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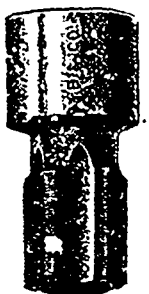
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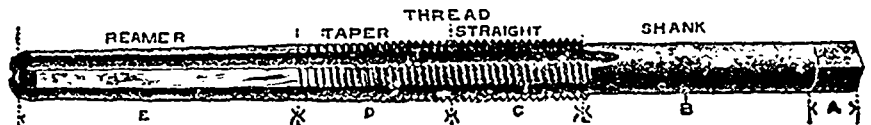
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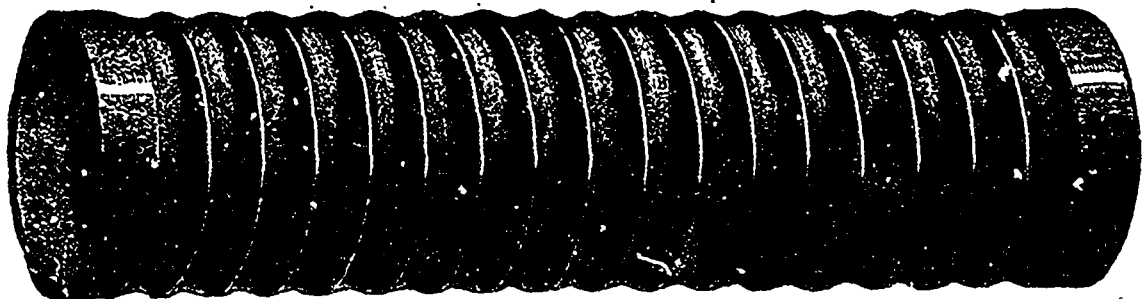
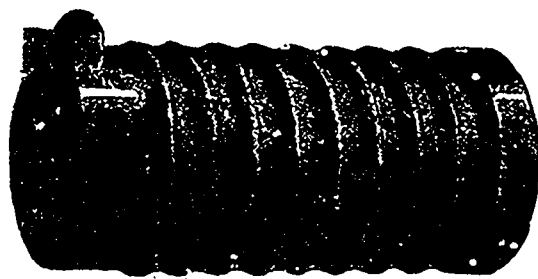
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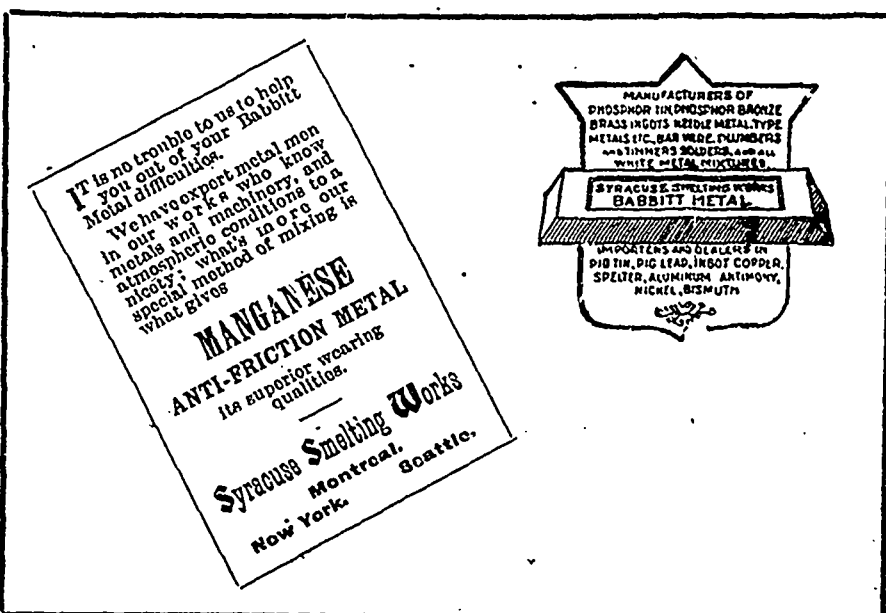
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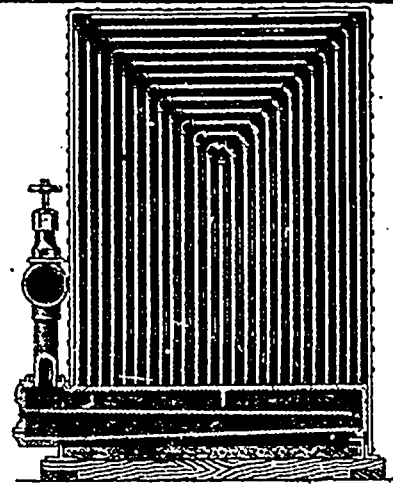
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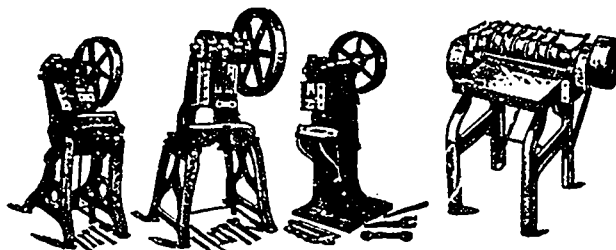
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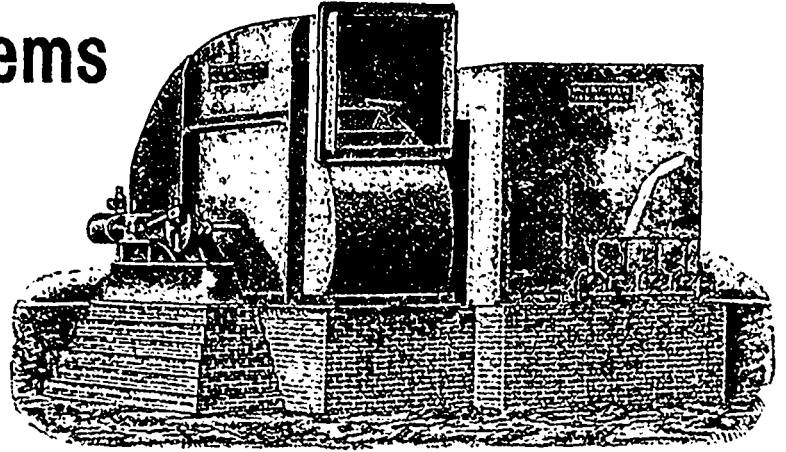
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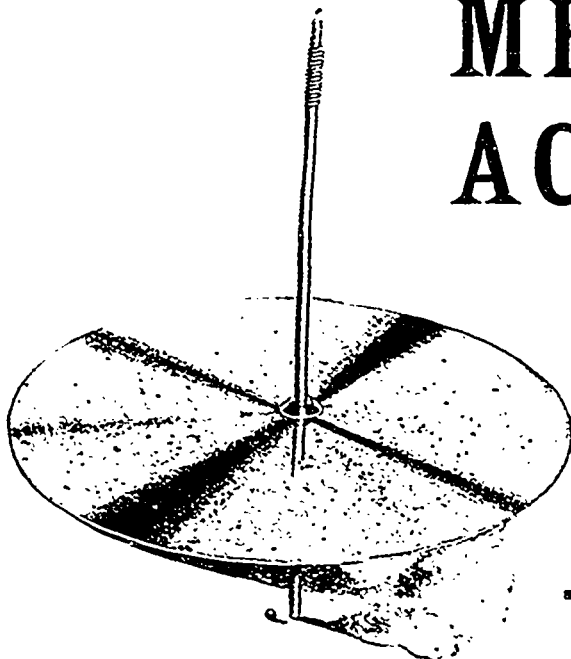
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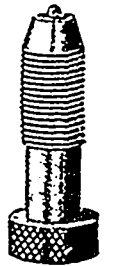
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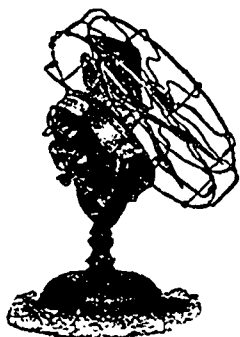
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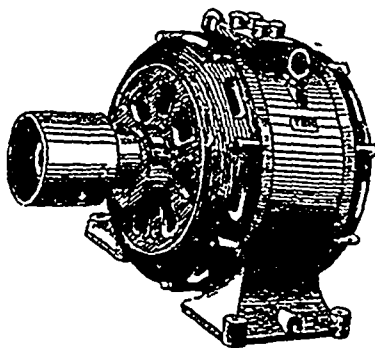
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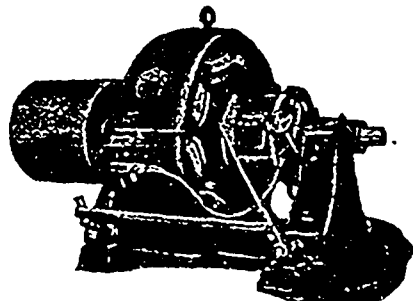
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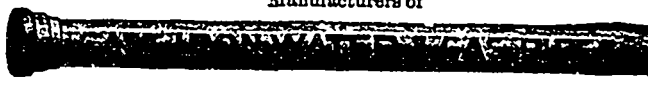
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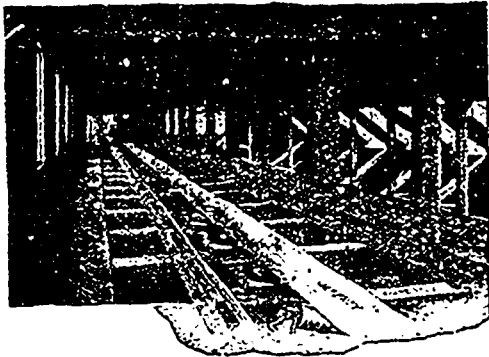
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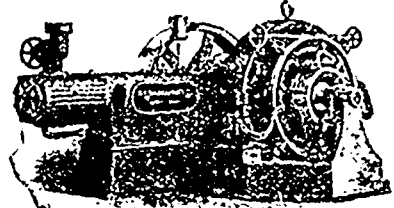
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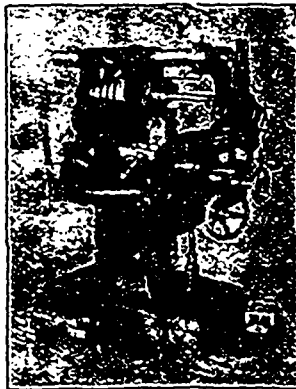
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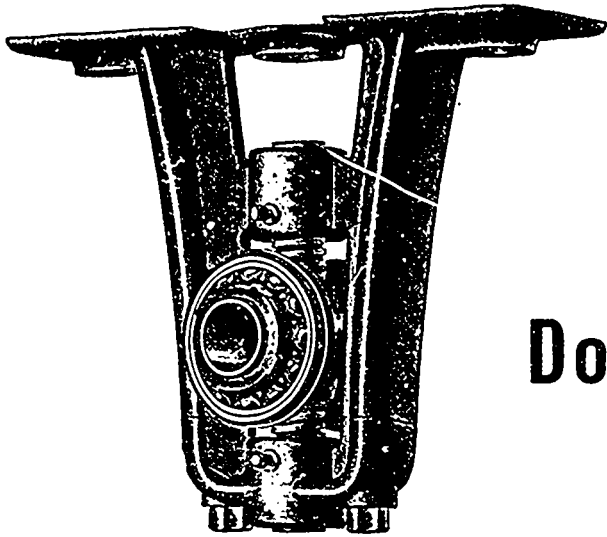
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SUBSCRIPTIONS:

Canada and United States \$1.50 per year. All other Countries in Postal Union ten shillings sterling, including postage.

J. J. CASSIDAY, *Editor and Manager*

Classified Index Page 42

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DEVELOPMENT OF CANADIAN TRADE.

The joint banquet held a couple of weeks ago in Berlin, Ont., under the auspices of the Board of Trade and the Berlin branch of the Industrial League was an enjoyable and profitable occasion. It was participated in by several hundred people, some of the speakers being F. D. Monk, M.P.; J. D. Allan, president of the Toronto Board of Trade; George Clare, M.P.; George Pattinson, M.P.P., and W. Griffin, representing Industrial Canada.

Mr. Griffin, responding to the toast "Canada for Canadians," said that that sentiment defined a policy that would keep Canadians in Canada. The last United States census showed that there were 1,200,000 Canadians in the United States, and if their descendants were counted the number of Canadians there would probably equal the number of Canadians in Canada. Canada's past policy had been, he said, practically the United States for Canadians—United States seaports for Canadian exports and imports; United States manufactures for Canadian farmers, and United States farm products for Canadian towns and cities. The doors of the United States are barred against Canadian products, and a similar policy was what Canada should adopt. It is not in Canada's power to cause Americans to eat more Canadian farm products, but Canada could cause Canadians to eat less of United States farm products. Non-intercourse between the two countries, according to Mr. Griffin, would signalize the acme of prosperity and happiness of Canada if it could be effected.

Mr. J. D. Allan was more optimistic in his views, Canada is going ahead in leaps and bounds. In 1845—sixty years ago, the seat of government of Canada as it then was, alternated between Toronto and the City of Quebec; sterling currency was used; the distance from Toronto to New York City, as regards time, was greater than from Toronto to Liverpool as at present. Until 1817 there were no banks in Canada while to-day 35 Canadian banks have branches in every city, town, and important village and industrial centre in the country. The total figures for the Toronto clearing house in 1892

THE SPIRIT OF INQUIRY.

Advertising is one of the greatest of educational forces. Education means rousing the spirit of inquiry. The easy and the sensible way to rouse this spirit in any human being is to tell him of something which he does not know and which it will be clearly to his advantage to know. The man with something good to sell is therefore in a position to increase the sum of human comfort and happiness—and the more he benefits himself, the more does he increase that sum.

A few years ago advertising was in a very crude state; it is still not quite the exact science it is going to be. For an exact science it must be—just as any other form of teaching.

Commerce is the great civilizer; advertising is to commerce what the teacher is to learning.

were \$326,000,000 and in 1904 they were \$842,000,000; and this is but a fair sample of the growth and prosperity of Canada.

The Dominion of Canada at this time, declared Mr. F. D. Monk, stands as a monument to the sagacity of the Fathers of Confederation, and in this connection Canada can well emulate the United States in the system of internal trade which exists between the eastern and western states. If Canada is to continue to flourish there must be a deep consciousness of common citizenship which is at the bottom of national feeling. There is too much of the spirit of localism throughout the land. Concluding, Mr. Monk said that he was not in sympathy with the Chamberlain policy.

There were other speakers whose cheerful, optimistic words lent stimulus to the occasion in sharp contrast to the pessimism of Mr. Griffin.

It is all well enough for enthusiastic manufacturers and others to bewail the fact that Canada is such a large importer of foreign goods, particularly from the United States, but there are some very potent causes for the situation, and others, equally potent which explain why, notwithstanding the preferential tariff, such a relatively small portion of our imports come from Great Britain. It should be remembered that the large importations of merchandise indicates an exceedingly prosperous condition of the country. Why is the demand for these goods not supplied by Canadian manufacturers? Why do so small a portion of these come from Great Britain? Why so large a portion from the United States? Canadian purchasers consider that, in a general way, the duty imposed upon imports is heavy enough to afford sufficient tariff protection to home manufacturers; and there are many such who entertain the opinion that neither they nor the country would be benefitted by an increase of duty. But they find that their products are not in as brisk demand as they desire, hence the promotion of "Made in Canada" fairs and banquets, which are excellent advertisers in their way, but to their disgust they observe that American goods have the call. Why?

Undoubtedly Canadian manufacturers produce goods the equal of any imported, but when it becomes a matter of making their merits known to consumers they are simply "not in it" with their Yankee competitors. The complaint is made that the cities, towns and villages of the country are overrun by American traveling salesmen who do not hesitate to cut prices when necessary to effect sales; and there is no doubt that in many lines the advertising of American goods in Canada is even more extensive and effective than the advertising of similar Canadian goods. The Yankees are strong believers in printer's ink. Purchasers consider that the duty laid upon imported goods equalizes the difference as to source and cost of production, and the purchase is made of the best advertised article. The British manufacturer makes no effort whatever to cater for Canadian trade, and the Canadian manufacturer lags behind his American rival in making the merits of his products known to Canadian purchasers.

A TARIFF COMMISSION.

A circular is being sent to the members of the Canadian Manufacturers' Association in which it is stated that it is practically certain that the Dominion Government will appoint a tariff commission at the present session of Parliament to enter upon a general revision of the tariff, and that in order to facilitate the work of the commission, and prevent duplication of investigation, it is important that Canadian manufacturers in their various branches of industry should without delay have their cases well prepared. The Association believe that that work can be accomplished with more satisfactory results by having the representations to be made to the commission made from sections of the Association rather than from individual concerns; and to this end special meetings of the various sections will be called to discuss the matter. If no section of the Association exists in any particular industry, and the manufacturers in it desire the assistance of the Association in securing tariff changes, they are invited to so advise the Association, after which it will discuss the matter.

If it should become absolutely certain that a tariff commission is to be appointed by the Government the fair presumption is that the Finance Minister will see to it that at least a majority of it are in full accord with the views of the Government on that subject, and no matter to what extent there may be a "general" revision, it will not show any startling changes. We take it that the present tariff embodies, substantially, the views of the Government, although some minor changes may be made to correct obvious errors; and it is very probable that the Finance Minister will be given power to take drastic action when it is brought to his knowledge that, because of a combine, as in a recent event in which a would-be purchaser who was not in a certain clique, was not permitted to purchase from the combine goods protected by the tariff, an injustice is done. Such action by the Government would be very closely akin to the action already taken to prevent dumping. No doubt Mr. Fielding would see to it that the interests of non-

combine purchasers would be protected, even as he has already guarded the interests of our manufacturers against the dumping of undervalued foreign goods.

FACTS WORTH NOTICING.

A demand has been made that the Dominion Government should, at stated times, call home their commercial agents stationed in different parts of the world to the end that they should carefully study the changes and advances that have occurred in our manufacturing industries the better to enable them, when they return to their posts, to transact the duties they were sent to perform. The idea is an excellent one.

On the other hand it would be well for manufacturers who engage in foreign trade to study what these commercial agents report about some of the features of this trade. The Department of Trade and Commerce publish weekly reports concerning Canadian foreign trade, in which the reports of the commercial agents are given; a noticeable and important one being that made by Mr. J. S. Larke, at Sydney, New South Wales. Mr. Larke says:

The usual crop of complaints have reached me this month. One is in reference to the old complaint of improper packing. A number of machines were ordered with definite instructions as to how they were to be packed. In due course an invoice was received with a covering letter stating that the instructions respecting packing were absurd, that they had made a study of it and had shipped in the manner they had found to be right. When the goods arrived half of them were found to be broken. Had the instructions sent been followed the loss would have fallen upon the buyers, but under the circumstances it must fall on the shipper. It must be borne in mind that while Australians may occasionally make mistakes in their directions, they have had a much greater experience in the requirements for long ocean voyages than the majority of Canadians and their instructions are based upon this experience.

Another is the refusal to meet the market. A Canadian manufacturer was assured of a good trade in boots and shoes if he changed his shape a little. He declined to do so.

In another instance an article was getting fairly introduced with excellent prospects before it, but it was cutting into the trade of a United States manufacturer. The latter launched into liberal advertising, and not only regained his trade, but now has a very large share of it. The Canadian firm refused to expend any money in this way and has lost his trade, though his goods were right and his prices below the successful rival. Buyers admit this, but say people ask for the other and we must sell what they want.

In one instance a failure was due to shipping goods made of inferior material and much below samples. In another case it was a refusal to reduce prices when others did so. In some of these instances this state of things was accompanied by sharp comments upon the incapacity of the agent, as otherwise he would have secured a large trade. In some cases this is undeserved, as the agents have done their best. A Canadian would be unwise to do business here if he cannot see a profit in it, and he has the right to say that he will only do it upon his own terms, but he should not be disappointed if he fails to meet with success when he declines to meet the conditions essential to success.

To say nothing of the deserved injury that such un-businesslike method brings upon the delinquent. They also have very injurious effect upon Canada throughout the commercial world.

It is highly commendable for our manufacturers to invade the outside markets of the world, but it is a grievous remissness to neglect the home market, or to adequately supply it with some of the common necessities of life of first class quality, leaving the door open for the admission of goods which the "made in Canada" sentiment cannot keep out. Read what United States Consul at Port Hope, Ont., says in a recent report. Referring to the opportunities for increased American trade in Ontario he says:

I am and have long been of the opinion that large quantities of American goods might be sold in this country were manufacturers and dealers to send traveling salesmen with samples to drum up trade. So far as my observation goes, the merchants generally buy from samples, and see only what the agent has to show them. They rarely visit the market in person, and would scarcely think of ordering from an American firm without an opportunity of examining the goods.

In this section many Americans are regular summer visitors, and the merchants keep on hand most kinds of American goods that are in common use. To specify one article, a certain brand of soap, which previously had been sold only in small cakes by druggists, is now a staple article with most merchants. The boot and shoe dealers carry fairly good lines of American-made boots and shoes, though many have a special line as exclusive agents. An American and a Canadian make of ladies' boots were shown me, which were supposed to be as near alike in style and quality as they could be, but the American boot would be taken first every time. Yet, after paying the 25 per cent. Canadian duty, the American boot costs the dealer 19 cents less than the Canadian make. The salesman comes with samples and sells the goods. In a recent issue of the Daily Consular Reports a colleague mentions the fact that fancy biscuits made in the United States have "practically captured the market" in his locality, and he adds: "It was through the visit of a personal representative of the manufacturers."

