hico Lewis & Son, Toronto.
Williams, A. R. Machinery Co., Toronto.

Lubricant
Hart & Co., Chicago, Ill.

Lubricators
Penberthy Injector Co., Windsor, Ont.

Machinists.
Buhl Malleable Co., Detroit, Mich.
Worth & Martin, Toronto.

Machinists' Supplies
Armstrong Mfg. Co., Bridgeport, Conn.
Buhl Malleable Co., Detroit, Mich.
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cooper, James, Montreal.
Dodge Mfg. Co., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Pittsburgh Shafting Co., Detroit, Mich.
Ryall Machine Screw Co., Montreal.
Worth & Martin, Toronto.

Machine Tools
Abbott, William, Montreal.
Bertram, John, & Sons Co., Dundas, Ont.
Cleveland Twist Drill Co., Cleveland, Ohio.
Darling Bros., Montreal.

Malleable Iron Castings
Buhl Malleable Co., Detroit, Mich.
McKinnon Dash & Metal Works Co., St. Catharines, Ont.
Smith's Falls Malleable Castings Co., Smith's Falls, Ont.

Metal Gates
Page Wiro Fence Co., Walkerville, Ont.

Metal Shears
Morgan Construction Co., Worcester, Mass.

Metal Stamping
Empire Machine & Metal Stamping Co., Toronto.

Metallurgists.
Mills, S. D., Toronto.
Wentz, R. F. Engineering Co., Toronto.

Mill Machinery and Supplies
Armstrong Mfg. Co., Bridgeport, Conn.
Buhl Malleable Co., Detroit, Mich.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cooper, James, Montreal.
Cowan & Co., Galt, Ont.
Darling Bros., Montreal.
Dodge Mfg. Co., Toronto.
Fleming, W. A., & Co., Montreal.
Gartshore, John J., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Hay, Peter Knife Co., Galt, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
Karch, H. W., Hespeler, Ont.
Leonard, E. & Sons, London, Ont.
London Machine Tool Co., London, Ont.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Penberthy Injector Co., Windsor, Ont.
Petric, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Robb Engineering Co., Amherst, N.S.
Ryall Machine Screw Co., Montreal.
Spence, R., & Co., Hamilton, Ont.
Wilson, J. C., & Co., Glenora, Ont.

Mining Machinery
Buhl Malleable Co., Detroit, Mich.
Canadian Hand Drill Co., Sherbrooke, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cooper, James, Montreal.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
Perrin, William R. & Company, Limited, Toronto.
Shaw, Willis, Chicago, Ill.
Williams, A. R. Machinery Co., Toronto.

Motors and Dynamos
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Fornan, John, Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.

Novelty Manufacturers.
Worth & Martin, Toronto.

Nozzles.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Office Furniture and Supplies
Canadian Office & School Furniture Co., Preston, Ont.

Oils and Lubricants
Dixon, Jos., Crucible Co., Jersey City, N.J.
Fleming, W. A., & Co., Montreal.
Imperial Oil Co., Petrolia, Ont.
Queen City Oil Co., Toronto.

Oil Cups
Penberthy Injector Co., Windsor, Ont.

Oil Filters
Burt Mfg. Co., Akron, Ohio.
Darling Bros., Montreal.

Oil Tanks
Petroleum Iron Works Co., Washington, Pa.

Paints and Colors
Bellhouse, Dillon & Co., Montreal.
Fleming, W. A., & Co., Montreal.
Geigy Anilino & Extract Co., New York City.
Klipstein, A., & Co., New York City.
McArthur, Cornelio & Co., Montreal.

Paper Manufacturers
Barber, Wm., & Bros., Georgetown, Ont.
Toronto Paper Mfg. Co., Cornwall, Ont.

Patents
Budden, Hanbury A., Montreal.
Case, Egerton H., Toronto.
Fetherstonhaugh & Co., Toronto.
Patent Exchange & Investment Co., Toronto, Ont.

Pattern Shop Equipments
American Machinery Co., Grand Rapids, Mich.

Perforated Metals
Greening, B. Wiro Co., Hamilton, Ont.

Phosphorizers.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Pig Iron
Bourne-Fuller Co., Cleveland, Ohio.
Canada Iron Furnace Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Syracuse Smelting Works, Montreal.

Pipe Threading Machines
Armstrong Mfg. Co., Bridgeport, Conn.
Rice Lewis & Son, Toronto.

Pipes and Tubes
Abbott, William, Montreal.
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
Montreal Pipe Foundry Co., Montreal.
Rice Lewis & Son, Toronto.

Plaster
Albert Mfg. Co., Hillsborough, N.B.

Plates
Bourne-Fuller Co., Cleveland, Ohio.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Rice Lewis & Son, Toronto.

Plumbago
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Pneumatic Tools
Chicago Pneumatic Tool Co., Chicago, Ill.

Pointer Rolls (For Rods and Wire.)
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Portland Cement
Canadian Portland Cement Co., Deseronto, Ont.
Owen Sound Portland Cement Co., Owen Sound, Ont.
Rathbun Co., Toronto.
St. Lawrence Portland Cement Co., Montreal.

Power—Electric and Water
Central Ontario Power Co., Peterboro, Ont.

Power Plants—Equipments
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Cleveland Twist Drill Co., Cleveland, Ohio.
Darling Bros., Montreal.
DeLano-Osborn Engineering Co., Toronto.
Dodge Mfg. Co., Toronto.
Electrical Construction Co., London, Ont.
Goldie & McCulloch, Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Leonard, E. & Sons, London, Ont.
Perrin, William R. & Company, Limited, Toronto.
Phillips, Eugene F. Electrical Works, Montreal.
Pittsburgh Shafting Co., Detroit, Mich.
Robb Engineering Co., Amherst, N.S.
Stevens, Alfred J., Toronto.
Sturtevant, B. F. Co., Boston, Mass.
Toronto & Hamilton Electric Co., Hamilton, Ont.
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CLASSIFIED INDEX.

(CONTINUED).

Wagons and Carriages

Horo, F. W., & Son, Hamilton, Ont.

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INDEX TO ADVERTISEMENTS.

Where the follo is not given the Advertisement appears at intervals.