The articles herein enumerated are but a few of those sold here or which could be introduced by energy on the part of Americans looking for a foreign market.

FIRE REGULATIONS.

Mr. J. A. C. McCuaig, manager of the Dominion Fire Protective Association, of Toronto, has issued the following specifications for the proper installation of fire pails in factories, etc., in this city. The requirements issued are based upon the recent action of the New York Fire Insurance Exchange, which, in allowing reduction in rates for this class of appliance, insists that the rules of the Exchange be strictly complied with. In connection with the report of the Chief of the Fire Department upon the need of various schools and charitable institutions of fire protection of this class, and the action of the local underwriters in adopting an allowance for casks and pails in all business risks, these rules are considered specially important. They are the result of fifty years' experience:

Fire pail equipments are required in all places of business where the insurance rate is computed by a schedule which provides allowances for the installation of fire pails, or provides charges for the absence of fire pails. They must be on every floor, and every part of a floor, used for business purposes. For a floor space of 2,500 square feet or less six pails are required. For each additional 2,500 square feet, or fraction, of floor space six additional pails. The pails must be of galvanized iron; capacity 10 or 12 quarts; to be painted red; to be lettered "Fire," or "For Fire Only"; letters to be black, not less than 2½ inches high; round bottom recommended for establishments where employes are likely to use pails for ordinary purposes; covers not required but recommended; wooden pails not acceptable under any circumstances.

The setting must be fixed, permanent and reserved for fire pails. Shelves, brackets, or benches are the approved setting, but they must be intended for, and limited in their use to, fire pails. Fire pails placed as follows, not acceptable: On the floor, on stock shelves, on window sills, on safes, on desks, on radiators, on boxes, on or under work tables or benches, on top of one another or in tiers; to be not lower than two feet above the floor, measured from the floor to the bottom of the pail; to be not higher than five feet above the floor, measured from the floor to the top of the pail; when round bottomed pails are set in shelves or benches, the holes cut for the oval bottom should be only large enough to receive the oval, that is, the flange of the bottom should rest on the wood, and not be set into the opening.

Distribution must be so as to provide pails near at hand in every part of the premises; to provide extra pails near dangerous features; in groups of two, three, four, five or six, but not larger than six; groups to be placed diagonally opposite, i.e. "criss-crossed" or "staggered."

The location must be in clear space, providing free and unimpeded access; in close proximity to exits, such as stairways, elevators, fire escapes; in a familiar place, within constant sight of the occupants; in close proximity to places where fire is likely to start; not to be blocked by stock or machinery, or covered with rubbish or other materials.

Water pails must be refilled once a week regularly with clean water; sand pails, where oils, paints or inflammable liquids are kept, used, or stored, one half of the total number of pails required, to be kept filled with clean dry sand, and a scoop to be provided for use in throwing the sand. Sand pails should not be filled so full as to make them inconveniently heavy, two-thirds full is sufficient.

When fire pails are located where there is a liability of the water being frozen in cold weather it is recommended that two pounds of chloride of calcium or salt (the chloride of calcium is preferable) be placed in each pail. For casks, the quantity recommended is 50 pounds for each cask. It is necessary that the chloride of calcium or the salt be dissolved by thorough stirring.

The fire pail equipment should always be placed in charge of the engineer, the janitor, the foreman, the watch-

man, or some person with authority, who will be answerable for its efficiency.

Safety fire bucket tanks, containing six fire pails, are accepted as the equivalent of six fire pails, provided they are tested once a week, to insure that the covers lift readily and that the pails may be withdrawn without delay.

Casks of water are accepted, each cask as the equivalent of six fire pails, provided the following conditions are complied with: Cask to be a good oak barrel; capacity to be not less than 50 gallons; to be painted red, with word "fire" or for "fire only" in black letters not less than six inches high; to have a cover with a handle. Six standard fire pails to be placed on a shelf or hooks alongside of the cask.

In case of fire, when possible, fire pails should be used under the direction of a competent person, and water not thrown in a wild, aimless manner, but if there is time make use of a wetted broom to beat out the fire or blankets to smother it. In using water for fire purposes it is to be remembered that to do any good it must reach the burning material.

Water should never be used on burning liquids, such as oils, paints, etc., as it will not extinguish the fire but float the burning liquids to a distance, and thereby spread the fire. Some material, such as sand, should be used, first, to keep the burning liquid from spreading and then to smother the fire.

The position taken by underwriters is that a pail of water is the best fire extinguisher yet devised. It costs little; its use is understood by everyone; it is easily kept ready for use; and its effect, if used at the proper moment, may be better than the work of an entire fire department five minutes later.

CANADIAN SHIPPING STATISTICS.

The annual report of the Department of Marine and Fisheries, giving the shipping statistics for last year, has been published. The total number of vessels remaining on the registry books of the Dominion on December 31, 1904, including old and new vessels, sailing vessels, steamers and barges, was 7,152, measuring 672,838 tons registered tonnage, being an increase of 132 vessels, and a decrease of 10,309 tons register, as compared with 1903. The number of steamers on the registry books on the same date was 2,543, with a gross tonnage of 353,514 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada on December 31, last would be \$20,185,140. The number of new vessels built and registered in Canada during the last year was 308, measuring 18,554 tons registered tonnage. Estimating the value of the new tonnage at \$45 per ton, it gives a total value of \$834,930 for new vessels. Canada has a total of 7,152 sailing ships and steamers, of which Nova Scotia has 2,066, Ontario 1,886, and Quebec 1,287. The number of steamers is 2,543, Ontario having 1,288, or more than half.

The tonnage of each of the maritime states of the world is given in the report, but unfortunately for comparative purposes, the Canadian figures are included in the British

returns. Canada, however, stands eighth in the total net tonnage of steam and sailing vessels. As usual, Great Britain and the colonies head the list with a magnificent total of 11,225,421 net tons, or within a fraction of half the entire shipping tonnage in the world. At the end of last year there were 11,532 steamers sailing the various waters of the Globe, and of this number Great Britain owned 8,406, Germany 1,479, Norway 1,037, and the United States 901. Of sailing vessels, out of a total number known to exist of 28,338, Great Britain owned 6,997, United States 3,671, Russia 2,556, France 1,819, Germany 1,226, Norway 1,717, Italy 1,571, Sweden 1,608. Russia owns 590 steamers, and Japan 556, while of sailing vessels Russia has 2,556 and Japan 1,590.

THE DUTY ON BITUMINOUS COAL.

Referring again to the question of reciprocity between the United States and Canada, or at least the abolition or reduction of the duty of 67 cents per ton now imposed by both governments upon importations of bituminous coal, the Coal Trade Journal notes that doubtless the most persistent advocates of this measure are the manufacturers and other large steam coal consumers of Ontario. The mill owners of New England, who are anxious for the opportunity to purchase Nova Scotia coal, without paying tariff charges, would probably be benefitted less by a mutual removal of the barriers than would their brethren in Ontario, who, owing to their distance from the Maritime Provinces and the absence of coal mines in the central portion of Canada, are compelled to look to the United States for their fuel supply.

During the last fiscal year, 4,252,333 tons of soft coal were imported into Canada from the United States, practically all of which was taken by Ontario. Some of this coal was produced in Ohio and shipped across Lake Erie in vessels; the remainder was Pennsylvania coal, which entered Canada all-rail via the Suspension Bridge route. After the duty has been paid, this coal can still be sold at a considerably lower figure than the Nova Scotia product can be delivered for, owing to the cost of transportation and the royalty exacted by the government of Nova Scotia from its coal producers upon every ton of coal mined, in consideration of the protection afforded them by the Dominion tariff. From this latter feature arises much of the dissatisfaction of the Ontario steam users, as they assert that they pay 67 cents a ton duty and get no return, as no Ontario industry is benefitted by the tax which all have to pay. Neither do the Nova Scotia mine owners derive any advantage from the duty on this tonnage, as practically none of their coal goes to Ontario, and therefore their interests would not be adversely affected if coal from the United States was admitted into that province free of duty. Petitions have been made to the Nova Scotia government, asking that a remission of this fee be made on coal shipped west of Montreal, but such requests have always been refused. If this royalty did not exist, the Nova Scotia coal might possibly reach, at least, some

parts of Ontario, and, to that extent, displace the Pennsylvania and Ohio product.

This state of affairs has set the Ontario manufacturers to discussing the question as to why they should continue to pay a duty on United States coal for the benefit of Nova Scotia, when that province refuses to put its own coal within their reach, and they insist that there will be no cessation of their efforts to secure a more equitable arrangement.

THE LABOR BUREAU REPORT.

The fifth annual report of the Ontario Labor Bureau, of which Mr. Robert Glockling is secretary, shows that during 1904 there were 54 trade disputes resulting in strikes in Ontario, involving 171 establishments and 8,945 persons. An aggregate of 878 days was covered by the strikes, the average duration of each dispute being 14.41 days, or 10.18 days per person, compared with 82 disputes, involving 429 establishments, 10,564 persons, aggregating 994 days, an average of 12.12 days to each dispute, and 10.62 days per person in 1903.

Attention is called to the fact that the secretary of the bureau is the conciliator under the act facilitating the settlement of trade disputes. A number of the disputes mentioned above were settled by him last year.

The industrial establishments reporting to the bureau were 174, employing 11,503 persons. The gross value of their aggregate product was \$25,714,296; the amount paid in wages \$4,400,626, an annual average earning of \$382.56 per person. The percentage labor cost of production was 17.15, as against 21.69 in 1901, and 25 in 1903.

The report includes the replies of clerks of cities, towns and villages to a circular inquiry as to the industrial opportunity existing in their municipalities. These replies are very valuable, and one cannot help being struck by the variety of business opportunities throughout the Province. A number of statistics of interest to all workers and employees, legal decisions affecting the relations between employer and employees, a synopsis of the labor laws of Ontario, the factory act, with the latest revisions thereto, and much other useful and valuable information is comprised in the report.

EDITORIAL NOTES.

At the recent meeting of the Montreal Light, Heat & Power Co., which furnishes gas for illuminating and other purposes in that city, President Holt, speaking of the price of gas and the cost of production, as compared with Toronto, stated that to use coal in the Montreal works equal to that used in Toronto would cost his company \$1.40 per ton more than in Toronto.

Hon. W. J. Hanna, Provincial Secretary, has written a letter to the Toronto Board of Trade stating that the Government will discontinue the manufacture of brooms, and woodenware at Central Prison, Toronto.

A new metal alloy, "Radium Argentiferum," discovered by Travaglian and Fabiana, two Tuscan engineers, has recently been patented. It is composed of copper, iron

and very fine portions of silver, radium and phosphorus. It is claimed to be of greater strength than steel, to be a better conductor than copper, to be nonoxidizable and cheap to manufacture, its cost being about one-tenth that of bronze when made in large quantities. Its discovery is interesting, as it was largely an accident. After the inventors had expended nearly \$20,000 in futile experiments, Travaglian, being annoyed by his inability to fuse the metals after hours of boiling, happened to throw a 2-franc piece into the crucible. The coin supplied the needed ingredients for fusion and the problem was solved.

It is almost three hundred years ago when the world received its first account of the wonders of the Niagara Falls. It is only fifty years ago when Livingstone carved his name on a tree standing in view of the marvels of the Victoria Falls, in what was then "Darkest Africa." After Livingstone came Stanley, and it was only thirty years ago that this great explorer explored the boundaries of Lake Victoria Nyanza, and it is less than twenty years ago when he made his last and in many respects most memorable trip through the then unknown regions of Central Africa. "Yet we have before us now," says the Wall Street Journal, "a two-page advertisement of a fast railway train running through the very region explored by Livingstone and Stanley. A train de luxe leaves Cape Town every Wednesday for Kimberley, Mafeking and Bulawayo, connecting with a fast saloon service and sleeping accommodations to Gwelo, Salisbury and Victoria Falls. These trains are lighted by electricity and provided with saloon, dining and buffet accommodations. The Cape to Cairo Railroad indeed reaches nearly every important point, which only a few years ago we were reading about in the wonderful narratives of Livingstone's and Stanley's explorations. Nothing could illustrate more vividly the rapidity with which modern civilization is moving, and the spell with which Darkest Africa is being opened, not only to the commerce but to the tourists of the world. Not only have the Victoria Falls thus been brought within the easy reach of travelers, but this stupendous wonder of the world, like Niagara, is about to be utilized to provide power to conduct electric energy for use in transportation and industry."

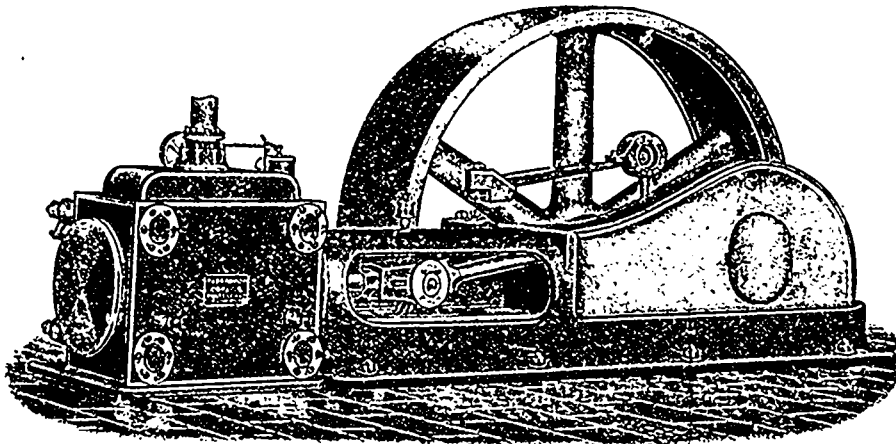
There is to be a Dominion Forestry Convention in the early future, called at the suggestion of Sir Wilfrid Laurier. The various provinces will be asked to cooperate. It is proposed to discuss the general question, with reference to the following heads: The lumbering industry, pulp and paper manufacture, water powers, irrigation, agriculture and transportation.

The bounties paid by the Dominion Government last year on iron, steel, lead, binder twine and petroleum were as follows:—pig iron, \$533,952; puddled iron bars, \$11,669; steel ingots, \$347,991; articles manufactured from steel, \$15,320; lead, \$195,628; binder twine, \$25,452; petroleum \$167,205; a total of about \$1,300,000.

MACHINERY AND ENGINEERING.

ROBB-ARMSTRONG CORLISS ENGINES, SLOW AND MEDIUM SPEED.

The Robb-Armstrong Corliss engine is designed on the lines of standard Corliss engines of the modern, heavy duty type, the stroke being rather short, giving a compact frame, free from the vibration, which always takes place in the older design of long stroke, girder frame. As shown by the cut "A," the frame is supported the whole length on the foundation: the crosshead guides and main bearing seats being bored in a special



A—NEW CORLISS ENGINE.

machine at one operation, making them in perfect alignment. The length of stroke is so proportioned that the revolutions of the engines may be anywhere from 90 to 150, and the speed of pistons and reciprocating parts do not exceed 450 to 600 feet per minute, which is very desirable for use in factories, saw mills, etc., where continuous service is required with the minimum amount of attention.

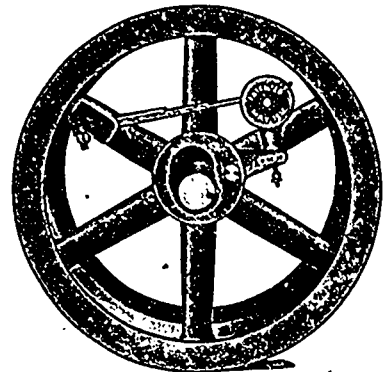
The special feature of this type of engine is the Armstrong-Corliss valve gear, which is much more simple in construction than the ordinary releasing gear, and will operate successfully at any speed up to 200 revolutions per minute.

The valve gear shown in the outline sketch "B," is the invention of Mr. E. J. Armstrong, M.E., the essential feature of it being that there are no springs, dash pots or disengaging parts which are usual in the ordinary Corliss valve gear. By the introduction of two small links, (a) and (b), between the wrist plate and bell cranks, the steam valves are caused to open and close quickly, and remain stationary during the remainder of the stroke, the action being almost precisely the same as with the releasing gear invented by George H. Corliss, the advantage being that as this valve gear is positively driven, and does not depend on springs or dash pots for closing, it may be operated at much higher speed than the releasing valve gear, and as there are only about half as many pieces and wearing surfaces, and no latches or detachable parts, the gear runs very smoothly without noise or friction. The

valves are of the usual Corliss rotative type, triple ported, of the latest design, giving very short travel and quick opening. The exhaust valves are driven from a wrist plate in the usual way.

The automatic cut off is obtained by means of a shaft governor, located in the driving wheel of the engine, so arranged that the position of the eccentric is varied, changing the cut off of the valves directly. This method of governing is much more positive, quicker in action and gives a closer regulation than the indirect method of governing used in connection with the releasing valve gear.

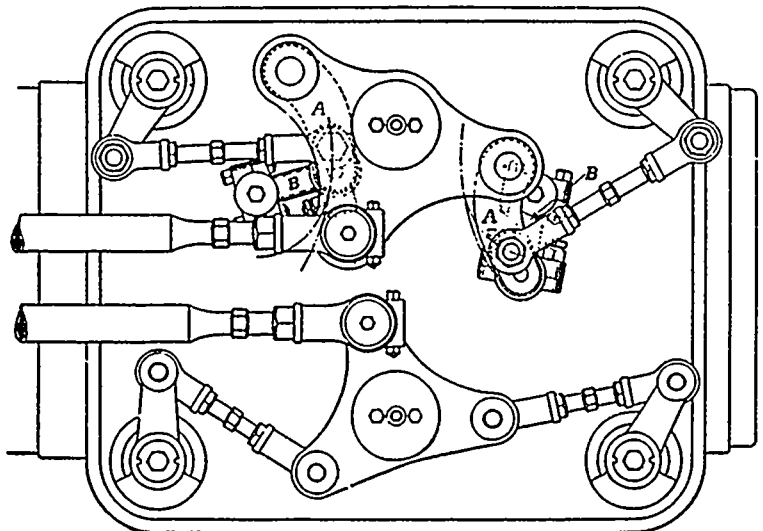
motion of the valve gear, and the weight is so placed that it gets the effect of inertia for quick regulation. The gov-



C—ROBB-ARMSTRONG-SWEET GOVERNOR.

ernor system is in gravity balance in all positions, because the eccentric is made to balance the centrifugal weight, the principle of balancing being the same as that invented by Professor John E. Sweet and used in the "Straight Line" governor. The result is an extremely simple and powerful governor, in which there is not enough friction to prevent it from changing position almost instantly to meet sudden changes of load, and there is no possibility of racing when properly adjusted. By means of a simple adjustment of the link connecting the eccentric and centrifugal weight, the governor weight may be adjusted to any degree of sensitiveness or close regulation. Only an engineer who has had experience with various types of governors can properly appreciate the ease and certainty with which the necessary adjustments are made on this one, and the absolute integrity with which they are maintained. No other governor compares with it in these all essential qualities.

The crank shaft is made of the best quality of mild, forged steel, and the crank disc of semi-steel or steel casting. The shaft is forced into the disc by hydraulic pressure, and as an extra pre-



B—VALVES AND VALVE GEAR.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER

caution, a key is inserted between the shaft and disc. The crank pin is large in diameter in proportion to the length, so that the centre of thrust is as close as possible to the shaft bearing, and springing of the crank minimized. The journals of the crank shaft and crank pin are carefully ground to gauge and lapped to perfect surface. The crank pin is oiled continuously by the waste oil from the

storing the alignment of the crank shaft. The shaft bearings have ring oiling in addition to the regular system of oiling, as described.

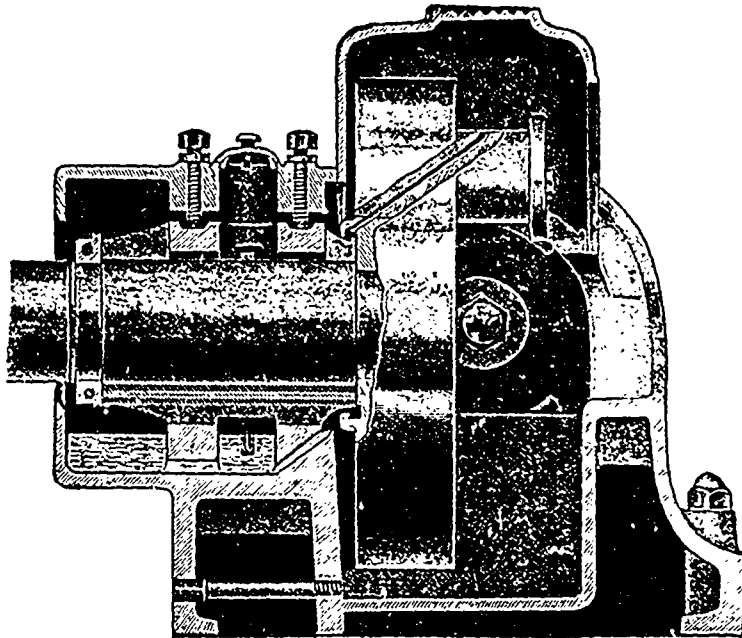
The connecting rod is a solid steel forging, the crosshead end being solid without straps, and the crank end either solid or of the marine type, the bearing surfaces being lined with genuine babbitt compressed into place, bored out and

is perhaps more essential than any other detail to its successful and satisfactory working, as well as to its length of life. The continuous oiling of all the bearings of the Robb-Armstrong engine is provided for by a large reservoir placed on a pedestal above the engine, and the oil is piped to every bearing with a sight feed valve for each, which may be adjusted once for all, the entire oiling system being started or stopped by opening or shutting a single valve at the reservoir. As stated previously, the main bearings have ring oiling in addition to the sight drop, and the crank pin is also supplied in two ways. The oil is all returned to the crank pit, where it may be drawn off and filtered, or allowed to drain to a separator and filter attached to the engine. The frame and crank, as well as the eccentric are entirely enclosed by sheet metal casings, which prevent the oil being thrown outside the engine. The cylinders are provided with positive feed lubricators.