See Classified Index Beginning on Page 39

ofc	outside front cover.	obo	outside back cover.
	Abbott, William, Montreal	41	Edwards, R. J., Toronto
	Agriculture, Ontario Minister of, Toronto	35	Electrical Construction Co., Londo, Ont
	Albert Mfg. Co., Hillsborough, N.B	8	Electric Engineering & Supply Co., Montreal
	Algoma Steel Co., Sault Ste. Marie, Ont	4	Empire Machine and Metal Stamping Co., Toronto
	American Machinery Co., Grand Rapids, Mich.	31	Engineering Review, London, England
	American Steam Pump Co., Battle Creek, Mich		Expanded Metal & Fireproofing Co., Toronto.
	Archbold, Dr. Geo., Prescott, Ont		Fotherstonhaugh & Co., Toronto
	Armstrong Mfg. Co. Bridgeport, Conn	36	Firstbrook Box Co. Toronto
	Babcock & Wilcox, Limited, Montreal	ofc	Fleming, W. A. & Co. Montreal
	Bank of Hamilton, Hamilton, Ont	44	Forman John, Montreal
	Barber, Wm & Bro., Georgetown, Ont	42	Gartshore, John J., Toronto
	Bellhouse, Dillon & Co., Montreal	11	Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont
	Benson, W. T. & Co., Montreal	11	Gelgy Antlino & Extract Co., New York, N.Y
	Bertram, John & Sons Co., Dundas, Ont	3	Globe Machine & Stamping Co., Cleveland, Ohio
	Blagdon, Waugh & Co., London, E.C., England	45	Goldie & McCulloch Co., Ont, Ont.
	Bourne-Fuller Co., Cleveland, Ohio	4	Greening B. Wire Co., Hamilton, Ont
	Bradstreets, Toronto and New York	44	Gutta Percha & Rubber Mfg Co., Toronto.
	Broner Machine Tool Co., Kalamazoo, Mich.	12	Hamilton Brass Mfg. Co. Hamilton Ont.
	Bristol Co., Waterbury Conn	obo	Hamilton Cotton Co., Hamilton Ont
	Brown & Co., Paris, Ont	41	Hamilton Facing Mills Co., Hamilton, Ont.
	Brownlee, J., Galt, Ont	5	Hamilton, Wm. Mfg. Co., Peterborough, Ont.
	Brunner, Mond & Co., Northwich, England	11	Hamilton Stamp & Stencil Works, Hamilton, Ont
	Budden, Hanbury A., Montreal	9	Hart & Co., Chicago, Ill
	Buhl Malleable Co., Detroit, Mich.	9	Hart Corundum Wheel Co., Hamilton, Ont.
	Burt Mfg Co., Akron, Ohio	obo	Hay, Peter Knife Co., Galt, Ont
	Butterfield & Co., Rock Island, Que	32	Hoys, Thomas & Son, Toronto
	Canada Corundum Co., Toronto	36	Hoffman, Jules G., Detroit, Mich.
	Canada Foundry Co., Toronto	2	Holden, Arthur P., Toronto
	Canada Iron Furnace Co., Montreal	13	Hors, F. W. & Son, Hamilton, Ont.
	Canadian Casualty & Boiler Assurance Co., Toronto	4	Hunt, Robert W & Co., Chicago, Ill
	Canadian Colored Cotton Mills Co., Montreal	37	Hyde Bros. & Co., Pittsburg, Pa
	Canadian Corundum Wheel Co., Hamilton, Ont.		Imperial Oil Co., Petrolia, Ont.
	Canadian Export Co., Toronto		Industrial Publication Co., New York N Y
	Canadian General Electric Co., Toronto		Industries, Youngstown, Ohio
	Canadian Helve Safety Boiler Co., Toronto		International Safety Solvent Co., Providence, R I
	Canadian Manufacturer Pub. Co., Toronto		Jeffrey Mfg Co., Columbus, Ohio
	Canadian Oak Helting Co., Brockville, Ont		Jones & Moore Electric Co., Toronto
	Canadian Office & School Furniture Co., Preston, Ont		Jone J. L., Engraving Co., Toronto
	Canadian Otis Elevator Co., Hamilton, Ont		Karch, H. W. Hespeler, Ont
	Canadian Portland Cement Co., Deseronto Ont.		Kelly's Directories, Toronto and London, England
	Canadian Rand Drill Co., Sherbrooke, Que		Kelch, R. S., Montreal
	Canadian Westinghouse Co., Ltd., Hamilton Ont.		Kerr Engine Co., Walkerville, Ont.
	Cantilo, James A., Montreal		Klipstein, A. & Co., New York, N.Y.
	Carlin's, Thomas Sons Co., Allegheny Pa		Leonard, E. & Sons, London, Ont
	Carrier, Laine & Co., Lewis, Que.		Leslie, A. C. & Co., Montreal.
	Case, Egerton R., Toronto		Lewis, Rice & Son, Toronto
	Cassella Color Co., New York and Montreal		London Machine Tool Co., London, Ont.
	Central Ontario Power Co., Peterborough, Ont.		Lowell Crayon Co., Lowell, Mass.
	Chicago & North-Western Railway, B. H. Bennett, General Agent, Toronto.		Meadows, Geo. B. Wire, Iron & Brass Works Co., Toronto
	Chicago Pneumatic Tool Co., Toronto and Chicago, Ill.		Metallic Roofing Co., Toronto
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	Clyde Steel Works, Toronto.		Milnes, J. H. & Co., Toronto
	Continental Iron Works, New York, N. Y		Montreal Pipe Foundry Co., Montreal
	Cooper, James, Montreal		Morgan Construction Co., Worcester, Mass
	Cowan & Co., Galt, Ont.		Morrison, T. A. & Co., Montreal
	Crosby Steam Gauge & Valve Co., Boston, Mass.		Morrow, John, Machine Screw Co., Ingersoll, Ont
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			Page Wire Fence Co., Walkerville, Ont
			Parke, Roderick J., Toronto
			Patent Exchange & Investment Co., Toronto
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			Pittsburgh Coal Co., Pittsburg, Pa.
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			Queen City Oil Co., Toronto
			Releha & Co., Bradford, England
			Rice Lewis & Son, Toronto
			Robb Engineering Co., Amherst N.S
			Russendale Belting Co., Toronto
			Rountree Publishing Co., Birmingham, Ala.
			Ryall Machine Screw Co., Montreal
			Shaw Wilks, Chicago, Ill
			Sheldon & Sheldon, Galt, Ont
			Shipman, O. W. Co., Detroit, Mich
			Simpson, T. T., Deschenes, Que
			Slingsby, H. C. for Canada, Montreal
			Smith Mfg. Co., Toronto
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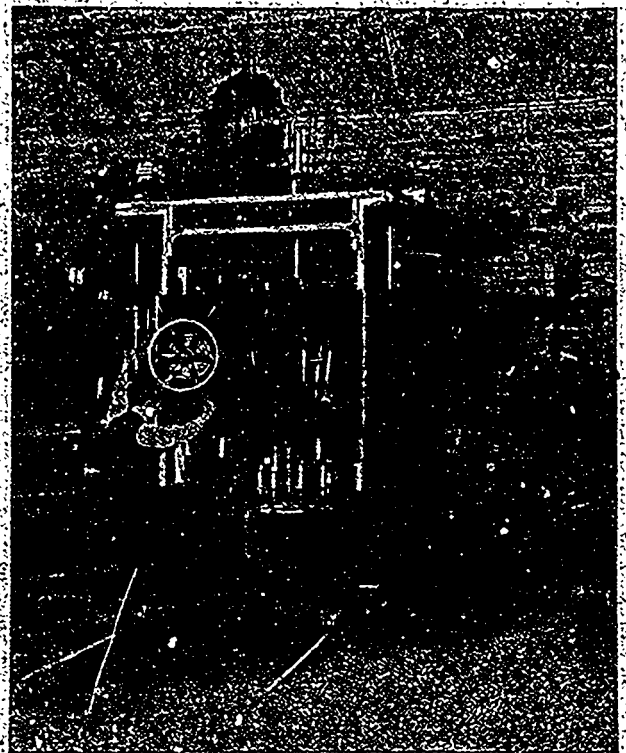
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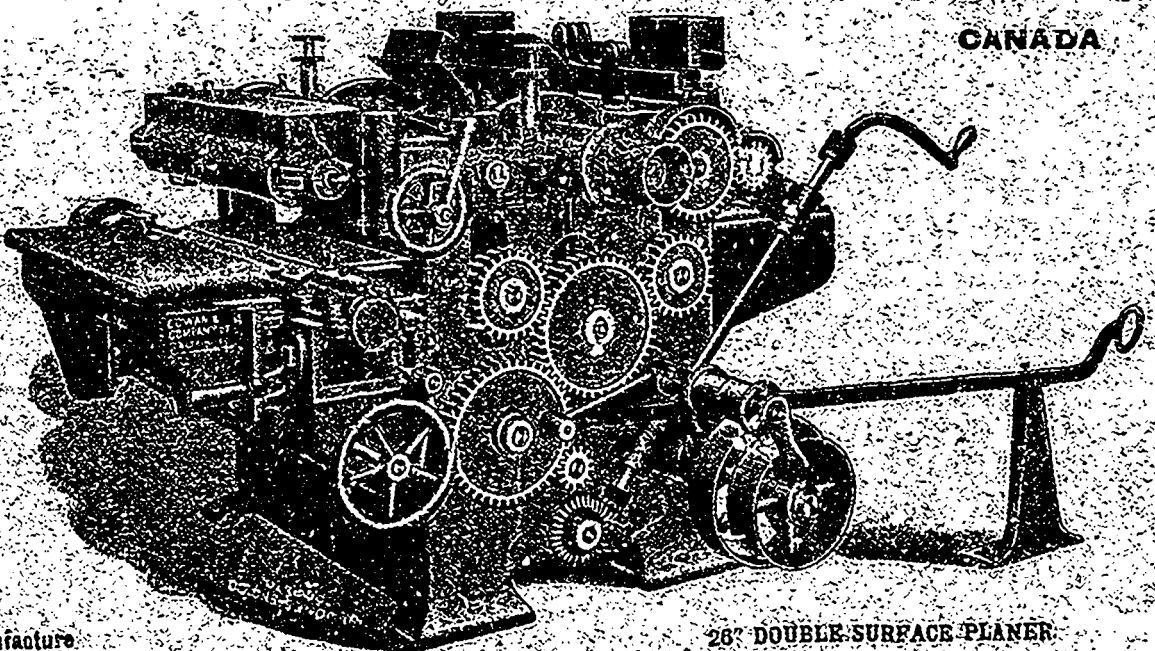
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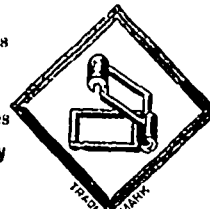
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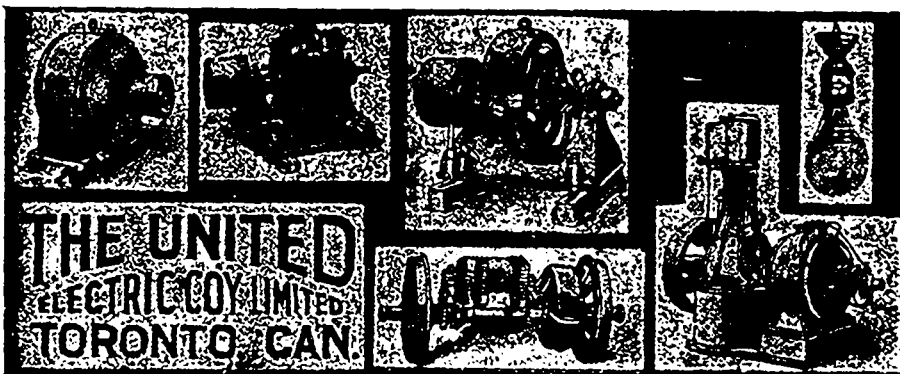
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