The Robb-Armstrong engines are designed with the special object of being made in quantities by the interchangeable system. The drawings, gauges, templates and manufacturing plant are especially adapted for it and a large stock of duplicate parts always kept on hand. Every part of each engine is numbered, corresponding with drawings, which are placed in our files for reference, so that the customer may obtain duplicate parts at any time by telegraphing the number of the engine and part required.

The value and efficiency of a steam engine depends on its ability to do continuous, hard work, without undue wear or breakage, and be as economical as possible in the use of steam. The special features of the Robb-Armstrong Corliss engines are the improved valve gear, extreme simplicity in the number and arrangement of parts, and that every wearing part may be replaced, thus keeping the engine in perfect condition indefinitely.

This machinery is manufactured by the Robb Engineering Co., Amherst, N.S.



D MAIN BEARING AND CRANK.

shaft bearing, and also from the sight feed valve on the main bearing cap, the oil being caught in an annular recess at the back of the crank disc and conveyed to the crank pin, by centrifugal force, through the oil hole shown in the sectional cut "D" of the main bearing and crank.

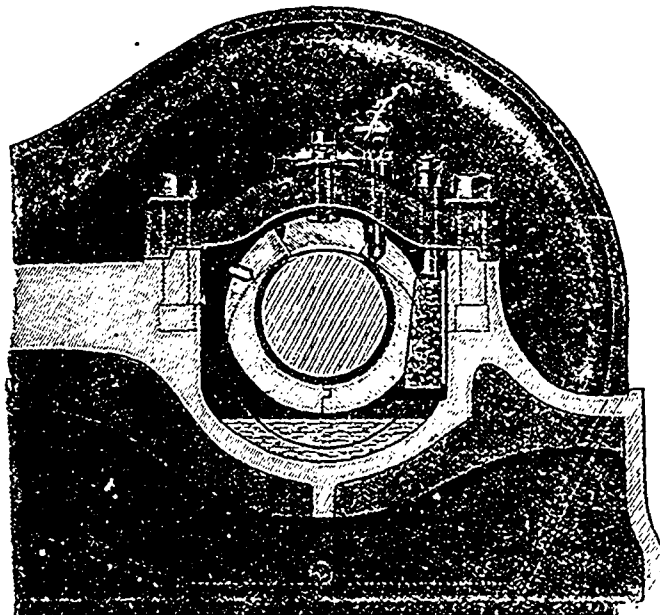
The shaft bearings consist of interchangeable, removable shells lined with genuine babbitt, made of pure copper, tin and antimony compressed into the outer cast iron shells and carefully bored and scraped to gauge. The shells are in halves, turned on the outside to fit seats in the frame of the engine, held to place and adjustable by wedges, as shown in the illustration "E." The adjustment is made by screws from the outside of the cap; by loosening the centre screws which hold the top wedge, and tightening the side screws, which lift the side wedges and close in the shell or vice versa. The adjustment of the shells may be made by hand while the engine is running, which enables the engineer to feel the tightness and prevents getting the bearing too tight. By this arrangement, the shell is closed in evenly all around, keeping the contact of the bearing surfaces even and equal as wear takes place, which is not the case in the ordinary four part box. As the strain on the bearing is on the bottom and sides only, the top part of the shell is open and does not touch the shaft, which prevents heating and allows the oil to be well distributed over the bearing. The bearing shells are interchangeable and may be replaced at any time without delay, re-

carefully scraped to gauge. The connecting rod boxes are interchangeable, so that they may be replaced at any time.

The crosshead is of the ordinary type, made of steel with an adjustable bottom shoe, which is lined with babbitt.

Large oil pockets are provided at each end of the guide, into which the crosshead shoe dips, so that it practically floats in oil.

A regular and copious supply of lubricant to all the working parts of an engine



E-SECTION THROUGH MAIN BEARING.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

LIFTING MAGNETS.

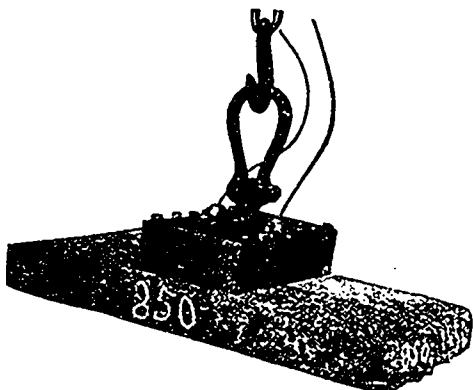
The introduction of electro magnets for the purpose of handling heavy metal materials has wrought a decided economy in this line of work. These magnets are now used in handling pig iron, steel or iron scrap bolts, nuts, rivets and similar material in bulk; plates, billets, blooms, slabs or cold ingots in quantities; and



MAGNET FOR HANDLING SCRAP.

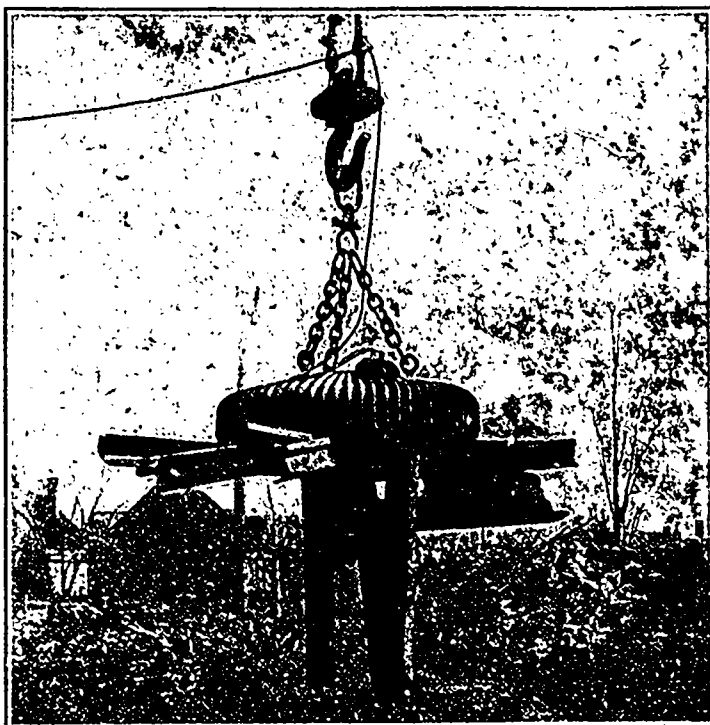
rails, pipes, sheets and other special shapes in quantities under special conditions.

The Electric Controller & Supply Co., Cleveland, Ohio, have recently perfected a line of magnets for the lines of work mentioned above, and these equipments are now in use in many industrial plants. Their use has resulted in a decided economy over other methods of handling such materials.



FOR HANDLING BILLETS.

The case of the magnet is a heavy casting made from such a grade of steel that when the circuit of the energizing coil is opened the magnet drops its load instantly so that no time is lost. The energizing coil is form wound, heavily insulated, and treated by a vacuum impregnating process which insures it against grounding or short circuiting. The coil is completely enclosed and protected by the case, which in the pig magnet type is ribbed to provide for the rapid radiation of the heat of the coil. The current is led to the coil through a heavily-guarded



PIG MAGNET FOR HANDLING RAIL ENDS.

plug connection, the plug being pulled out when it is desired to detach the magnet from the crane hook. The magnet is moisture-proof, and not easily injured by rough usage.

transport and release. No time lost as with chains, where the piece must be barred up and the chains attached and adjusted.

No ground-helper required except to adjust where several pieces, as billets, are to be carried at each lift.

When magnets are used all stock can be piled solid, and to the maximum height permitted by the crane, and hence a greater amount can be stored in a given space.

The pig magnets are built in two sizes. The first is of 35 inches diameter, and weighs complete about 1,650 pounds. This magnet is designed to handle 500 pounds of pig iron per-lift. The larger size has a



FOR HANDLING HEAVY MELTED STOCK.

It is operated by a small controller mounted in the crane cabin, all magnets being operated in connection with traveling cranes.

A drum is mounted on the trolley and geared to a hoist shaft. A twin conducted flexible cable conveys the current to and from the magnet, the drum taking care of the slack. The cable is connected to a pair of contact rings on the drum, and the current is conveyed from the controller in the cab to the drum through an extra trolley wire and returned through the common return trolley wire. Another method of connecting up the magnet to the crane is by means of the twin conductor cable.

In operating the lifting magnets it is only necessary to lower on the piece or pieces to be lifted, close the switch, hoist,



FOR HANDLING BOLTS AND NUTS IN BULK.

CAPTAINS OF INDUSTRY.

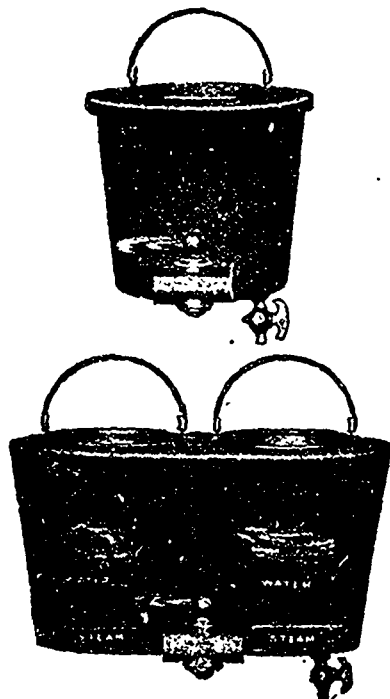
The following items of information, which are classified under the title "Captains of Industry," relate to matters that are of special interest to every advertiser in these pages, and to every concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses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

diameter of 51 inches, weighs 4,950 pounds, and will lift from 1,100 to 1,400 pounds. A magnet similar to the pig magnet is used for skull-cracker work. The largest of this type now in use will lift about 11,000 pounds. For handling rails, billets, slabs, etc., a flat rectangular magnet is used, two or more of these being attached to the same crane for use in handling long material.

A number of the uses to which lifting magnets are applied are illustrated herewith.

SCIENTIFIC GLUE HEATING.

The scientific principles of heating glue have been incorporated by the Advance Machinery Co., Toledo, Ohio, into a new style device, similar in application to some equipments now on the market, combining, however, new and practical ideas to insure economy and convenience of operation. The accompanying illustrations show the general construction, consisting of a cast-iron jacket, with steam chamber in bottom, portable copper glue-pot, and a patent independent brass valve for governing supply of steam. Any number of these individual heaters may be attached to a line of steam pipe, arranged in such position on the workman's bench as to meet the requirements of general conditions. The steam enters the steam chamber in cast iron jacket,



making complete circuit, exit being at opposite end of valve. Any temperature may be maintained. The independent feature of this valve permits the heating of each pot independent of all others, as steam may enter as above explained, or, by reversing valve key, passes directly through valve. Consumption of steam, by this method, is reduced to a minimum. This device is adaptable to the requirements of most all conditions, and its construction leaves little room for improvement. It is especially recommended for use in large establishments, but may be used to advantage by shops of ordinary size, as any number of pots may be used.

The Canadian Northern Railway Co. have placed orders for the following passenger equipment: Five 60-foot baggage cars, and ten passenger coaches with the Crossen Car Mfg. Co., Cobourg, Ont.; four first-class passenger coaches, five 60-foot baggage cars, ten 60-foot mail and express cars with Rhodes, Curry & Co., Amherst, N.S.

W. C. Crawford's handle factory at Tilbury, Ont., was damaged by fire June 2.

The Chief of the Toronto Fire Department has submitted to the Fire and Light Committee the following list of institutions in that city lacking the necessary fire protection appliances as required by law: Salvation Army Training School, McMaster Hall, Loretto Academy, Moulton College, Wycliffe College, Westminster College, Aunesley Hall, St. Margaret's College, St. Michael's College, Young Men's Christian Association, Precious Blood Convent, Bishop Strachan School, Infants' Home, Protestant Orphans' Home, Home for Incurables, Sunnyside Orphanage, Monastery of Our Lady of Charity, Trinity College, St. Hilda's College for Ladies, the Haven, House of Industry, House of Providence, Boys' Home, Girls' Home, Miss Philpot's Ladies' Boarding School, Toronto University, Oakham House Working Boys' Home, Refuge for Girls, Glenmoor Boarding School, Aged Women's Home, Aged Men's Home, Home for Incurable Children, St. Joseph's Convent, Havergal Hall, St. Nicholas' Home, De La Salle Institute, Victoria College and Knox College.

The town of St. Catharines, Ont., is now using natural gas.

Mr. M. J. Haney, Toronto, has been awarded the contract for the construction of a tunnel under Toronto Bay at a cost of \$269,000.

Mr. F. A. Wegner, Brockville, Ont., will supply the city of Kingston with an approved alternating current dynamo with a capacity of 2,000 lights at a cost of \$500.

The Redemptorist Fathers, Toronto, have taken out a permit for the erection of a church building at a cost of \$90,000.

James Bogue, contractor, Peterborough, Ont., has been awarded the contract for laying about 150,000 feet of granolithic walk in Arnprior, Ont., at a cost of \$20,000.

A foundry will probably be erected at Windsor, Ont., at a cost of \$500,000 in connection with the Michigan Central Railway Co.'s tunnel under the Detroit River at that place.

Messrs. W. Gardner & Sons will rebuild their planing mill at Galt, Ont.

A company in which Mr. T. W. Nealon, of Philadelphia, Pa., is interested are considering establishing a paper mill for the manufacture of peat board, at

Cannington, Ont. For further information apply to Wm. A. Robinson, Cannington.

The contract has been signed by R. H. Bradburn with the New York Theatrical Stock Exchange for the erection of a new \$30,000 opera house, with a seating capacity of 1,500, at Peterborough.

The Canadian Northern Railway Co. have placed an order with the Canada Foundry Co., Toronto, for five ten-wheel freight and passenger locomotives for the James Bay Railway.

The Montreal Steel Works will erect a factory building in Montreal at a cost of \$25,000.

The Cataract Wine & Canning Co., Niagara Falls, Ont., will commence work immediately on the erection of a \$35,000 factory.

The Ottawa Cement Block Co., Ottawa, have been incorporated with a capital of \$10,000, to manufacture cement blocks, bricks, concrete, etc. The provisional directors include L. S. Macoun, R. W. Wright and C. A. Irvin, Ottawa.

The Standard Co., Ottawa, have been incorporated with a capital of \$20,000, to carry on a general contracting business. The provisional directors include J. A. Beauchesne, Arthabaska, Que., John Louray and Alfred Lalonde, Ottawa.

The Chatham Steam Heating Co., Chatham, Ont., have been incorporated with a capital of \$40,000, to produce steam, electricity, natural gas, etc. The provisional directors include G. W. Kipp, Towanda, Pa., J. T. O'Keefe and W. N. Warburton, Chatham.

The Temagami Navigation Co., Toronto, have been incorporated with a capital of \$50,000, to carry on a warehousing and shipping business, etc. The provisional directors include J. E. Russell, Simon Hall and J. M. Sinclair, Toronto.

The C. C. Huffman Co., Toronto, have been incorporated with a capital of \$50,000, to manufacture soaps, oils, chemicals, etc. The provisional directors include H. E. Johnston, J. E. Teeter and C. C. Huffman, Toronto.

The William Rennie Co., Toronto, have been incorporated with a capital of \$150,000, to engage in the business of seedsmen and to manufacture implements for garden use. The provisional directors include Robert Rennie and John Rennie, Toronto.

The Mack's Creo-Chemical Co., Owen Sound, Ont., have been incorporated with a capital of \$40,000, to manufacture soaps, disinfectants, etc. The provisional directors include R. H. McWilliams, Michael Horan and N. B. Horton, Owen Sound.

The Russell Elevator Co., Toronto, have been incorporated with a capital of \$20,000, to manufacture elevators, hoisting machinery, etc. The provisional directors include John Russell, A. Russell and C. J. Parker, Toronto.

The Toronto Furnace & Crematory Co., Toronto, will erect a foundry and machine shop in that city.

The Clark Mfg. Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture hats, caps, etc. The provisional directors include A. R. Smith, Toronto, Arthur Ash and J. C. Watson, London, Ont.

The Ladies' Novelty Mfg. Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture ladies' novelties, leather goods, etc. The provisional directors include A. J. Doherty, W. H. Garvey and M. Garvey, Toronto.

The Mineral Springs, Limited, Toronto, have been incorporated with a capital of \$100,000, to manufacture mineral and distilled waters, ginger beer, fruit wines, etc. The provisional directors include W. G. Gooderham, E. B. Shuttleworth and W. H. Gooderham, Toronto.

The Caster, Powell Land & Lumber Co., Toronto, have been incorporated with a capital of \$50,000, to manufacture lumber, etc. The provisional directors include Frederick Kiely, Wm. Pinkerton and J. B. Bertram, Toronto.

The Toronto Construction Co., Toronto, have been incorporated with a capital of \$200,000, to construct railways, canals, bridges, etc. The provisional directors include G. S. Deeks, A. B. Cook, Toronto, and Wm. Winters, Spokane, Washington.

The Bryan Mfg. Co., Limited, Collingwood, Ont., have been incorporated with a capital of \$150,000, to acquire the planing mill and box manufacturing business of the Bryan Mfg. Co., and to manufacture sashes, doors, etc. The provisional directors include F. W. Bryan, W. H. Bryan and W. T. Herrington, Collingwood.

Messrs. Doolittle & Wilcox, Limited, Hamilton, Ont., have been incorporated with a capital of \$100,000, to acquire the business of Doolittle & Wilcox, and to quarry and manufacture stone, brick, lime, etc. The provisional directors include C. M. Doolittle, H. W. Wilcox, Hamilton, and F. W. Schwendiman, Barton, Ont.

The Port Rowan Natural Gas Co., Port Rowan, Ont., have been incorporated with a capital of \$40,000, to produce natural gas for light, heat and power purposes, etc. The provisional directors include C. S. Killmaster, J. L. Buck and F. H. Pearsall, Port Rowan.

The Puritan Knitting Mills, Limited, Toronto, have been incorporated with a capital of \$40,000, to manufacture knitted goods, etc., and to acquire the business of the Puritan Knitting Mills. The provisional directors include J. W. Woods, G. A. Woods and W. J. Craig, Toronto.

The Britannia Paper Co., Toronto, have been incorporated with a capital of \$200,000, to manufacture paper, wood pulp, etc. The provisional directors include G. A. Turner, Toronto, Thomas Brown and Chas. Brown, St. Catharines, Ont.

The Macdonald Engineering Co., a United States incorporation, have been licensed to construct grain elevators, power plants, etc., and to manufacture

machinery and supplies in Ontario with a capital of \$50,000. W. H. Adamson, Toronto, is their attorney.

The New York Oil Co., a United States incorporation, have been licensed to produce oil, petroleum, etc., in Ontario with a capital of \$1,000,000. W. A. Brake, Leamington, Ont., is their attorney.

The Crescent Oil & Gas Co., a United States incorporation, have been licensed to produce oils, natural gas, asphaltum, etc., in Ontario, with a capital of \$1,000,000. W. A. Brake, Leamington, Ont., is their attorney.

The Canada Malting Co., Dundas, Ont., have increased their capital from \$250,000, to \$500,000.

The Rolla L. Crain Co., Ottawa, have increased their capital from \$30,000 to \$100,000.

The Manning Wood Fibre Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture excelsior packing, lumber, etc. The provisional directors include W. W. Thompson, Gravenhurst, Ont., Thomas Porter, Embro, Ont., and H. Manning, Toronto.

The International Acheson Graphite Co. will erect a large factory at Niagara Falls, Ont.

The receipts of the Toronto Street Railway Co. for May, 1905, were \$227,046.90, of which the city's percentage is \$27,245.63. Last year for May the city received \$24,219.51, out of \$201,829.25 received by the company.

Work has started on a \$35,000 station for the Canadian Northern Railway at Port Arthur, Ont.

A new Y.M.C.A. building will be erected at Orillia, Ont., at a cost of about \$20,000.

The Hamilton Bridge Co., Hamilton, Ont., have been awarded the contract for the steel work for the new fourteen-story Traders' Bank building, to be erected in Toronto. The amount of steel to be used will be about 3,500,000 pounds, and the contract price is \$100,000.

Manager Seeley, of the Helen Mine at Sault Ste. Marie, Ont., reports that more than 1,000 tons of ore per day are now being taken out, and already this season over 30,000 tons have been shipped. It has been found that 180 feet below the old Boyer lake level the ore is as good and abundant as ever, and a new shaft has been sunk, which gives access to splendid ore 400 feet below the original bed. A syndicate of New York capitalists is at present considering the erection of a large smelter at the Soo in contemplation of the extensive developments that are now certain to occur throughout the Algoma district.

The Michigan Central Railway Co.'s workshops at St. Thomas, Ont., were damaged by fire June 10. Loss about \$10,000.

G. Mason & Co.'s sash and door factory at Ottawa, was destroyed by fire June 12. Loss about \$10,000.

The F. W. Bird Paper Co., Hamilton, Ont., have taken out a permit for the erection of a factory at a cost of \$18,000.

Engineers W. O. & O. C. Hamman have purchased land from Wm. Strong in

Barton township, Ontario, for the purpose of erecting a factory for the manufacture of steel dump cars and cars for mining purposes, etc.

The Consolidated Crossin Piano Co., Limited, Toronto, have been incorporated with a capital of \$100,000, to acquire the business of the Crossin Piano Mfg. Co., and to manufacture pianos, musical instruments, etc. The provisional directors include Edward Crossin, Henry Harman and Wm. Bullock, Toronto.

The Dominion Commercial Co., Toronto, have been incorporated with a capital of \$30,000, to manufacture precious stones, etc. The provisional directors include Louis Aarons, Herman Clarke, Toronto, and H. A. Ward, Port Hope, Ont.

The Minister-Myles Shoe Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture boots, shoes, rubbers, etc. The provisional directors include Alfred Minister, Robert Myles and F. P. Myles, Toronto.

The Norris Mfg. Co., Windsor, Ont., have been incorporated with a capital of \$50,000, to manufacture shirts, collars, etc. The provisional directors include Geo. Bartlett, Windsor, G. E. Norris and F. H. Norris, Detroit, Mich.

The Richmond Conduit Mfg. Co., Toronto, have changed their name to Conduits Co., Limited.

The Welch Mfg. Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture gold, silver, precious stones, metals, etc. The provisional directors include A. H. Welch, A. J. Welch and A. Welch, Toronto.

The H. Corby Distillery Co., Corbyville, Ont., have been incorporated with a capital of \$1,500,000, to carry on a brewing and malting business. The provisional directors include Henry Corby, Belleville, Ont., M. M. Laidlaw, Toronto, and H. R. O'Hara, Ottawa.

The Portland Mica Co., Ottawa, have been incorporated with a capital of \$6,000, to carry on a mining and development business. The provisional directors include F. W. Webster, Boston, Mass., J. F. Higginson, Buckingham, Que., and Henry Aylen, Ottawa.

The White Mfg. Co., Ottawa, have been incorporated with a capital of \$45,000, to manufacture clothing, tents, awnings, etc. The provisional directors include G. K. White, A. M. Laucks and R. J. White, Ottawa.

The Crossen Car Mfg. Co., Cobourg, Ont., have orders on hand for 16 passenger cars of different descriptions for the Intercolonial Railway, one baggage and mail car and 200 box cars for the Temiskaming & Northern Ontario Railway; 10 passenger coaches, five baggage cars and 200 box cars for the Canadian Northern Railway; and 100 flat cars for the James Bay Railway.

The ratepayers of Gannoque, Ont., will vote on a by-law to raise \$35,000 to complete the waterworks and sewerage systems.

The Geo. B. Meadows, Wire, Iron & Brass Works Co., Toronto, have pur-

chased a site 140 x 90 feet on Wellington Place, corner of Draper St., on which they are erecting a new factory designed especially for their line of work. The factory will be 120 x 40 feet, four stories high. This move has been made necessary by the expansion of the business.

The London Hotel Co. have been organized at St. Thomas, Ont., with a capital of \$500,000, to erect a large hotel at London, Ont.

The Bank of Hamilton building at Hamilton, Ont., will be enlarged.

The Canadian Shipbuilding Co., Toronto, of which Mr. Frederic Nicholls is president, have purchased the plant of the Bertram Engine Works Co., Toronto. The Canadian Shipbuilding Co. have yards at Bridgeburg on the Niagara River, which will be utilized for the building of vessels larger than canal size for service on the upper lakes. The Toronto yards will be used for building ships of canal size, and for excursion steamers for Lake Ontario. Several hundred men are employed at these two yards. Mr. Arendt Angstrom, who occupied the position of general manager of the Canadian Shipbuilding Co. will be general manager of the united companies.

The Canadian Pacific Railway Co.'s roundhouse at Teeswater, Ont., was destroyed by fire June 6.

The Canadian Westinghouse Co. have prepared plans for doubling the size of their foundry building at Hamilton, Ont.

The Dyment-Baker Lumber Co., London, will rebuild their factory which was destroyed by fire recently.

Toronto's building industry for the five months of this year shows a vast increase over the same period last year. The following is a statement of the approximate value of buildings from January 1 to May 31, 1904, \$1,525,063; 1905, \$3,191,118; approximate value of buildings from May 1 to May 31, 1904, \$554,956; 1905, \$1,104,154; number building permits issued January 1 to May 1, 1904, 706; 1905, 914; number building permits issued May 1 to May 31, 1904, 172; 1905, 311; approximate number of new buildings erected from January 1 to May 31, 1904, 526; 1905, 1,078.

La Compagnie Desjardins, St. Andre, Ont., have commenced to rebuild their plant destroyed by fire recently. The buildings and machinery will be of the most modern types. The foundry and machine shop will be 160x56 feet, one story, and the woodworking shop 210x50 feet, two stories. This company manufacture threshing machines operated by horsepower known as the Canadian Champion, as well as buck boards, wagon trucks and machinery for small saw mills and flour mills.

Messrs. Featherstonhaugh & Co., Patent Barristers, Toronto, Montreal, Ottawa and Washington, D.C., have issued Canadian patents to the following: P. C. Bacourt, St. James, Que., can or jar closures; F. N. Danison, Victoria, B.C., tea strainers and infusers; W. G. Fowler, Winnipeg, ventilated rubber shoes; R. B. Scott, L. O. Steinhoff, Simcoe, Ont., continuous steam

cookers; L. A. Codera and A. E. Choquette, Sherbrooke, Que., electric signalling apparatus; A. H. Larochelle, Levis, Que., roasting machines; S. G. Brown, G. H. Hill, Montreal, transformers; C. Brent, Rat Portage, Ont., cement mixers; M. G. Nicholson, Goderich, Ont., railway car doors to be used in shipping grain; J. W. Van Meter, Toronto, process of washing out steam boilers; D. Houlahan, Toronto, street car fenders; T. D. MacFarlane & J. R. Douglas, Ottawa, fireproof outside shutters for windows; D. J. Archer, Toronto, window swinging devices; P. J. Leahy, St. Henry, Que., brake pressure releasing apparatus; H. McCann, Hamilton, box plates; J. Waddell, Orono, Ont., artificial stone or concrete receptacles for burial caskets; F. McDonald, Powassan, Ont., snow plows; the Marconi Wireless Telegraph Co., Montreal, telegraphic signalling keys; R. Adams, Toronto, pipe wrenches; J. Graham, Goderich, Ont., peat fuel compressors; C. Dawson, Montreal, rod and bar heating furnaces; A. J. Lavoie, Toronto, air compressors.

The Raven Lake Cement Co., Raven Lake, Ont., are now shipping cement and will shortly be producing their full capacity of 500 barrels daily. Arrangements have been made with the Ontario Lime Association to act as selling agents in Toronto.

The Canadian Westinghouse Co., Hamilton, Ont., are manufacturing "The Dominion Safety Brake Shoe" under a patent issued to J. J. Kinzer.

The prize list of the Canadian National Exhibition, Toronto, is now ready, and will be distributed in the course of the next few days. Manager Orr will be pleased to forward a copy to any part of the world on application at the office, City Hall. While the lines of the different classes are very much as usual, material changes have been made in some of the details, and the adequate value of the prizes given this year in cash and kind is considerably larger than in former years. Including cups, medals and plate, the amount to be distributed will total to upwards of \$40,000, three-fourths of which is, of course, devoted to live stock. The competitions in all classes are open to the world. Entries are set to close on Monday, August 7, and the sooner they are made the more is the work of the office facilitated. Entry blanks can also be had.

The Eckardt Casket Co. and the Eckardt Silver Plate Co., Toronto, have purchased an extensive property on Niagara Street, at a cost of \$100,000. The building will be entirely remodeled and adapted to the purposes of their business.

Messrs. Dean & Main, Boston, Mass., have placed an order with the Robb Engineering Co., Amherst, N.S., for two large boilers for the new factory of the Walter M. Lowney Co., at Montreal.

The buffing room in the brass department at the new Angus shops of the Canadian Pacific Railway, Montreal, presents an interesting illustration of recent advance in the removal of dust from buffing and grinding wheels. Here a Sturtevant exhaust fan with a special form of Sturtevant hood enclosing the wheels insures

the withdrawal of all the dust and fine chips. This system maintains a perfectly clear atmosphere within the room, separates the chips from the dust and prevents the discharge to the outer atmosphere of the dust laden air with the attendant disagreeable results.

The Canadian Shoe Machinery Co., Quebec City, have been incorporated with a capital of \$500,000, to acquire the business of Ernest Caron and to manufacture shoe machinery, boots, shoes, etc. The provisional directors include G. E. A. Jones, Ernest Caron and C. W. Walcott, Quebec City.

Standard Explosives, Limited, Montreal, have been incorporated with a capital of \$300,000, to manufacture explosives, chemicals, etc. The provisional directors include W. T. Rodden, Westmount, Que., J. F. Johnson, and W. J. White, Montreal.

The Carter White Lead Co., of Canada, Montreal, have been incorporated with a capital of \$475,000, to manufacture white lead, red lead, orange mineral, etc. The provisional directors include E. J. Cornish, Omaha, Nebraska, P. M. Carter and J. F. Oshmera, Montreal.

The Ajax Metal Co., Montreal, have been incorporated with a capital of \$50,000, to manufacture metals, alloys, etc. The provisional directors include G. M. Pyke, J. R. Meadowcroft and W. J. Henderson, Montreal.

The Ellams Duplicator Co., of Canada, Montreal, have been incorporated with a capital of \$20,000, to manufacture carbon, typewriter supplies, inks, etc. The provisional directors include G. H. Napier, E. M. Wilson and Arnold Wainwright, Montreal.

The Court House and Town Hall, at St. Paul's Bay, Que., were destroyed by fire June 6. Loss about \$9,000.

The Hampden Court Apartment Co., Montreal, will erect an apartment house in that city, at a cost of about \$112,000.

The Boston Last Co., Portland, Me., have been authorized to do business in Canada and have appointed W. E. McIver, Richmond, Que., as their representative.

The Model Building Stone Co., Montreal, have been incorporated with a capital of \$20,000, to manufacture building and cement stone, granite, marble, bricks, etc. The provisional directors include James Boddy, Antime Valin and J. E. Wilder, Montreal.

The Empire Tobacco Co.'s leafsternery, at Granby, Que., was destroyed by fire June 3. Loss about \$25,000.

Col. B. A. Scott's sawmill at Roberval, Que., was destroyed by fire May 29. Loss about \$50,000.

The Y.M.C.A. building at Montreal, was damaged by fire June 5. Loss about \$15,000.

During May building permits in Montreal amounted to the sum of \$1,062,348. In now buildings the month totalled \$963,662 as against \$664,395 for May of last year. In alterations \$96,686, as compared with \$92,980 for the corresponding date last year.

Messrs. Laird, Paton & Son, Limited, Montreal, have been incorporated with a capital of \$95,000, to acquire the business of Laird, Paton & Son, and to carry on a general contracting and constructing business. The provisional directors include James Paton, H. L. S. Paton and W. J. Thompson, Montreal.

The Shippers Cartage Co., Montreal, have been incorporated with a capital of \$1,500,000, to carry on a warehousing and storage business. The provisional directors include A. Chase-Casgrain, C. M. Cotton and K. J. Beardwood, Montreal.

Customs receipts at the port of Montreal for May were the largest in its history, being \$1,066,919, an increase of \$98,126 over May of last year.

The Walter M. Lowney Co. of Canada, have awarded the contract for the erection of a six story factory and warehouse in Montreal, to F. B. Gilbreth, New York City, at a cost of about \$100,000.

Mr. Geo. Roberts, Montreal, has been awarded the contract for the erection of the new branch building of the Molson's Bank, in that city, at a cost of about \$100,000.

The Quebec Government have made a grant of \$5,000 for the benefit of the Montreal Industrial Exhibition.

Messrs. Marion & Marion, Patent Attorneys, Montreal and Washington, D.C., have issued the following Canadian patents recently:—P. J. Leahy, St. Henri, Que., brake-pressure releasing apparatus; Herbert Embree, Oxford, N. S., hose coupling; Fred Cords, Elmwood, Ont., clothes reel; Robert Donaldson, Montreal, truck; H. E. Soulard, St. Walde, Que., panel; J. Leckie, Carberry, Man., oil pump; J. G. Oliver, Battleford, Sask., track laying device; F. S. Frost, Charlottetown, P.E.I., wire fence stays; G. S. Cushing, St. John, N.B., grinding machine; P. T. Cantara, Montreal, composition which may be used in the manufacture of bricks, pavements, etc.; J. C. Anderson, Victoria, B.C., preserving jar; P. H. Eaton, New Castle, N.B., fire alarm; G. S. Cushin, St. John, N.B., process of making wood pulp, also a grinding machine; William Goetz, Winnipeg, Man., harness tug securing and releasing devices; W. S. Morris, Halifax, N.S., improvements in manuscript holders and lighting appliance; John B. Marion, Montreal, jacks; A. L. Donogh, Griswold, Man., road grader; L. A. Desy, Sorel, Que., trenching machine; Messrs. Dunbar & Sons, Woodstock, N.B., gang saw; Henry Lalumiere, Bromptonville, Que., sap spout and cover; George Hutton, Richmond, Que., truck; Austin Conway, Sherbrooke, Que., vending machine; and Joseph Lemire, Drummondville, Que., railway signalling device.

Messrs. Lemont & Sons, Limited, Fredericton, N.B., have been incorporated with a capital of \$24,000, to acquire the business of Lemont & Sons and to manufacture furniture, pianos, etc. The provisional directors include Wm. Lemont, J. M. Lemont, Fredericton, and A. E. Colwell, St. Marys, N.B.

The new wharf plans accepted by the City of St. John, N.B., provide for fifteen

hundred feet of wharf fronts, with sheds and other equipment.

John L. D. Cormier's hotel at Buc-touche, N.B., was destroyed by fire recently.

The first steel rail to be turned out by the Dominion Iron & Steel Co. was manufactured at Sydney, N.S. The rail was 60 feet long.

A test of fire bricks made from Drummond colliery fire clay has been made at the steel works, Sydney, N.S., with excellent results. The bricks were tested in the ladles and the belief is, though the Steel Co. does not say so, that the bricks served the purpose fully as well as the imported ones. A further test is to be made in one of the open hearth furnaces, and hopes are high that a brick to stand any required heat can be produced at Westville, N.S. Often has the wish been expressed that there was fire clay in Nova Scotia suitable for making fire brick. It looks now as if through the perseverance and faith of Mr. Fergie the problem is about to be solved in a satisfactory manner. It is the intention of the management to erect two kilns of a capacity of 80,000 bricks each per month and also to extend the drying house to three times its present size.—Mining Record.

The Canadian steamer Fairmount has left the head of the lakes for Sydney, N.S., with iron ore. After discharging her cargo she will go around the island of Newfoundland to Pilley's Island, where she will load a return cargo of pyrites for Washburn, Wis.

The Dominion Iron & Steel Co., Sydney, N.S., have been awarded a contract for 20,000 tons of steel rails to be used on the Intercolonial Railway.

The Truro Knitting Mills Co., Truro, N.S., are installing new machinery in their mills and an 80 h.p. boiler will also be installed in their power house.

The Robb Engineering Co., Amherst, N.S., have received an order from the Windsor & Tecumseh Electric Railway Co., Walkerville, Ont., for a 450 h.p. Robb-Armstrong Corliss engine and two 200 h.p. Robb-Mumford boilers, also for a large steel smoke stack, condenser and all piping complete.

Captain J. A. Farquhar has proposed to the North Sydney, N.S., city council to build a railway dry dock, at that place, at a cost of \$250,000, if a bonus of \$2,500 a year for 20 years with free water and exemption from taxes are granted him. He is also interesting the government with a view to obtaining a subsidy for a complete modern wrecking plant, to be established at North Sydney. This would cost about \$140,000 additional.

The Charlotte Steamship Co., Halifax, N.S., will erect a steamer similar to the Turbinia, which runs between Hamilton and Toronto.

Messrs. Alexander & Law Bros., millers, Brandon, Man., have let the contract for two 30,000 bushel grain elevators to be built on the Arcola & Regina Railroad.

Messrs. Foley Bros., St. Paul, Minn., have been awarded the contract for ex-

tensions on the Canadian Pacific Railway in the western provinces, to cost about \$3,000,000.

The ratepayers of St. Boniface, Man., will vote on a by-law to grant the Royal Flour Milling Co., Toronto, exemption from taxation on their buildings and plant for a period of twenty years. It is the intention of the company to establish a branch at St. Boniface and to erect buildings there to cost about \$250,000.

The Cusson Lumber Co., St. Boniface, Man., have been incorporated with a capital of \$200,000, to manufacture lumber, etc. The provisional directors include J. A. Cusson, Joseph Cusson and S. J. Dussault, St. Boniface.

The Kingdon Printing Co., Winnipeg, Man., have been incorporated with a capital of \$60,000, to acquire the printing business of E. A. Kingdon. The provisional directors include Abraham Kingdon, David Pender and W. J. Le Cappelain, Winnipeg.

The British Beer Breweries, Limited, Winnipeg, Man., have been incorporated with a capital of \$50,000, to carry on a brewing and malting business. The provisional directors include S. J. H. Aberg, H. W. A. Johnson and Geo. Munro, Winnipeg.

The Winnipeg Dustless House Cleaning Co., Winnipeg, Man., have been incorporated with a capital of \$20,000. The provisional directors include A. C. Ewart, J. A. Cantlie, Jr., and Jas. Fisher, Winnipeg.

The Winnipeg Street Railway Co will erect a large power plant in Winnipeg in addition to the one now being erected at Lac du Bonnet, Man.

The Winnipeg Fur Co., Winnipeg, Man., have been incorporated with a capital of \$100,000, to manufacture hats, caps, gloves, furs, etc. The provisional directors include Archibald Wright, J. A. Knott and J. A. Wright, Winnipeg.

A company has been organized at Edmonton, N.W.T., with a capital of \$100,000, to erect a flour mill with a capacity of 250 barrels daily. They are asking the town for a bonus and exemption from taxation for ten years. For further information apply to Ex-Mayor Short, of Edmonton.

Mr. S. P. Hodgson of Swan Lake, Man., has let the contract for a 100-barrel flour mill and 30,000-bushe' elevator to the Willford Mfg. Co., Minneapolis, Minn.

The Barnett-McQueen Co., Winnipeg, Man., have been incorporated with a capital of \$120,000, to carry on a mechanical and electrical engineering business, etc. The provisional directors include L. C. Barnett, Superior, Wis., F. R. McQueen, Minneapolis, Minn., and W. H. McWilliams, Winnipeg.

The Manitoba Iron Works, Winnipeg, Man., have recently closed a contract with the town of Portage La Prairie, Man., for a water tower 25 feet in diameter and 80 feet high, to be constructed entirely of steel.

The Sovereign Lumber Co. have been incorporated at Victoria, B.C., with a

capital of \$100,000, to manufacture lumber, pulp wood, etc.

The Lorne Creek Hydraulic Mining Co., Vancouver, B.C., have been incorporated with a capital of \$10,000, to carry on a mining and development business, etc. W. E. Burns, Vancouver, is their representative.

Ald. J. Marshall, of Phoenix, B.C., will erect a three story frame hotel at a cost of \$20,000.

The plant of the Fernie Mfg. Co., at Fernie, B.C., was destroyed by fire June 7. Loss about \$30,000.

The electric light station and the Northern Lumber Co.'s mill at Altin, B.C., were destroyed by fire recently. Loss about \$60,000.

The Canadian Pacific Railway Co. have let contracts for the construction of a line from Spencer Bridge, B.C., to the Nicola coal fields, a distance of 45 miles. The completion of this line will probably be followed by the development of sections of the Nicola district.

The Vulcan Iron Works Co., Toledo, Ohio, have shipped one of their "Little Giant" steam shovels to the Northern Mines Co., Altin, B.C., where it will be used in placer work.

The Baker Shoe Co., Victoria, B.C., have been incorporated with a capital of \$20,000, to acquire the business of J. H. Barker and to manufacture boots, shoes, etc.

ELECTRICITY.

Electrical machinery and appliances of all kinds, electrical power plants and other progress in the electrical industries will be noted here.

The Windsor & Tecumseh Electric Railway, at Walkerville, Ont., will be equipped with 300 K.W. 3,300 Volt Westinghouse Single Phase engine type generators direct coupled to Robb-Armstrong engines, and its car equipments are to consist of two 50 h.p. Westinghouse Single Phase Motors each. As this is the first single phase road in Canada, its developments will be watched with considerable interest. One of the advantages of this equipment for short Interurban Roads is the elimination of feeders, sub-stations and raising transformers. The generator voltage is fed directly to the car through the trolley wire and step-down transformers are carried by each car.

The Bell Telephone Co., Montreal, have increased their capital from \$8,000,000 to \$9,000,000.

The Russell Telephone Co., Russell, Man., have been incorporated with a capital of \$5,000, to carry on the business of a general telephone company, etc. The provisional directors include A. G. P. Smellie, W. J. Doig and J. J. Moon, Russell.

A new electric light and power plant will probably be erected at Collingwood, Ont., at a cost of about \$35,000.

The Melita-Arthur Telephone Co., Melita, Man., have been incorporated with a capital of \$10,000, to carry on the

business of a telephone company, etc. The provisional directors include Duncan Day, Arthur, Man., L. W. Hunt, Lyleton, Man., and W. J. S. Atkinson, Melita.

The Hamilton Cataract Power, Light & Traction Co. are making extensive additions to their plant at De Cew Falls, Ont. Orders have been placed with the Canadian Westinghouse Co., Hamilton, Ont., for the following apparatus:—two 6,400 K.W. 3 phase, 2,400 volt, 8,000 alteration 287 R.P.N., two bearing generators with motor-driven exciters and switch board apparatus, four 3,200 K.W. oil insulated water cooled raising transformers.

The Sherbrooke Power, Light & Heat Co., Sherbrooke, Que., will shortly install two large dynamos and water wheels, and will call for tenders for making these and other improvements to their plant.

The West Kootenay, B.C., Light & Power Co. will erect a power plant at Upper Bonnington Falls, B.C., that will have a capacity of 24,000 h.p., and will cost about \$1,000,000.

The Bell Telephone Co. will erect a new office building at Brantford, Ont., at a cost of \$40,000.

The Chatham, Wallaceburg & Lake Erie Railway Co. are building a new line of electric railway from Chatham to Wallaceburg, Ont., a distance of about 20 miles. An order for four double equipments and one quadruple equipment of No. 101 railway motors has been placed with the Canadian Westinghouse Co., Hamilton, Ont.

A four-million candle power searchlight was used on June 5, by the United States Geographic Survey in examining the crest of the Horseshoe Falls. The light was one of the most powerful ever built, and its effect on the Falls was awe-inspiring. The outline of the horseshoe was seen plainer than ever before, and the experts were well pleased. The light was placed on the Canadian side and the power for it furnished by a Canadian power house.

The ratepayers of Napanee, Ont., will vote on a by-law to raise \$35,000 for an electric lighting plant.

The Montreal Light, Heat & Power Co., Montreal, will erect an electrical transformer and distributor structure at a cost of \$10,000.

The St. Maurice Light & Power Co., Shawinigan Falls, Que., have been incorporated with a capital of \$75,000, to develop water powers, electricity, etc., for light and heat purposes. The provisional directors include V. Burrill, C. H. Moritz and J. G. Smith, Shawinigan Falls.

BRITISH COLUMBIA ENTERPRISE.

United States Consul Smith, at Victoria, B.C., reporting to his government regarding certain industrial interests in that province says:

I am assured by one of the leading officials of the road that on February 1, 1905, a contract was made by James Dunsmuir, president and sole owner of the Esquimalt & Nanaimo Railway, with

leading officials of the Canadian Pacific Railway Co. for the absolute transfer to the latter of the Esquimalt & Nanaimo Railway system. This includes the railway line from Victoria to Wellington, a distance of 78 miles, with equipment, rolling stock and right of way; the ferry business operating between Vancouver and Ladysmith by means of the tug Czar and barge; the steamer Joan, which plies between Nanaimo and Vancouver; and the steamer City of Nanaimo, running among the Gulf islands from Victoria to Comox, including boats and barges plying on the east coast of Vancouver Island. The consideration, which is not definitely made public, it is stated amounts to over a million dollars. It is authoritatively stated that the deal does not include the land in the railway belt owned by Mr. Dunsmuir, which amounts to about 1,500,000 acres. The original grant was 2,000,000 acres, but 500,000 acres have been sold. This land will remain in the possession of Mr. Dunsmuir, as also will the Wellington coal mines of Vancouver Island.

It is expected that this important transfer will lead to the early extension of the Island Railroad from Wellington to Cape Scott, at the extreme north. Residents of Victoria also hope, now that the British navy no longer monopolizes the harbor at Esquimalt, that the Canadian Pacific Co. will run a car ferry direct, without necessitating change of cars from Vancouver, connecting with the Esquimalt & Nanaimo Railway at Ladysmith, thence to Esquimalt, where passengers will be transferred direct to the ocean steamers, known as the "Empresses," for the Orient; also that these steamers will dock at and sail to and from Esquimalt, thus dispensing with the 80-mile passage through the Georgia Straits to Vancouver, and help to build up trade at Victoria, where the Canadian Pacific Railway Co. are now erecting a large up-to-date hotel. Victorians hope that the future western terminus of the Canadian Pacific Railway will be at Esquimalt.

It is announced that on May 1 the Canadian Pacific Railway steamer Princess Victoria will resume her daily run from Vancouver, via Victoria, to Seattle and return. It is also stated that the same company, as soon as the legal transfer of the Esquimalt & Nanaimo Railway is completed, will erect large additional wharves both at Esquimalt and Victoria.

IN FAVOR OF MARCONI.

The United States Circuit Court at New York has handed down its decision in the case of the Marconi Wireless Telegraph Co. of America v. the DeForest Wireless Telegraph Co., and it is unqualifiedly in favor of the Marconi Co.

In the course of his decision, Judge Townsend reviews the history of wireless telegraphy, including reference to the experiments of all the leading scientists who have devoted their attention to the subject. He characterizes the attempts of all the other scientists as unsuccessful, and says: "It would seem, therefore,

to be a sufficient answer to the attempts to belittle Marconi's great invention that, with the whole scientific world awakened by the disclosures of Hertz in 1887 to the new and undeveloped possibilities of electric waves, nine years elapsed without a single practical or commercially successful result, and that Marconi was the first to describe and the first to achieve the transmission of definite intelligible signals by means of these Hertzian waves. Other inventors, venturing forth on the sea of electrical movement, met the rising tide of the Hertzian waves and allowed them to roll by without appreciating that this new current was destined to carry onward the freight and traffic of the world's commerce. Marconi, daring to hoist his sail and explore the unknown current, first disclosed the new highway."

Judge Townsend holds that the important claims covering the use of elevated conductors and grounded connections, in combination with the imperfect electrical contact or receiving device, were good and valid law. Elevated conductors and grounded connections are essential to wireless telegraphy, and are used by all practical systems to-day. The honorable judge says: "As Marconi confessedly disclosed in his patent the first successfully operating commercial apparatus and developed it, the defendant should not be permitted to escape infringement by claiming that Marconi, in describing his conductors as insulated, was necessarily confined to a form in which the insulation was absolute at both ends. But whatever interpretation of the term 'insulated' be adopted, the decision of the question of infringement rests upon the fact that the Marconi invention in suit is a primary invention, and as such, is entitled to a broader range of equivalents, so as to prevent the appropriation of the substance of the invention by a mere change in form accomplishing a mere change in degree."

"Therefore," Judge Townsend held, "the defendant's system was an infringement of claims 3 and 5 of the suit as brought, and an injunction is issued against the defendant company, restraining it from the further use of this great invention, and also an accounting, and the complainant to recover one-half of its costs."

Judge Townsend further points out, step by step, the progress of Marconi's achievement and its uninterrupted tangible progress.

Signor Marconi expresses himself as entirely satisfied with the decision, because elevated conductors, against the use of which all other systems are enjoined, are essential for practical wireless telegraphy.

The coaling tests at sea between the naval collier Marcellus and the battleship Illinois, off Norfolk, Va., proved eminently satisfactory, as the report filed shows. The practicability of coaling a heavy battleship at sea was demonstrated as from thirty to thirty-five one-ton loads were delivered in one hour without any change in the equipment. This was at the rate of one ton every two minutes.

FUEL.

For names of fuel dealers see "Coal and Coke" in Classified Index.

The fuel supply question is a most important one to Canadian manufacturers. The information published in this department will keep the readers posted on sources of production.

The Ottumwa Box Car Loader Co., Ottumwa, Ia., have recently sold one of their machines to the Dominion Coal Co., and another to the George Hall Coal Co., Prescott, Ont.

The Seattle and Washington Coal Co. have been formed in Seattle to acquire and develop about four square miles of coal lands near Coulee in the Nicola Valley. This property has been held under lease for some years back, but seemingly has not been opened up to any extent. There are, however, many promising indications of coal in this vicinity.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., has now a fleet of eleven steamers employed in the coal and ore carrying trade. Eight of these are engaged in the coal trade.

The imports of bituminous coal from the United States during the month of April aggregated 292,928 tons, a gain of 25,742 tons over the same month of last year. For the ten months ending April 30, 1905, the bituminous exports amounted to 3,705,060 tons, a gain of 162,399 tons over the same period of 1904. The imports of coke for April, 1905, amounted to 61,906 tons, a gain of 23,144 tons over April, 1905.

The Dominion Coal Co. will erect a modern plant for unloading coal vessels at Halifax, N.S.

The International Coal & Coke Co. are producing about 300 tons of coal a day at their mine at Coleman, in the Crow's Nest Pass region of British Columbia, and the main entry is now in the mountain for a distance of 4,000 feet. The coke ovens near the mine are producing 125 tons a day, which is taken by the smelters in the North-West.

At Frank, Alberta, the Canadian-American Coal Co. have repaired the damage recently done to their mine by fire, and are now turning out 800 tons a day, and are preparing to sink a new slope to further develop its property.

The St. Lawrence Coal Co., who own considerable coal properties at North Sydney, N.S., will shortly commence operations, and install a plant with a capacity of raising 500 tons of coal a day, Charles Brandeis, consulting engineer, Montreal, has been retained as chief engineer of the company.

The Acadia Coal Co., who are sinking two new shafts near Stellarton, N.S., have struck the Foord seam at a depth of 900 feet. This seam is said to be one of the largest and most valuable deposits in Nova Scotia. When the two new shafts are completed and ready to begin producing at full capacity, the company will be in a position to quadruple their present output.

The contract for furnishing and erecting the coal handling machinery for the Canadian Northern docks at Port Arthur, Ont., has been let to the Mead-Morrison Mfg. Co. The docks are to be operated by the Pittsburg Coal Co., Pittsburg, Pa. The plant will consist of one patent transfer and pick-up bridge, a large storage system, two movable steel towers equipped with 16x24 direct acting engines and two-ton Rawson buckets.

The Canadian Coal & Ore Dock Co. will build a combined coal and ore dock at Port Arthur, Ont. The first section, to be 3,000 by 600 feet, will be completed this year. It is proposed to dredge a channel, about 200 feet wide and 3,000 feet in length, from the harbor, which will cross the end of the dock, and to divert into it the waters of the creek and river. The dock will be open to the public and all coal dealers will be permitted to use it, a fixed tariff being arranged for handling and storage. The Barnett & Record Co., Minneapolis, Minn., are the contractors.

NEW STEEL TIPPLE.

The contract for the erection of a new steel tippie at the Coal Creek mines of the Crow's Nest Pass Coal Co. has been awarded to Messrs. Heyl & Patterson, Pittsburg, Pa.

The entire structure, stretching across the valley, 900 feet in length, will be built of steel. Its position will be a few feet farther up than the site of the wooden structure recently destroyed by fire. The tippie proper is 234 feet long, and 44 feet wide, with extensions for picking tables. The width of the trestle is 30 feet. The entire structure is to be roofed with corrugated iron sheeting and the tippie will be housed in with metal siding, with windows for lighting. All the supports are to be built on concrete piers sunk deep in the ground.

The new tippie will be equipped with the latest machinery for dumping, cleaning and loading the coal. Two revolving dumps, with a daily capacity of 4,000 tons will empty the coal cars as they enter the tippie. These dumps turn the cars upside down, and do away with the need for doors on the end of the cars. Each of these dumps is connected with a distinct system of machinery for treating the coal, which is briefly described as follows:—The coal after entering the receiving hopper is fed to the shaking screens, which delivers the coal to the picking table. A hinged apron at the end of the table is lowered into the railroad car, and the coal is loaded without any drop. Alongside the picking table is a revolving rock conveyor. As the rock is picked off the table it is placed on the rock conveyor, which takes it to the rock bin, where it is loaded on a car. Underneath the shaking screens is a belt conveyor which carries the slack and fine coal to the slack car beneath. This system, as stated, is duplicated for the other car dumper. Each picking table is 5 feet wide and 50 feet long, and extends at right angles to the tippie. Each small car after being dumped is pushed along a return track by a "trip-maker," and

loads of empties are automatically made up.

Two of the celebrated Smith gravity box-car loaders will be installed. These will be similar to the ones installed at Carbonado a couple of years ago, which have given great satisfaction. The car is tipped on one end and then on the other, and each end is loaded by gravity. All the machinery of the tippie is worked by electricity, supplied from the power house. Coal can be loaded on to four tracks and slack on to one track. The tippie's capacity will be 4,000 tons daily. The structure will contain 850 tons of steel. The total cost of the entire structure, with machinery, will be about \$200,000.

FUEL IN ALBERTA.

The great feature of the economic outlook in the new province of Alberta, next to its agricultural possibilities, is the coal fields which underlie so large a part of its area. There are said to be 65,000 square miles of these coal fields, and active mining is being carried on at whatever points a market can be found. An indication of the amazing extent of the distribution of fuel wealth may be best obtained by a mere enumeration of the places within the new province where mining is being carried on.

At Coleman by the International Coal & Coke Co.; steam coal and coke.

At Frank by the Canadian & American Coal & Coke Co.; steam coal and coke.

At Lille by a Belgian company with headquarters at Blairmore; steam coal.

At or near Cowley by the Lundbreck Coal Co.; steam and domestic coal.

At Lethbridge by the Alberta Railway and Irrigation Co.; good domestic coal.

East of Lethbridge by the Taber Coal Co.; good domestic lignite.

At Bankhead by the Canadian Pacific Railway Co.; anthracite coal.

At Medicine Hat, domestic coal.

At Canmore by the H. W. McNeil Co.; steam coal.

At Anthracite by Sir Sandford Fleming. This mine is not in operation, but not because either of the scarcity or the poor quality of the coal.

At Red Deer and Knee Hill, domestic coal.

On the reserve of the Crowfoot band of Indians a quarry of coal which the Indians shovel out and sell to the settlers.

At Edmonton and along the banks of the Saskatchewan River at many points the settlers have made openings and mine their own coal. It is also carried on as a business, however. There are thirty mines in Edmonton and immediate vicinity. Farmers' banks where the settler drives up and mines a cartload of coal may be come upon at various points in Alberta from Edmonton to Pincher Creek.

It would be difficult to exaggerate the importance of this wide distribution of one of the necessities of life, especially in a country where fuel of any other kind is scarce or non-existent. When these plains are teeming with settlers there will be an enormous traffic in the transportation of coal. There will be

railways which will be known as "coal roads," just as there are in Pennsylvania.

Coal naturally suggests natural gas, although there may be no causal effect between the two. Indications of natural gas have been reported from many parts of the Territories, but the chief deposit so far as known is found at Medicine Hat. As early as 1883 gas was discovered some forty miles west of Medicine Hat. The strike was made by some Canadian Pacific Railway employees who were boring for water. In 1891 Sir Wm. Van Horne suggested to the town authorities that they should ascertain whether there was any coal under their town. He offered to lend them a diamond drill for the purpose of making the investigation. At a depth of 660 feet gas was struck. The well still yields gas at the same pressure which it showed fourteen years ago. Eight years later Mr. J. C. Coulter sank a well, striking the gas at the same depth. A company then made application to the town for a franchise. A public meeting was called to consider this application, and it was almost unanimously decided not to grant a franchise, but to operate the boon as a public matter. The city authorities then sank a well, and, as usual, gas was found after the 600-foot depth was passed. The gas from this was used as fuel for the waterworks boilers. Three more wells were sunk, and the gas sold to users at twenty cents a thousand feet. The demand soon overtook the supply, and then the question arose whether more wells should be sunk or those already in existence deepened. A deputation was sent to other gas fields to examine and make a report. When they returned their advice was to go deeper. The Council by resolution determined to bore for a thousand feet if a large flow was not encountered before that depth. Boring was at once begun, and when the thousand feet was reached no results had been obtained. The Council had to consider what was to be done. Some of its members were decidedly against putting any more taxes in a hole in the ground. Fortunately there was a majority willing to go a little further, and the contractor got authority to go on. They were only ten feet away from success, for at 1,010 feet there was a whiz and a whistle, a tremendous rush of gas, and Medicine Hat has been smiling ever since.

The gas is smokeless and odorless. The pressure was 550 pounds to the square inch, and from this one well the whole town is supplied with light and fuel. It was thought advisable to have another well sunk, for use in case of anything happening to the pioneer well. This has been completed. It is almost identical in depth and identical in pressure with its mate at the other end of the town. This gift of nature is certainly a boon. It enables the waterworks to be operated for next to nothing. It is supplied to householders at 17½ cents per 1,000 feet. In one home, where the gas is used for illuminating, heating and cooking, the cost for 12 months was \$60.56. The house contained 18,000 cubic feet of space.

There is a business aspect to the thing, too. The Council has resolved to supply manufacturers using a large amount of

gas at five cents per 1,000 feet. When its convenience and availability are considered this must be regarded as cheaper fuel and power than can be found even at the mouths of the numerous coal mines that are being operated in Alberta. When it is remembered that the Canadian Pacific Railway's irrigation scheme will during the next ten or fifteen years settle a farming population of half a million people between Medicine Hat and Calgary, it must be thought that the former, with its cheap fuel and power, will be the workshop of that populous district, although Calgary is already, and will continue to be, the wholesale centre. The deposit is known to be of considerable extent, for, as already stated, the first discovery was made 40 miles west of the town, and other facts show that it has a much more extensive area even than that. The Canadian Pacific Railway has recently completed the capping of a well which they have sunk near their roundhouse. The pressure was 555 pounds to the square inch, and when they had taken all the lights and taps from it that were required it had only reduced the pressure by five pounds, leaving 550 still unused. It is confidently anticipated that much of the railway work requiring a convenient fuel will be transferred to Medicine Hat.

The town has already the nucleus of useful industries. The high banks near the town contain an inexhaustible deposit of brick clay, which is already being utilized, and another company is now negotiating with the town for the establishment of a pressed brick works. A woolen mill will soon be in operation, and a flour mill is already in operation. An institution that is peculiarly creditable to the town is the hospital, of which Dr. Smyth is the enthusiastic head. The Aberdeen Woman's Hospital has just been doubled in size, and a handsome Nurse's Home is not yet quite completed.

OPPORTUNITIES.

Manufacturers and others in need of machinery, supplies, etc., of any kind are requested to consult our advertising columns, and if they cannot find just what they want, if they will send us particulars we will make their wants known free of cost, and in this way secure the attention of those who may be able to supply them. No charge for publishing what is wanted nor for giving information. When writing to enquirers kindly mention The Canadian Manufacturer.

Reeve Gill, Roblin P.O., Man., will receive tenders for the building of a 102 foot Howe truss bridge over the Assiniboine River, near Roblin.

Tenders will be received by the Department of Public Works, at Ottawa, for the construction of an extension to the Toronto Island breakwater.

A. C. McConnell, Lime Lake, Ont., is inviting tenders for the erection of a new church building in that town.

The Department of Public Works, Fredericton, N.B., will receive tenders for rebuilding the following bridges, Brihy Creek bridge, Tedley Creek bridge,

near Brighton, N.B., and Nevers bridge, near Cambridge, N.B.

Tenders will be received by the Department of Public Works at Ottawa for the construction of postal station "F" at Toronto.

Tenders for the erection of a military store building at London, Ont., will be received by the Department of Public Works, Ottawa.

N. F. McNeil, town clerk, Glace Bay, N.S., will receive tenders for the erection of an electric light station in that town.

J. A. Soram, Boston, Mass., will erect a 250-ton concentrating plant in the Guanacevi mining district, Mexico.

J. F. Johnson will erect a 500-ton smelting plant at Jimenez, Chihuahua, Mexico, at a cost of \$100,000.

Architect Mills, Hamilton, Ont., is inviting tenders for the erection of an addition of five stories to the head office of the Bank of Hamilton, and also for an eight story office building.

PUBLICATIONS.

The publishers of The Canadian Manufacturer solicit in advance, if possible, catalogues, circulars, and other industrial publications issued by manufacturers. We wish to review such literature, and bring the principal points to the attention of our readers.

"Gas Engines and Launches," by F. K. Grain. This is the day of the gas engine which drives so many vehicles on the land and in the water. The man who owns a motor boat often prefers to manage it himself rather than to engage a skilled engineer for that purpose, and the simplicity of the gas engine makes this feasible. Nevertheless, there are a multitude of little knacks and details about the management of such an engine which can be acquired only by experience; and the gaining of this experience is often costly of temper, time and money. To assist the novice to overcome the difficulties which he must inevitably meet, Mr. F. K. Grain, the superintendent and mechanical expert of a considerable gas engine concern in Connecticut, has written a little book, "Gas Engines and Launches," soon to be published by the Forest and Stream Publishing Co. The author's wide experience has taught him just what to look for, and what to do when the unexpected occurs in running a gas engine, and he has explained in plain and simple language, and has often illustrated by diagrams, the course to be pursued under any given set of conditions. Any one who desires to run his own power boat will find in this little book a most useful manual for the pocket. Cloth, price, \$1.25.

The W. H. Blake Steam Pump Co., Hyde Park, Mass., have published an attractive catalogue, No. 25, illustrating the jet and surface condensers manufactured by them. These range in size from a horizontal jet condenser of 600 pounds capacity in steam condensed per hour, up to one of 26,100 pounds, while the twin simple and compound air pumps and jet condensers range in capacity from 8,700

pounds of steam condensed per hour to 135,000 pounds. Measured by the same standard the surface condensers with air and circulating pumps are built in sizes ranging from 4,100 pounds to 40,000 pounds capacity.

The Canadian Westinghouse Co., Hamilton, Ont., have issued a neat brochure relating to Westinghouse fan motors for alternating current circuits.

The Smart-Turner Machine Co., Hamilton, Ont., have issued Bulletin No. 5, relating to pumping machinery.

"Coal is King" is the title of an interesting volume on the fuel question by M. C. Hayette, Board of Trade Building, Toronto. Much valuable information in the production and economic use of fuel is given.

The Canadian Electrical Association have issued a programme for their annual convention, to be held in Montreal June 21-23.

The Cassella Color Co., 182 Front Street, New York City, have sent us a booklet containing samples and instructions of black dyeings on half silk, and also another folder relating to Diamine colors printed on Beaverton.

BRITISH COLUMBIA MINERAL OUTPUT.

The report of the British Columbia minister of mines just published shows that during the year 1904 the mineral output of that province was valued at \$18,977,350, an increase of \$1,481,405 over the preceding year, and exceeded only in 1901, when the output was \$20,000,000. The actual ore shipments from the mines last year were 1,461,609 tons, as compared with 920,416 tons in 1901. Almost the same number of men were employed to get out this ore as in 1903.

The report shows a falling off in coal export. In 1902, 75 per cent. of the Vancouver Island output was shipped to California, while last year only 53 per cent. was shipped.

The total value of the gold produced in British Columbia last year was \$5,704,908. Of this total, \$1,115,300 represented the production of placer gold, while \$4,589,908 was the value of lode gold. The value of the silver produced was \$1,719,516, while the output of copper was \$4,578,037. The value of lead produced was \$1,421,874.

In his report the Minister includes an analysis made by Arthur King, an expert chemist of England, upon specimens of oil shales from Beaver Valley, Cariboo. Mr. King finds that the oil is of very low commercial value, because it does not contain a practical amount of the solid paraffins, and it is too high a specific gravity. The shale itself is held to be worthless. On the whole, the report shows that mining is on the upward road and a better report may be hoped for next year.

Weary Walker—Dis paper says dat worry kills more fellers dan work. Tired Tatters—I reckon dat's right, but dey ain't nothin' wot worries me like work.

PERSONALS.

J. W. Duntley, president of the Chicago Pneumatic Tool Co., Chicago, Ill., recently returned from a business trip in Europe, bringing with him orders for pneumatic tools, aggregating 3,300 machines.

Dr. George Archbold, M.A., of Prescott, Ont., who has for a number of years been connected with some of the most enterprising manufacturing concerns in Canada and the United States, as technical chemist, has returned home from several months' absence in Europe, principally in Russia, to which country he has sold a patent right to manufacture a smokeless gunpowder, a constituent of which is starch. It is said that Dr. Archbold has been offered inducements to remain in Russia to take charge of the works to be erected there for the manufacture of this smokeless powder.

At a meeting of the board of directors of the Westinghouse Electric & Mfg. Co., held in New York a few days ago, E. M. Herr was elected first vice-president and chief executive under the president. The company now have four vice-presidents, E. M. Herr, F. H. Taylor, L. A. Osborne and Newcomb Carlton, which makes an especially able and efficient force of officials.

The Pittsburg offices of the Sligo Iron & Steel Co. are now located in the House Building. This company is one of the oldest concerns in the United States engaged in the manufacture of stay bolt iron, and have a considerable trade in Canada.

Mr. W. H. Plummer, a merchant of Sault Ste. Marie, Ont., has been appointed to the Board of the Consolidated Lake Superior Co. as one of the Government's representatives, in succession to Mr. N. W. Rowell, K.C., who has resigned. The Government has also named Mr. W. H. Hearst, solicitor, Sault Ste. Marie, as the Government's agent in connection with the company.

Mr. David Brown, formerly of the Orford Copper Co., Constable Hook, New Jersey, has been appointed Metallurgist to the Canadian Copper Co., with headquarters at Copper Cliff, Ont.

The International Time Recording Co. have opened Canadian offices at 78 King Street East, Toronto.

Mr. A. I. Findlay has terminated his labors with the Iron Trade Review of Cleveland, Ohio, and has assumed an editorial position with the Iron Age at New York.

Clarence Morgan, a Harvard graduate, has been appointed first professor of the new railroad and transportation course at McGill University, Montreal.

Mr. J. G. Sing, a member of the Canadian Society of Civil Engineers, and engineer in charge of the Public Works of Canada in Western Ontario, has been appointed acting engineer in charge of the district of Eastern Ontario, which was, up to the time of his death, in charge of the late Major Henry A. Gray, M. Inst., C.E.

THE GOOD ROADS CONVENTION.

At the session of the Western Good Roads Association held in Toronto, Mr. A. W. Campbell, Deputy Commissioner of Public Works, spoke at some length upon the building of concrete culverts, bridges and sluices. He urged the members of the municipal Councils and others interested in road improvement to study this question. Wooden culverts were no longer built, while tile was unsatisfactory, but strong, cheap and permanent culverts were easily made with cement if they were properly constructed and were of sufficient capacity to accommodate the water during the seasons of flood, or during winter rains or sudden thaws, when the ice was troublesome in obstructing the outlets. In building culverts of over three feet span, arches should be made. These might with perfect safety be run as high as thirty feet span. When an arch was over twenty feet the cement floor should be reinforced with iron rods, which might be of varying thickness, but should be laid about one foot apart, and covered with six to eight inches of cement. One bridge of this character, with a span of thirty feet, was built for \$625, while the local tenders for a wooden structure were \$700 and over. For small culverts he suggested that the cement should be mixed in the proportion of one to eight of gravel and sand. In larger work the outside facing of the wall should be stronger, namely, one of cement to six of gravel and sand, but for the inside of the wall one to eight would be sufficient. He insisted upon solid foundations for

all culvert walls, and suggested that the lack of proper provisions in this respect had caused a great deal of trouble to inexperienced constructors. In closing his address Mr. Campbell made the suggestion that the municipal councillors should, before undertaking any building of this kind, send full information to him, and he would forward sketches and specifications for their use.

A NEW CANADIAN TOWN.

The final selection of a Lake Superior terminus on Thunder Bay marks an important stage in the evolution of the Grand Trunk Pacific Railway Co., and of the National Transcontinental Railway for the control and operation of which they are responsible, says The Globe. The site chosen is on the bank of the Kaministiquia River, higher up stream than the Canadian Pacific terminus, but otherwise similarly situated. The low lying flat banks and the deep water close to the natural shore make the location an ideal one for an extensive shipping business, as the Canadian Pacific Co. have already discovered. The ease with which the natural channel of the river may be deepened or broadened by dredging is an absolute guarantee against anything like an uncontrollable congestion of traffic, however rapid or extensive the development of the traffic may be.

The future of the interesting settlement on the shore of Thunder Bay and along the Kaministiquia River is an agreeable one to contemplate. The twin towns of Port Arthur and Fort William

have already become places of importance, but they are obviously destined to expand indefinitely in population and business. However efficient the trunk railways may be made for transportation purposes, they cannot render useless the facilities afforded by the great St. Lawrence navigation system, which, in Canada, begins at Thunder Bay and ends at Quebec or Montreal. This truth has been clearly discerned by the Grand Trunk Pacific management, which has wisely undertaken to provide from the outset all the facilities required for storage and transshipment. Presumably the same management will be equally on the alert in the matter of securing on reasonable terms a fair share of the power capable of being developed a few miles up the Kaministiquia at the Kakabeka Falls and Ecarte Rapids. The final disposition of this fine waterpower will be determined during the present session of the Ontario Legislature.

ONTARIO'S PUBLIC WORKS.

The annual report of the Commissioner of Public Works for the year ending December 31, 1904, shows that a total of \$816,822 was expended on capital account on works and buildings, and \$111,991 on maintenance account for fuel, light, water, furniture, repairs, salaries, etc., for Osgoode Hall, the Normal Schools of Toronto, Ottawa and London, the School of Practical Science, the Education Department offices, the Parliament buildings, Government House, and various other branches of the ser-

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vice. From July 1, 1867, to December 31, 1904, the expenditure on capital account for asylums was \$4,774,684.48; penal institutions, \$1,356,979.02; educational institutions, \$1,791,329.68; agricultural institutions, \$709,257.51; buildings for administration of justice, \$459,938.26; Parliament and departmental buildings and Government House, \$1,776,474.75; works for the improvement of navigation, such as locks, dams, slides, etc., \$1,010,493.50; works for the improvement of transportation, such as bridges, piers, roads, etc., \$204,033.68; drainage works and advances to municipalities therefor, \$418,161.85; miscellaneous, \$54,590.07; colonization roads, \$4,059,464.44; paid to railways (actual cash expended) \$7,456,173.01—a grand total of \$24,071,480.25 expended on the foregoing accounts since confederation. The amount expended on colonization roads last year was \$175,620.74, divided as follows:—East division, \$57,567.74; Temiskaming district, \$38,277.43; west and north divisions, \$20,026.36 and \$59,749.21, respectively. About 360 miles of new roads were opened, 650 miles of highways repaired, and seventeen bridges, aggregating 1,504 feet, constructed.

Though not many miles of new railway were completed and opened for traffic, extension work during the year was active. The Grand Trunk Railway did not construct any new lines, but laid a second track between Hamilton and London, sixty miles. The Canadian Pacific Railway opened the Lindsay, Bobcaygeon & Pontypool Railway, from Burketon, on the main line, to Bobcaygeon, 38.79 miles. Track-laying is expected to commence at once on the Canadian Pacific Railway Company's fifty-nine miles of railway between Romford, near Sudbury, and Byng Inlet. Revised surveys for a continuation of the line from Byng Inlet to a junction with the Owen Sound section near Kleinburg are nearly completed. The James Bay Railway is constructing a line from Toronto to a junction with the Canadian Pacific Railway, near Sudbury, 265 miles. The Bruce Mines & Algoma Railway made a short extension from Bruce Mines to the shore of Lake Huron and constructed a commodious dock there. The total of this railway now completed, from Lake Huron to Rock Lake, Aberdeen township, is seventeen miles. The Temiskaming & Northern Ontario Railway, the Government line, was completed and opened for traffic from North Bay to New Liskeard, 113 miles, and a contract entered into for an extension northward from New Liskeard of 80 to 100 miles.

Prior to confederation there were 1,447.5 miles of railway completed in the Province; 5,876.42 miles have been completed since then; 525 miles are now under construction, and the miles of rail-

way in operation in the Province are 7,323.92.

OIL IN BOILERS.

The steam pressure used in stationary boilers has been steadily increasing during the last decade, until we now have many boilers carrying from 120 to 150 pounds as against 75 to 100 pounds a few years ago, says a bulletin issued by the Canadian Casualty & Boiler Inspection Co., of Toronto. A pressure of 150 pounds is just as safe as 75 pounds if the boiler is constructed for the higher pressure, and the necessary care and intelligence used in its operation. During this time also competition has forced the factory or mill manager to study economy in the steam end of the plant. He must get the greatest return in mechanical work for the heat units in the coal. This has caused the use of the exhaust steam for many purposes about the factory. It is usually first used to heat the feed water with a result that is equal to 1 per cent. of fuel saved for each 10° Fahr. added to it. The application of exhaust steam for heating the factory, for use in the dry kilns or for any other purpose, that the heat in exhaust steam is suitable for. A first-class open exhaust steam feed water-heater will heat the feed water from a temperature of 50 or 60° Fahr. up to 205°, and in this way from 12 to 15 per cent. of fuel may be saved. An open heater is one in which the steam and water mix. This will condense about 1/11 of the steam; then the steam may be used for heating, and in that case all of the water of condensation should be returned to the boilers, and herein lies one of the troubles in utilizing this heat. All exhaust steam carries a certain amount of cylinder oil with it, which is liable to be pumped into the boilers with the feed water. The effect of oils in steam boilers are very troublesome and expensive, but still the results are worth the trouble and expense incurred to utilize the water of condensation. From recent experiments it has been clearly demonstrated that a boiler with clean plates, supplied with clean water, will not be injured even if the fires are forced to the utmost. It is found that the temperature of the plate on the fire side would be 420° Fahr., and on the water side 360° Fahr., a difference of 70°. This is for steam at atmospheric pressure, and would be proportionately the same for all pressures. If we apply a very thin coating of oil upon the water side of the sheet the fire side will have a temperature of 550° Fahr., and the water side only 351°, a difference of 199°. The oil being a bad conductor it will not allow the water to take up the heat from the sheet.

If the deposit of oil goes on until it has a thickness of 1/16 inch the difference is still greater—the sheet becoming so hot that it buckles or bags down, this being dan-

gerous, and calling for expensive repairs. The result upon all lap seams is also such that they have to be re-riveted. The differences of temperature is so great that expansion and contraction causes every rivet to leak. Should the temperature of the sheets or heads upon the fire side reach 650° Fahr., every tube end will leak, and great danger from explosion result. In our inspections we find many fire sheets bagged down, and are often told that the boiler was perfectly clean when it occurred. This, we know, is not the case. A fire can be forced until it has increased ten fold without injury to a clean sheet. The thinnest coating of oil on tubes and shell will cause a loss of the transmission of heat from the fire to the water of 11 per cent. The same loss also applies in the radiation of heat from heating pipes, and is a straight fuel loss. Considerable danger, many shut-downs, expensive repairs and the material shortening of the life of the boiler are the results of oil in them. Money spent for the purpose of preventing it will be saved many times over.

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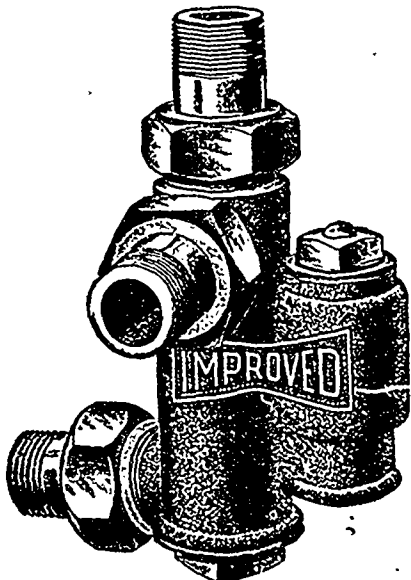
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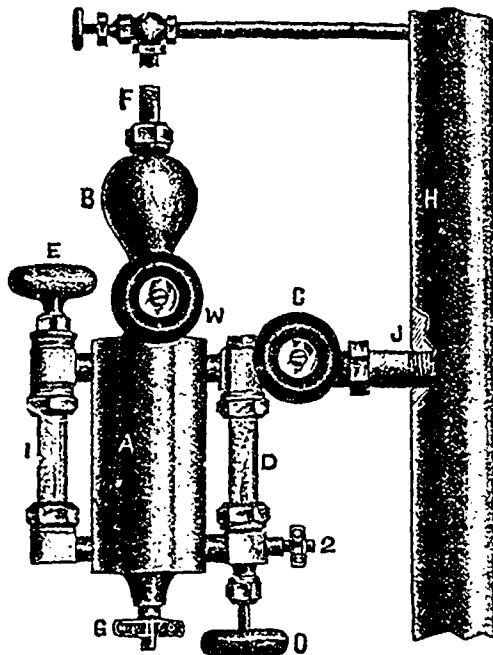
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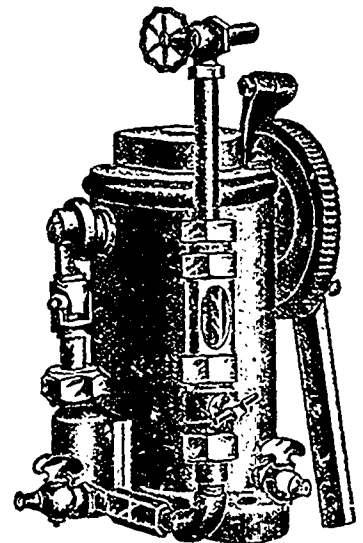
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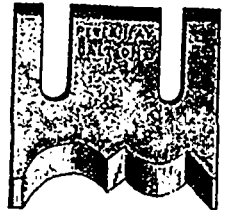
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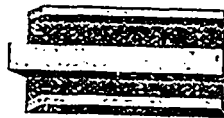
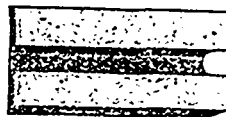
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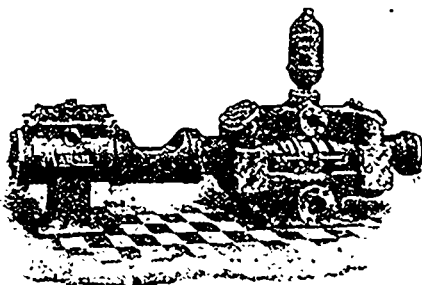
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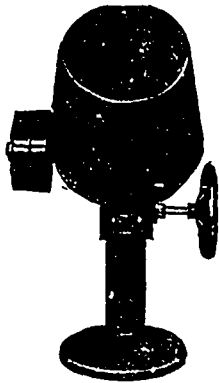
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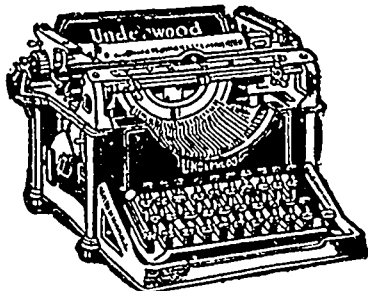


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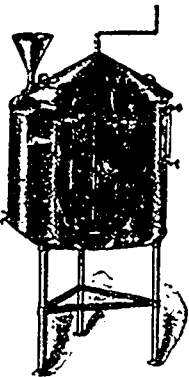
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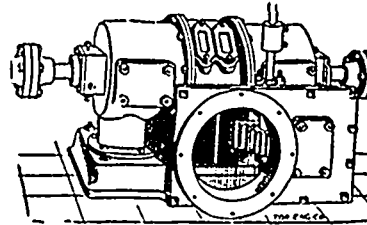


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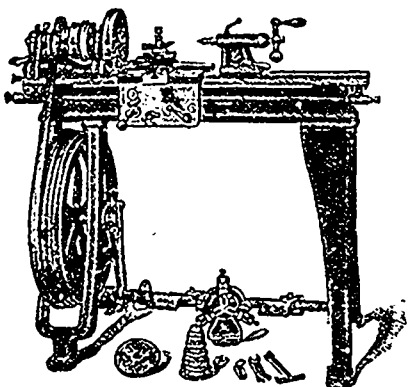
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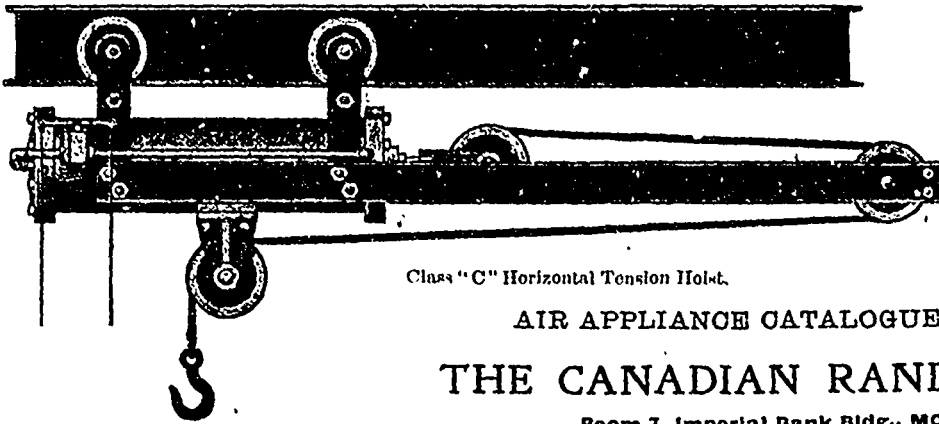
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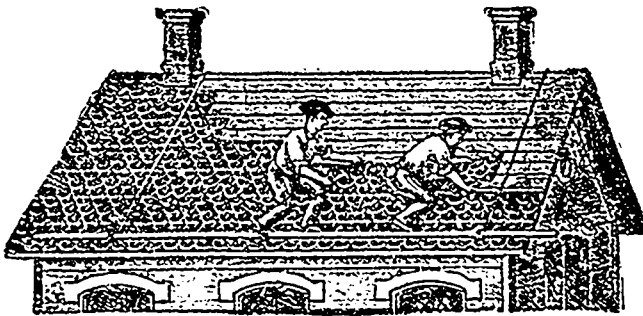
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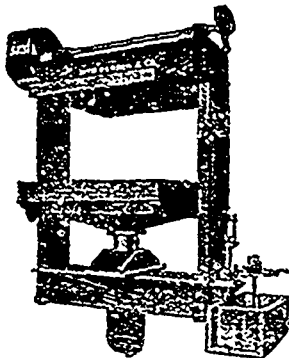
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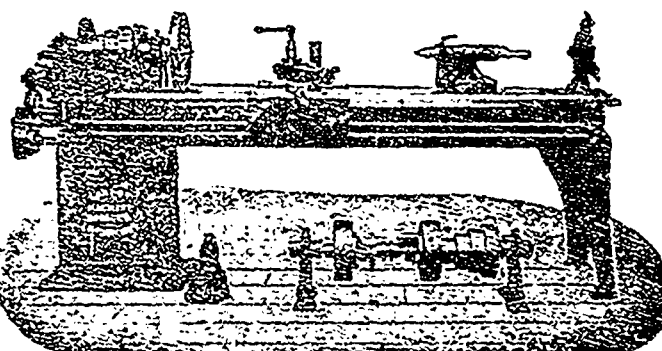


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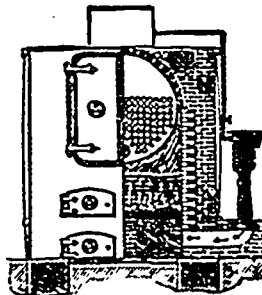
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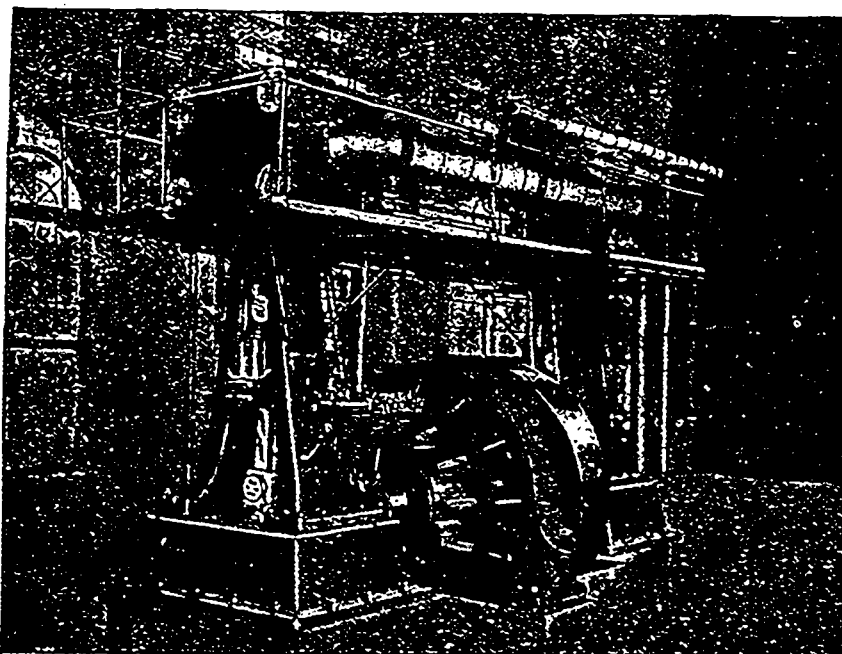
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Canada Foundry Co., Toronto.
Canadian Rand Drill Co., Sherbrooke, Que.
Corbett, R. B., Brooklyn, N.Y.
Darling Bros., Montreal.
Schutte & Koerting Co., Philadelphia, Pa.

Alum

Nichols Chemical Co. of Canada, Montreal.

Aluminum

Northern Aluminum Co., Pittsburg, Pa.
Syracuse Smelting Works, Montreal.

Angles, Beams and Girders

Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Hopkins, F. H. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Aniline Colors and Dyewood Extracts

Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Canada Chemical Mfg. Co., London, Ont.
Cassella Color Co., New York City.
Geigy Aniline & Extract Co., New York City.
McArthur, Cornelia & Co., Montreal.
Nichols Chemical Co. of Canada, Montreal.
Winn & Holland, Montreal.

Annealing Muffles and Furnaces (Wire)

Leslie, A. C. & Co., Montreal.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Antimony

Syracuse Smelting Works, Montreal.

Anvils and Vises

Hopkins, F. H. & Co., Montreal.
Leslie, A. C. & Co., Montreal.

Architects

Edwards, R. J., Toronto.
Parke, R. J., Toronto.
Vogel, C. H., Ottawa.

Automatic Gear Cutting Machines

Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Automobiles

Ford Motor Co. of Canada, Walkerville, Ont.

Axles

Hopkins, F. H. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Babbitt Metal

Petrie, H. W., Toronto.
Syracuse Smelting Works, Montreal.

Banks

Bank of Hamilton, Hamilton, Ont.

Bar Iron and Steel

Bourne-Fuller Co., Cleveland, Ohio.
Hopkins, F. H. & Co., Montreal.
Leslie, A. C. & Co., Montreal.
London Rolling Mills, London, Ont.

Belt Dressing

McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Rossendale Belting Co., Toronto.
Sadler & Haworth, Montreal and Toronto.
Williams, A. R. Machinery Co., Toronto.

Belt Fasteners

Bristol Co., Waterbury, Conn.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Rossendale Belting Co., Toronto.
Sadler & Haworth, Montreal and Toronto.
Williams, A. R. Machinery Co., Toronto.

Belting (Cotton)

Dominion Belting Co., Hamilton, Ont.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Reddaway, F. & Co., Manchester, England.
Rossendale Belting Co., Toronto.
Sadler & Haworth, Montreal and Toronto.

Belting (Leather)

Fleming, W. A. & Co., Montreal.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Reddaway, F. & Co., Manchester, England.
Sadler & Haworth, Montreal and Toronto.
Williams, A. R. Machinery Co., Toronto.

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(CONTINUED).

Belting (Rubber)

Gutta Percha & Rubber Mfg. Co., Toronto.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C., Belting Co., Montreal.
Petrie, H. W., Toronto.
Sadler & Haworth, Montreal and Toronto.

Belting and Supplies

Bristol Co., Waterbury, Conn.
Dominion Belting Co., Hamilton, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C., Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Roddaway, F. & Co., Manchester, England.
Rosendale Belting Co., Toronto.
Sadler & Haworth, Montreal and Toronto.
Williams A. R. Machinery Co., Toronto.

Blast Furnace Brick

Dover Fire Brick Co., Cleveland, Ohio.
Dunbar Fire Brick Co., Pittsburgh, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Pennsylvania Fire Brick Co., Lock Haven, Pa.
Queen's Run Fire Brick Co., Lock Haven, Pa.
Reese-Hammond Fire Brick Co., Bolivar, Pa.
Savage Mountain Fire Brick Co., Frostburg, Md.
Stowe-Fuller Co., Cleveland, Ohio.

Blowers

McEachren Heating & Ventilating Co., Galt, Ont.
Schutte & Koerting Co., Philadelphia, Pa.
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Boiler Compounds

Canada Chemical Mfg. Co., London, Ont.

Boiler Inspection

Boiler Inspection & Insurance Co., Toronto.
Canadian Casualty & Boiler Insurance Co., Toronto.

BOILERS (See Engines and Boilers) Rods and Nuts

London Roll & Nut, London, Ont.
Morrow, Juan, Machine Screw Co., Ingersoll, Ont.

Brass Founders

Hamilton Brass Mfg. Co., Hamilton, Ont.
Penberthy Injector Co., Windsor, Ont.

Brick and Bricklaying Machinery Allis-Chalmers-Bullock, Limited, Montreal.

Building and Paving Brick

Dover Fire Brick Co., Cleveland, Ohio.
Dunbar Fire Brick Co., Pittsburgh, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Pennsylvania Fire Brick Co., Lock Haven, Pa.
Queen's Run Fire Brick Co., Lock Haven, Pa.
Reese-Hammond Fire Brick Co., Bolivar, Pa.
Savage Mountain Fire Brick Co., Frostburg, Md.
Stowe-Fuller Co., Cleveland, Ohio.

Building Iron and Steel

Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Pedlar People, Oshawa, Ont.

Builders' Materials

Albert Mfg. Co., Hillsboro, Ont.
Canada Foundry Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Gartshore, John J., Toronto.
Hopkins, F. H. & Co., Montreal.
Otis-Fenson Elevator Co., Toronto.
Pedlar People, Oshawa, Ont.
Sheldon & Sheldon, Galt, Ont.

Cables

Dominion Wire Rope Co., Montreal.
Greening, B. Wire Co., Hamilton, Ont.
Phillips, Eugene F. Electrical Works, Montreal.
Wire & Cable Co., Montreal.

Canada Plates

Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Canoes

Peterborough Canoe Co., Peterborough, Ont.

Gaps

McCullough-Dalsell Crucible Co., Pittsburg, Pa.

Card Clothing

McLaren, D. K., Montreal and Toronto.
McLaren, J. C., Belting Co., Montreal and Toronto.

Cast Iron Pipe

Canada Foundry Co., Toronto.
Montreal Pipe Foundry Co., Montreal.
McDougal, John, Caledonian Iron Works Co., Montreal.

Castings (Grey Iron, Malleable Iron and Brass)

Canada Machinery Co., Sarnia, Ont.
International Harvester Co., Hamilton, Ont.
Jenckes Machine Co., Sherbrooke, Que.
Kerr Engine Co., Walkerville, Ont.
McDougal, John, Caledonian Iron Works Co., Montreal.

Cement Machinery

Allis-Chalmers-Bullock, Limited, Montreal
Bradley Pulverizer Co., Boston, Mass.
McDougal, John, Caledonian Iron Works Co., Montreal.

Centrifugal Pumping Machinery Morris Machine Works, Baldwinville, N. Y.

Chain Making Machinery (Welded Coil Chain)

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

Channels

Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Charcoal Pig Iron

Canada Iron Furnace Co., Montreal.
McDougal, John, Caledonian Iron Works Co., Montreal.

Chemicals

Canada Chemical Co., London, Ont.
Nichols Chemical Co. of Canada, Montreal.

Chemists

Arschbold, Dr. Geo., Prescott, Ont.
Heys, Thomas & Son, Toronto.

Clay Working Machinery

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

Coal and Coke

Bourne-Fuller Co., Cleveland, Ohio.
Ferguson, J. D., Hamilton, Ont.
Milnes, James H. & Co., Toronto.
Myles' Thos. Sons, Hamilton, Ont.
Old Colony Coal & Coke Co., Pittsburgh, Pa.
Pittsburgh Coal Co., Pittsburgh, Pa.
Shawmut Coal & Coke Co., St. Mary's, Pa.
Sawyer, Edward T., Columbus, Ohio.
Skae, E. A., Detroit, Mich.
Wick, H. K. & Co., Buffalo, N.Y.
Wilson, H. T. Coal Co., Detroit, Mich.

Coal Cutting Machines

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Jeffrey Mfg. Co., Columbus Ohio.

Coal Tipples

Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.

Coil Chains

Greening, B. Wire Co., Hamilton, Ont.
Leslie, A. C. & Co., Montreal.

Coke Oven Brick

Dover Fire Brick Co., Cleveland, Ohio.
Dunbar Fire Brick Co., Pittsburgh, Pa.
Stowe-Fuller Co., Cleveland, Ohio.

Collection Agency

Petrie, H. D., Hamilton, Ont.

Concrete Mixers

Hopkins, F. H. & Co., Montreal

Contractors' Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Gartshore, John J., Toronto.
Hopkins, F. H. & Co., Montreal.
Jenckes Machine Co., Sherbrooke, Que.
McDougal, John, Caledonian Iron Works Co., Montreal.
Schutte & Koerting Co., Philadelphia, Pa.

Contractor's Plants

Allis-Chalmers-Bullock, Limited, Montreal.
Hopkins, F. H. & Co., Montreal.
Jenckes Machine Co., Sherbrooke, Que.
Petrie, H. W., Toronto.
Von der Osten, E. & Co., Toronto.
Williams, A. R. Machinery Co., Toronto.

Conveying Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Engineering Co., Philadelphia, Pa.
McDougal, John, Caledonian Iron Works Co., Montreal.
Ferrin, William R. & Co., Limited, Toronto.
Rosendale Belting Co., Toronto.

Copper Materials

Greening, B. Wire Co., Hamilton, Ont.
Phillips, Eugene F. Electrical Works, Montreal.
Syracuse Smelting Works, Montreal.
Wire & Cable Co., Montreal.

Dominion Oil Cloth Co.

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Oil-Cloth, Stair Oil-Cloth, etc.

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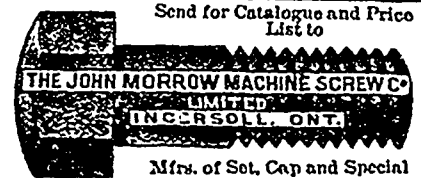
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(CONTINUED).

Cotton Banding and Rope
McLaren, J. C., Belting Co., Montreal.

Covers
McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.

Crayons
Lowell Crayon Co., Lowell, Mass.
McLaren, J. C., Belting Co., Montreal.

Crucibles
Dixon, Joseph, Crucible Co., Jersey City, N.Y.
McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.
Syracuse Smelting Works, Montreal.

Crucible Caps
McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.

Crucible Covers
McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.

Cutter Grinding Machines
Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Deep Well Engines
American Steam Pump Co., Battle Creek, Mich.

Detective Agency
Dewar Detective Agency, St. Louis, Mo.

Dies (Socket, Sewer Pipe and Tile)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Directories
Kelly's Directories, Limited, Toronto.

Draw Benches (Wire)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Drilling & Fishing Tools
National Supply Co., Leamington, Ont.
Oil Well Supply Co., Pittsburgh, Pa.

Drilling Machines (Portable)
National Supply Co., Leamington, Ont.
Oil Well Supply Co., Pittsburgh, Pa.

Drills
Allis-Chalmers-Bullock, Limited, Montreal.
Barnes, B. F. Co., Rockford, Ill.
Canada Machinery Co., Sarnia, Ont.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.

Drills (Pneumatic and Rock)
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Jeffrey Mfg. Co., Columbus, Ohio.

Drop Forgings
Globe Machine & Stamping Co., Cleveland, Ohio.

Drop Forging Dies
Canada Machinery Co., Sarnia, Ont.
Globe Machine & Stamping Co., Cleveland, Ohio.

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

Dust and Shavings Separators
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Dye Stuffs and Chemicals
Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Canada Chemical Mfg. Co., London, Ont.
Casella Color Co., New York City.
Geigy Aniline & Extract Co., New York City.
McArthur, Corneille & Co., Montreal.
Nichols Chemical Co. of Canada, Montreal.
Winn & Holland, Montreal.

DYNAMOS (See Motors and Dynamos)
Electric Meters and Transformers
Allis-Chalmers-Bullock, Limited, Montreal.
Packard Electric Co., St. Catharines, Ont.

Electric Mine Locomotives
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.

Electrical Repairs
Keystone Engineering Co., Toronto.

Electrical Supplies
Allis-Chalmers-Bullock, Limited, Montreal.
Bristol Co., Waterbury, Conn.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jones & Moore Electric Co., Toronto.
Keystone Engineering Co., Toronto.
Packard Electric Co., St. Catharines, Ont.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Worth & Martin, Toronto.

Elevators and Conveyors
Allis-Chalmers-Bullock, Limited, Montreal.
Darling Bros., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.
Link-Belt Engineering Co., Philadelphia, Pa.
Otis-Fensom Elevator Co., Toronto.

Elevator Insurance
Canadian Casualty & Boiler Insurance Co., Toronto

Emery and Emery Wheels
Forman, John, Montreal.
Petrie, H. W., Toronto.

Engineers (Chemical)
Heys, Thomas & Son, Toronto.
Hunt, Robert W. & Co., Chicago, Ill.

Engineers (Civil)
DeLano-Osborn Engineering Co., Toronto.
Parke, R. J., Toronto.
Vogel, C. H., Ottawa.

Engineers (Consulting)
Aitken, K. L., Toronto.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Hunt, Robert W. & Co., Chicago, Ill.
Keystone Engineering Co., Toronto, Ont.
Marion & Marion, Montreal.
Parke, R. J., Toronto.
Perrin, William R. & Co., Limited, Toronto.
Vogel, C. H., Ottawa.
Von der Osten, E. & Co., Toronto.

Engineers (Contracting)
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Electrical Construction Co., London, Ont.
Keystone Engineering Co., Toronto, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Robb Engineering Co., Amherst, N.S.

Engineers (Electrical)
Aitken, K. L., Toronto.
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Crocker-Wheeler Co., St. Catharines, Ont.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Jones & Moore Electric Co., Toronto.
Keystone Engineering Co., Toronto, Ont.
Marion & Marion, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Worth & Martin, Toronto.

Engineers (Mechanical)
Allis-Chalmers-Bullock, Limited, Montreal.
Armstrong, Herbert J., Toronto.
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Hunt, Robert W. & Co., Chicago, Ill.
Kerr Engine Co., Wakeville, Ont.
Marion & Marion, Montreal.
Robb Engineering Co., Amherst, N.S.
Sheldon & Sheldon, Galt, Ont.

Engineers (Mill and Hydraulic)
DeLano-Osborn Engineering Co., Toronto.
Hawkesworth, Alfred, Montreal.
Vogel, C. H., Ottawa.

Engineers (Mining)
Heys, Thomas & Son, Toronto.
Mills, S. D., Toronto.

Engineers (Municipal)
Von der Osten, E. & Co., Toronto.

Engineers and Contractors
Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.

Engines and Boilers
Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Bertram Engine Works Co., Toronto.
Canada Foundry Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Goldie & McCulloch Co., Galt, Ont.

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Hamilton, Wm. Mfg. Co., Peterborough, Ont.
 Hopkins, F. H. & Co., Montreal.
 Jenckes Machine Co., Sherbrooke, Que.
 Morris Machine Works, Baldwinville, N. Y.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 McEachren Heating & Ventilating Co., Galt, Ont.
 National Supply Co., Leamington, Ont.
 Oil Well Supply Co., Pittsburgh, Pa.
 Petrie, H. W., Toronto.
 Robb Engineering Co., Amherst, N.S.
 Sheldon & Sheldon, Galt, Ont.
 Sturtevant, B. F. Co., Boston, Mass.
 Williams, A. R. Machinery Co., Toronto.

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

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

Exhaust Heads
 Darling Bros., Montreal.
 Sheldon & Sheldon, Galt, Ont.

Exhausters
 Schutte & Koerting Co., Philadelphia, Pa.

Explorer and Geologist
 Evans, Horace F. Ashcroft B.C.

Factory Sites
 See Factory Locations, page 34.
 Central Ontario Power Co., Peterboro, Ont.
 Hutcheson, S. M., Paisley, Ont.

Feed Water Heaters
 Babcock & Wilcox, Limited, Montreal.
 Darling Bros., Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Robb Engineering Co., Amherst, N.S.
 Schutte & Koerting Co., Philadelphia, Pa.

Files
 Pence, R. & Co., Hamilton, Ont.

Fillet (Pattern)
 McLaren, J. C. Belting Co., Montreal.
 Sadler & Haworth, Montreal and Toronto.

Filters (Oil)
 Babcock & Wilcox, Limited, Montreal.
 Darling Bros., Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Perrin William R. & Co. Limited, Toronto.

Filters and Filtering Systems (Water)
 Babcock & Wilcox, Limited, Montreal.
 Jenckes Machine Co., Sherbrooke, Que.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Financial
 Bradstreet's, New York City.
 Dun, R. G. & Co., Toronto.
 Hoff & Postlethwaite, Toronto.
 Petrie, H. D. Hamilton Ont.

Fire Brick and Clay
 Cover Fire Brick Co., Cleveland, Ohio.
 Lunbar Fire Brick Co., Pittsburgh, Pa.
 Hamilton Facing Mill Co., Hamilton, Ont.
 Pennsylvania Fire Brick Co., Lock Haven.
 Queen's Run Fire Brick Co., Lock Haven, Pa.
 Reese-Hammond Fire Brick Co., Boliver, Pa.
 Savage Mountain Fire Brick Co., Frostburg, Md.
 Howe-Fuller Co., Cleveland, Ohio.

Fire Escapes
 Darling Bros., Montreal.

Flour Mill Machinery
 Goldie & McCulloch Co., Galt, Ont.

Forges and Blows
 Canada Foundry Co., Toronto.
 McEachren Heating & Ventilating Co., Galt, Ont.
 Sheldon & Sheldon, Galt, Ont.
 Sturtevant, B. F. Co., Boston, Mass.

Founders
 Canada Foundry Co., Toronto.
 Canada Machinery Co., Sarnia, Ont.
 Goldie & McCulloch Co., Galt, Ont.
 Hamilton, Wm. Mfg. Co., Peterborough, Ont.
 Jenckes Machine Co., Sherbrooke, Que.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Robb Engineering Co., Amherst, N.S.

Foundry Facings and Supplies
 Hamilton Facing Mill Co., Hamilton, Ont.

Fuel Economizers
 Babcock & Wilcox, Limited, Montreal.
 Schutte & Koerting Co., Philadelphia, Pa.
 Sturtevant, B. F. Co., Hyde Park, Mass.

Furniture (Lodge, Opera and School)
 Canadian Office & School Furniture Co., Preston, Ont.

Galvanizing
 Ontario Wind Engine & Pump Co., Toronto.

Galvanizing and Tinning Machinery and Furnaces (Wire)
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Gas and Gasoline Engines
 Goldie & McCulloch Co., Galt, Ont.
 Morrison, T. A. & Co., Montreal.

Gauges (Recording Pressure)
 Bristol Co., Waterbury, Conn.

Gauges (Steam)
 Ponberthy Injector Co., Windsor, Ont.
 Petrie, H. W., Toronto.
 Williams, A. R. Machinery Co., Toronto.

Gauges (Water)
 Babcock & Wilcox, Limited, Montreal.
 Penberthy Injector Co., Windsor, Ont.

Generators
 Allis-Chalmers-Bullock, Limited, Montreal.
 Canadian General Electric Co., Toronto.
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.
 Electrical Construction Co., London, Ont.
 Forman, John, Montreal.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Jones & Moore Electric Co., Toronto.
 Phillips, Eugene F., Electrical Works, Montreal.
 Toronto & Hamilton Electric Co., Hamilton, Ont.

Gloves, Mittens and Moccasins
 Storey, W. H. & Son, Acton, Ont.

Glue Heaters
 Advance Machinery Co., Toledo, Ohio.

Glue Room Equipment
 Advance Machinery Co., Toledo, Ohio.

Government Notices
 Factory Inspectors.
 Minister of Agriculture.

Graphite
 Dixon, Jos., Crucible Co., Jersey City, N.J.
 McCulloch-Dalzell Crucible Co., Pittsburg, Pa.
 Pittsburg Crucible Works, Pittsburg, Pa.

Grease Cups
 Penberthy Injector Co., Windsor, Ont.

Hardware
 Butterfield & Co., Rock Island, Que.
 Gantahore, John J., Toronto.
 Globe Machine & Stamping Co., Cleveland, Ohio.
 Hopkins, F. H. & Co., Montreal.
 Morrow, John, Machine Screw Co., Ingersoll, Ont.

Heating and Ventilating Apparatus
 Darling Bros., Montreal.
 McEachren Heating & Ventilating Co., Galt, Ont.
 Sheldon & Sheldon, Galt, Ont.
 Sturtevant, B. F. Co., Boston, Mass.

Hoisting Engines
 Bertram Engine Works Co., Toronto.
 Jenckes Machine Co., Sherbrooke, Que.

Hoists (Chain and Pneumatic)
 Allis-Chalmers-Bullock, Limited, Montreal.
 Canadian Rand Drill Co., Sherbrooke, Que.
 Hopkins, F. H. & Co., Montreal.

Hose (Fire and Pneumatic)
 Gutta Percha & Rubber Mfg. Co., Toronto.
 McLaren, J. C. Belting Co., Montreal and Toronto.
 Sadler & Haworth, Montreal and Toronto.

Hotel
 Gallatin Hotel, New York City.

Hydrants
 Kerr Engine Co., Walkerville, Ont.
 Jenckes Machine Co. Sherbrooke, Que.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Accumulators
 Jenckes Machine Co., Sherbrooke, Que.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Leather
 McLaren, J. C., Belting Co., Montreal.
 Sadler & Haworth, Montreal and Toronto.

Hydraulic Machinery
 Canada Foundry Co., Toronto.
 Darling Bros., Montreal.
 Hamilton, Wm. Mfg. Co., Peterborough, Ont.
 Jenckes Machine Co., Sherbrooke, Que.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Leather
 Perrin, William R. & Co., Limited, Toronto.
 Petrie, H. W., Toronto.
 Wilson, J. C. & Co., Glenora, Ont.

Industrial Plants
 Von der Ostan, E. & Co., Toronto.

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The line at the bottom of our advertising pages requests you when writing to Advertisers, to mention THE CANADIAN MANUFACTURER. Compliance with the request costs nothing, but would mean a great deal to us. As the manufacturer usually grades the salary of his salesman according to the value of the orders he turns in, so the advertiser values space according to inquiries received. The only way for this journal to receive full credit for sales influenced is for our readers, when writing to advertisers, to kindly mention THE CANADIAN MANUFACTURER.

CLASSIFIED INDEX.

(CONTINUED).

Insulated Wires and Cables

Phillips, Eugene F., Electrical Works, Montreal.
Wire & Cable Co., Montreal.

Iron and Steel Specialties

Armstrong Mfg. Co., Bridgeport, Conn.
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Leslie, A. O. & Co., Montreal.
London Rolling Mill Co., London, Ont.
Lysaght, John, Limited, Bristol, England and Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.

Injectors

Canada Foundry Co., Toronto.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Penberthy Injector Co., Windsor, Ont.
Schutte & Koerting Co., Philadelphia, Pa.
Williams, A. R. Machinery Co., Toronto.

Iron and Steel Inspection

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

Lamps—Electric

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Forman, John, Montreal.
Packard Electric Co., St. Catharines, Ont.
Sunbeam Incandescent Lamp Co., Toronto and St. Catharines, Ont.

Lathes

Barnes, B. F. Co., Rockford, Ill.
Canada Machinery Co., Sarnia, Ont.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Lathes (Wood-working)

Goldie & McCulloch Co., Galt, Ont.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Loom Reeds.

McLaren, J. C., Belting Co., Montreal.

Lubricators

Penberthy Injector Co., Windsor, Ont.

Machinists

Bertram Engine Works Co., Toronto.
Canada Machinery Co., Sarnia, Ont.
Goldie & McCulloch Co., Galt, Ont.
London Machine Tool Co., London, Ont.
Robb Engineering Co., Amherst, N.S.
Worth & Martin, Toronto.

Machinists' Supplies

Armstrong Mfg. Co., Bridgeport, Conn.
Butterfield & Co., Rock Island, Que.
Canada Machinery Co., Sarnia, Ont.
Goldie & McCulloch Co., Galt, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Hopkins, F. H. & Co., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
London Machine Tool Co., London, Ont.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Petrie, H. W., Toronto.
Worth & Martin, Toronto.

Machine Tools

Barnes, B. F. Co., Rockford, Ill.
Becker-Brainard Milling Machine Co., Hyde Park, Mass.
Canada Machinery Co., Sarnia, Ont.
Darling Bros., Montreal.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.

Machinery Repairs

Bertram Engine Works Co., Toronto
Canada Machinery Co., Sarnia, Ont.

Malleable Castings

International Harvester Co., Hamilton, Ont.
Smith's Falls Malleable Castings Co., Smith's Falls, Ont.

Marine and Stationary Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
Bertram Engine Works Co., Toronto.
Jenckes Machine Co., Sherbrooke, Que.

Mechanical Draft

Babcock & Wilcox, Limited, Montreal.
McEachren Heating & Ventilating Co., Galt, Ont.
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Metal Stamping
Globe Machine & Stamping Co., Cleveland, Ohio
Pedlar People, Oshawa, Ont.

Metallurgists
Mills, S. D., Toronto.

Mill Machinery and Supplies

Allis-Chalmers-Bullock, Limited, Montreal.
Armstrong Mfg. Co., Bridgeport, Conn.
Becker-Brainard Milling Machine Co., Hyde Park, Mass.
Darling Bros., Montreal.
Fleming, W. A. & Co., Montreal.
Gartshore, John J., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Hamilton, Wm., Mfg. Co., Peterborough, Ont.
Hawksworth, Alfred, Montreal.
Hay, Peter Knife Co., Galt, Ont.
Hopkins, F. H. & Co., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.
London Machine Tool Co., London, Ont.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

McLaren, D. K., Montreal and Toronto.
McLaren, J. C., Belting Co., Montreal.

Penberthy Injector Co., Windsor, Ont.
Petrie, H. W., Toronto.
Reddaway, F. & Co., Manchester, England.
Robb Engineering Co., Amherst, N.S.
Spence, R. & Co., Hamilton, Ont.
Wilson, J. C. & Co., Glenora, Ont.

Milling Cutters and Machines

Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Miners' Lamps

Allis-Chalmers-Bullock, Limited Montreal.
Anton, John & Son, Monongahela, Pa.

Mining Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Corbett, R. B., Brooklyn, N.Y.
Gartshore, John J., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Hopkins, F. H. & Co., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jenckes Machine Co., Sherbrooke, Que.
Link-Belt Engineering Co., Philadelphia, Pa.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin, William R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Schutte & Koerting Co., Philadelphia, Pa.
Williams, A. R. Machinery Co., Toronto.

Motors and Dynamos

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Corbett, R. B., Brooklyn, N.Y.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Keystone Engineering Co., Toronto.
Petrie, H. W., Toronto.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.

Moulding Sand

Hamilton Facing Mills Co., Hamilton, Ont.

Nickel.

Canadian Copper Co., New York, N.Y.
Orford Copper Co., New York, N.Y.

Novelty Manufacturers

Worth & Martin, Toronto.

Nozzles

McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.

Office and Bank Fittings

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

Oils and Lubricants

Dixon, Jos. Crucible Co., Jersey City, N.J.
Imperial Oil Co., Petrolia, Ont.
Queen City Oil Co., Toronto.

Oil Cloth

Dominion Oil Cloth Co., Montreal.

Oil Cups

Penberthy Injector Co., Windsor, Ont.

Oil Well Supplies

National Supply Co., Leamington, Ont.
Oil Well Supply Co., Pittsburg, Pa.

Paints and Colors

Berry Bros., Walkerville, Ont.
Geigy, Aniline & Extract Co., New York City.
McArthur, Cornelle & Co., Montreal.

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(CONTINUED).

Paper Manufacturers

er, Wm., & Bros., Georgetown, Ont.
nto Paper Mfg. Co., Cornwall, Ont.

Patents

len, Hanbury, A., Montreal.
erstonhaugh & Co., Toronto.
on & Marion, Montreal.

Perforated Metals

e Machine & Stamping Co., Cleveland, Ohio.
ing, B. Wire Co., Hamilton, Ont.

Personal Accident

dian Casualty & Boiler Insurance Co., Toronto.

Phosphorizers

llough-Dalsell Crucible Co., Pittsburg, Pa.
urg Crucible Works, Pittsburg, Pa.

Pig Iron

ne-Fuller Co., Cleveland, Ohio.
ea Iron Furnace Co., Montreal.
Scotia Steel & Coal Co., New Glasgow, N.S.
ouse Smelting Works, Montreal.

Pipe Line Supplies

onal Supply Co., Leamington, Ont.
Well Supply Co., Pittsburgh, Pa.

Pipe (Riveted, Iron and Steel)

ock & Wilcox, Limited, Montreal.
ugall, John, Caledonian Iron Works Co., Mont-
real.

Pipe Threading Machines

trong Mfg. Co., Bridgeport, Conn.
erfield & Co., Rock Island, Que.
p, H. W., Toronto.

Pipes and Tubes

ne-Fuller Co., Cleveland, Ohio.
ia Foundry Co., Toronto.
tt, R. B., Brooklyn, N.Y.
real Pipe Foundry Co., Montreal.
onal Supply Co., Leamington, Ont.
Well Supply Co., Pittsburgh, Pa.

Plaster

e Mfg. Co., Hillsborough, N.B.

Plates

ne-Fuller Co., Cleveland, Ohio.
Scotia Steel & Coal Co., New Glasgow, N.S.

Plumbago

ton Facing Mills Co., Hamilton, Ont.
lough-Dalsell Crucible Co., Pittsburg, Pa.
urg Crucible Works, Pittsburg, Pa.

Pneumatic Tools

halmers-Bullock, Limited, Montreal.
iau Rand Drill Co., Sherbrooke, Que.

Pointer Rolls (For Rods and Wire)

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

Power Plants—Equipments

halmers-Bullock, Limited, Montreal.
strong, Herbert J., Toronto.
ock & Wilcox, Limited, Montreal.
uan General Electric Co., Toronto.
ian Westinghouse Co., Ltd., Hamilton, Ont.
tt, R. B., Brooklyn, N.Y.
g Bros., Montreal.
no-Osborn Engineering Co., Toronto.
nial Construction Co., London, Ont.
e & McCulloch, Galt, Ont.
a Percha & Rubber Mfg. Co., Toronto.
ton, Wm. Mfg. Co., Peterborough, Ont.
y Mfg. Co., Columbus, Ohio.
& Moore Electric Co., Toronto.
one Engineering Co., Toronto, Ont.
ugall, John, Caledonian Iron Works Co., Mont-
real.
rd Electric Co., St. Catharines, Ont.
William R. & Co., Limited, Toronto.
p, H. W., Toronto.
s, Eugene F., Electrical Works, Montreal.
Engineering Co., Amherst, N.S.
evant, B. F. Co., Boston, Mass.
to & Hamilton Electric Co., Hamilton, Ont.
d Electric Co., Toronto.
n, J. C. & Co., Glencra, Ont.

Presses (File, Sewer Pipe, Nozzles and Sleeves)

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

Pulleys

g Bros., Montreal.
e & McCulloch Co., Galt, Ont.
ton, Wm. Mfg. Co., Peterborough, Ont.
y Mfg. Co., Columbus, Ohio.
ugall, John, Caledonian Iron Works Co., Mont-
real.
ren, J. C., Belting Co., Montreal and Toronto.
p, H. W., Toronto.
n, J. C. & Co., Glencra, Ont.

Pumps and Pumping Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
American Steam Pump Co., Battle Creek, Mich.
Canada Foundry Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Darling Bros., Montreal.
Downis Pump Co., Downsville, Pa.
Goldie & McCulloch Co., Galt, Ont.
Jencks Machine Co., Sherbrooke, Que.
Kerr Engine Co., Walkerville, Ont.
Morris Machine Works, Baldwinsville, N.Y.
McDougall, John, Caledonian Iron Works Co., Mont-
real.
Ontario Wind Engine & Pump Co., Toronto.
Petrie, H. W., Toronto.
Schutte & Koerting Co., Philadelphia, Pa.

Punches and Shears

Canada Machinery Co., Sarnia, Ont.
Globe Machine & Stamping Co., Cleveland, Ohio.
Petrie, H. W., Toronto.

Purifiers

Babcock & Wilcox, Limited, Montreal.
Goldie & McCulloch Co., Galt, Ont.
McDougall, John, Caledonian Iron Works Co., Mont-
real.

Purifying and Softening Systems (Water)

Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McDougall, John, Caledonian Iron Works Co., Mont-
real.

Railroads

Chicago & North-Western Ry., Toronto & St. Paul,
Minn.

Railway Supplies

Algonia Steel Co., Sault Ste. Marie, Ont.
Allis-Chalmers-Bullock, Limited, Montreal.
Gastshore, John J., Toronto.
Greening, B. Wire Co., Hamilton, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Hopkins, F. H. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Phillips, Eugene F., Electrical Works, Montreal.

Reamers

Butterfield & Co., Rock Island, Que.

Rivets

Bourne-Fuller Co., Cleveland, Ohio.
London Rolling Mills, London, Ont.

Rock and Ore Crushers

Allis-Chalmers-Bullock, Limited, Montreal.
Bradley Pulverizer Co., Boston, Mass.

Rolling Mill Engineers

Bourne-Fuller Co., Cleveland, Ohio.

Roofing

Bourne-Fuller Co., Cleveland, Ohio.
Pedlar People, Oshawa, Ont.

Rubber Goods

Gutta Percha & Rubber Mfg. Co., Toronto.

Rubber Packing

Gutta Percha & Rubber Mfg. Co., Toronto.

Rubber Washing Tubs

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

Rural Mail Boxes

Globe Machine & Stamping Co., Cleveland, Ohio.

Safts and Vaults

Goldie & McCulloch Co., Galt, Ont.

Screws

Morrow John, Machine Screw Co., Ingersoll, Ont.

Screw Plates

Armstrong Mfg. Co., Bridgeport, Conn.
Butterfield & Co., Rock Island, Que.

Shafts

Allis-Chalmers-Bullock, Limited, Montreal.
Bourne-Fuller Co., Cleveland, Ohio.
Goldie & McCulloch Co., Galt, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
McDougall, John, Caledonian Iron Works Co., Mont-
real.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.

Shapers and Carvers

Advance Machinery Co., Toledo, Ohio.

Shear Knives

Hay, Peter Knife Co., Galt, Ont.

Sheets (Iron and Steel)

Bourne-Fuller Co., Cleveland, Ohio.
Leslie, A. C. & Co., Montreal.
Lysaght, John, Limited, Bristol, England and Mont-
real.

Sheet Metal Goods

Globe Machine & Stamping Co., Cleveland, Ohio.
Pedlar People, Oshawa, Ont.

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J. J. CASSIDY, Manager.

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Sheet Metal Stamping
Globe Machine & Stamping Co., Cleveland, Ohio.
Pedlar People, Oshawa, Ont.

Ship Builders
Bertram Engine Works Co., Toronto.

Smoke Stacks
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Robb Engineering Co., Amherst, N.S.

Solder
Globe Machine & Stamping Co., Cleveland, Ohio.
Syracuse Smelting Co., Montreal.

Special Machinery
Allis-Chalmers-Bullock, Limited, Montreal.
Canada Machinery Co., Sarnia, Ont.
Globe Machine & Stamping Co., Cleveland, Ohio.

Speed Recorders
Bristol Co., Waterbury, Conn.

Sprinkler Insurance
Canadian Casualty & Boiler Insurance Co., Toronto.

Stamps and Stencils
Globe Machine & Stamping Co., Cleveland, Ohio.

Steam Pumps
Allis-Chalmers-Bullock, Limited, Montreal.
American Steam Pump Co., Battle Creek, Mich.
Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Goldie & McCulloch Co., Galt, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Patrie, H. W., Toronto.
Williams A. R. Machinery Co., Toronto.

Steam Separators
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McEachern Heating & Ventilating Co., Galt, Ont.
Robb Engineering Co., Amherst, N.S.
Sheldon & Sheldon, Galt, Ont.

Steam Specialties
Darling Bros., Montreal.
McEachern Heating & Ventilating Co., Galt, Ont.
Penberthy Injector Co., Windsor, Ont.
Schutte & Koerting Co., Philadelphia, Pa.
Sheldon & Sheldon, Galt, Ont.

Steam Valves
American Steam Pump Co., Battle Creek, Mich.
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
Kerr Engine Co., Walkerville, Ont.
Patrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Steel and Composite Ships
Bertram Engine Works Co., Toronto.

Steel Balls
Algoma Steel Co., Sault Ste. Marie, Ont.
Drummond, McCall & Co., Montreal and Toronto.
Garsshore, John J., Toronto.
Hopkins, F. H. & Co., Montreal.

Steel Shating
Darling Bros., Montreal.
Goldie & McCulloch Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Leslie, A. C. & Co., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Wilson, J. O. & Co., Glengora, Ont.

Stocks and Dies
Armstrong Mfg. Co., Bridgeport, Conn.
Butterfield & Co., Rock Island, Que.
Patrie, H. W., Toronto.
Worth & Martin, Toronto.

Stoppers
McCullough-Dalsell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.

Structural Steel
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Hopkins, F. H. & Co., Montreal.

Sulphate of Alumina
Nichols Chemical Co. of Canada, Montreal.

Sulphur Furnaces
Schutte & Koerting Co., Philadelphia, Pa.

Suspension Furnaces
Continental Iron Works Co., New York City.

Tanks (Oil and Water)
Canada Foundry Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Goldie & McCulloch Co., Galt, Ont.

Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jencks Machine Co., Sherbrooke, Que.
McDougall, John, Caledonian Iron Works Co., Montreal.
Ontario Wind Engine & Pump Co., Toronto.

Taps and Dies
Butterfield & Co., Rock Island, Que.
Globe Machine & Stamping Co., Cleveland, Ohio.

Tees
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.

Textile Manufacturers
Dominion Oil Cloth Co., Montreal.
Smith Mfg. Co., Toronto.
Storey, W. H. & Sons, Acton, Ont.

Textile Supplies
McLaren, J. C. Belting Co., Montreal and Toronto.

Thermometers (Recording)
Bristol Co., Waterbury, Conn.

Tin
Leslie, A. C. & Co., Montreal.
Syracuse Smelting Works, Montreal.

Tool Grinders
Barnes, B. F. Co., Rockford, Ill.

Tool Steel
Bourne-Fuller Co., Cleveland, Ohio.
Hopkins, F. H. & Co., Montreal.
Leslie, A. C. & Co., Montreal.

Trucks
Corbett, R. B., Brooklyn, N.Y.
Hopkins, F. H. & Co., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Sheldon & Sheldon, Galt, Ont.

Trucks (Railway)
Canada Foundry Co., Toronto.

Trucks (Wire Mill Supplies)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Tubs (Cleaning and Coating Wire)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Tugs
Bertram Engine Works Co., Toronto.

Tumbling Barrels
Globe Machine & Stamping Co., Cleveland, Ohio.

Turbines
Canada Foundry Co., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jencks Machine Co., Sherbrooke, Que.
Wilson, J. O. & Co., Glengora, Ont.

Typewriters and Supplies
United Typewriter Co., Toronto.

Valves
American Steam Pump Co., Battle Creek, Mich.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Kerr Engine Co., Walkerville, Ont.
Patrie, H. W., Toronto.
Schutte & Koerting Co., Philadelphia, Pa.
Williams, A. R. Machinery Co., Toronto.

Valves (Rubber)
Gutta Percha & Rubber Mfg. Co., Toronto.

Varnishes
Berry Bros., Walkerville, Ont.

Ventilators
Darling Bros., Montreal.
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Wagon and Carriage Wood Work
Hore, F. W. & Son, Hamilton, Ont.

Washers or Hollenders (Cleaning Rubber)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Watchman's Clocks
Eco Magneto Clock Co., Boston, Mass.

Water Power Development
Vogel, C. H., Ottawa.

Water Purifying Chemicals
Canada Chemical Mfg. Co., London, Ont.

Windmills
Ontario Wind Engine & Pump Co., Toronto.

Wire Mill Supplies
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Wire and Wire Rope
Dominion Wire Rope Co., Montreal.
Greening, B. Wire Co., Hamilton, Ont.
Leslie, A. C. & Co., Montreal.
Phillips, Eugene F. Electrical Works, Montreal.
Wire & Cable Co., Montreal.

Wire Rope Fittings
Dominion Wire Rope Co., Montreal.

Wire Cloth
Greening, B. Wire Co., Hamilton, Ont.

Wire Drawing Machinery
Turner, Vaughn & Taylor Co., Cuyahoga Falls.

Wood-Working Machinery
Advance Machinery Co., Toledo, Ohio.
Canada Machinery Co., Sarnia, Ont.
Goldie & McCulloch Co., Galt, Ont.
London Machine Tool Co., London, Ont.
Patrie, H. W., Toronto.
Sheldon & Sheldon, Galt, Ont.
Williams, A. R. Machinery Co., Toronto.

Yachts
Bertram Engine Works Co., Toronto.

Zinc
Leslie, A. C. & Co., Montreal.
Syracuse Smelting Works, Montreal.

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MISSING