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

Vol. 49.

TORONTO, NOVEMBER 18, 1904.

No. 10.

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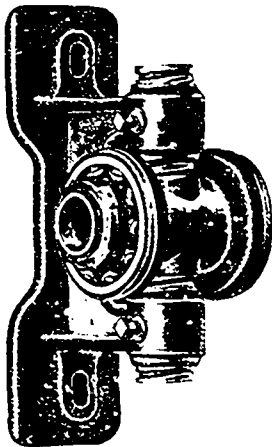


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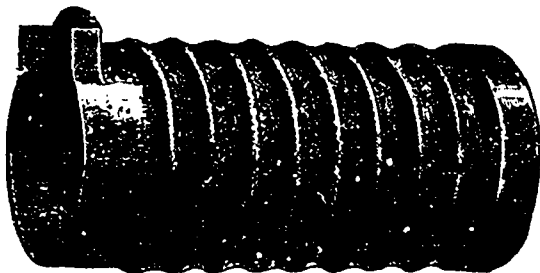
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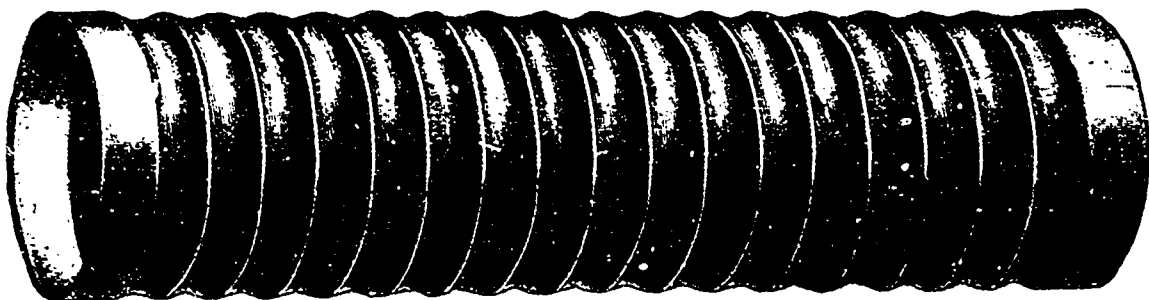


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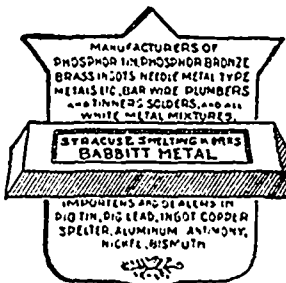
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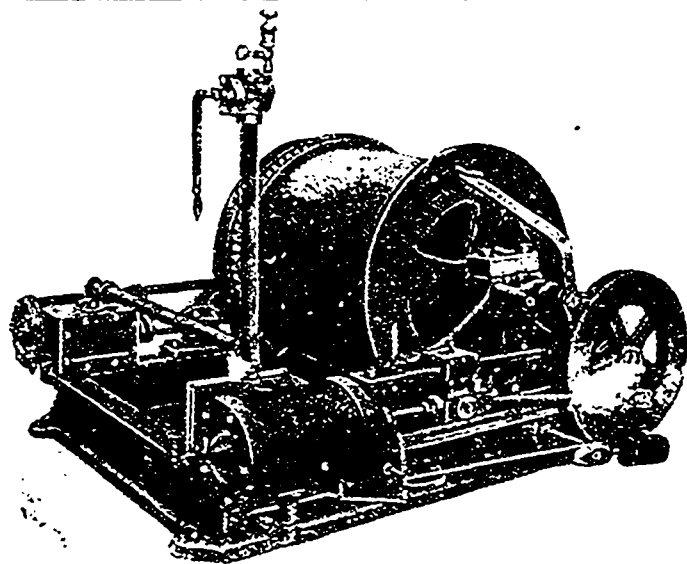
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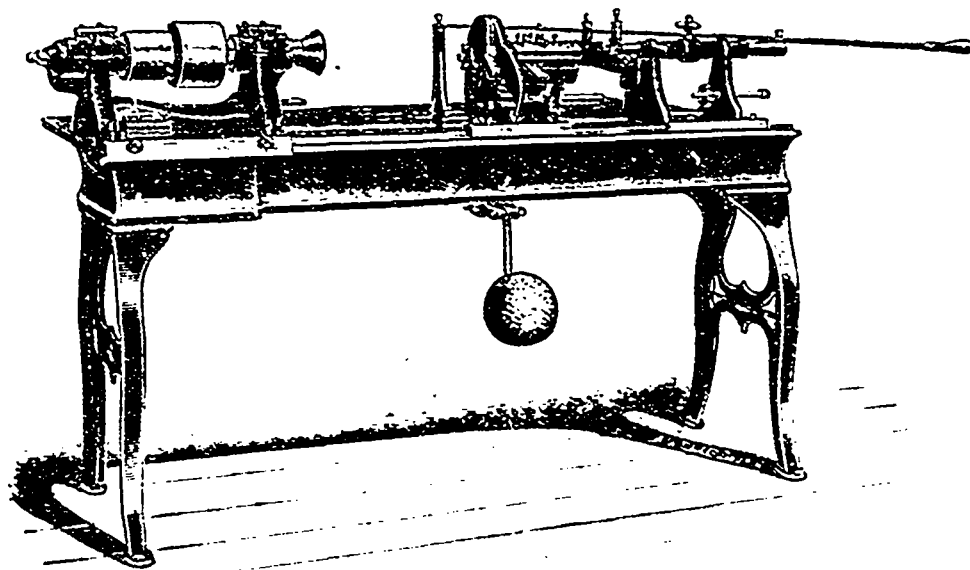
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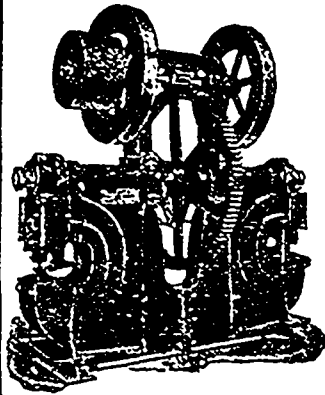
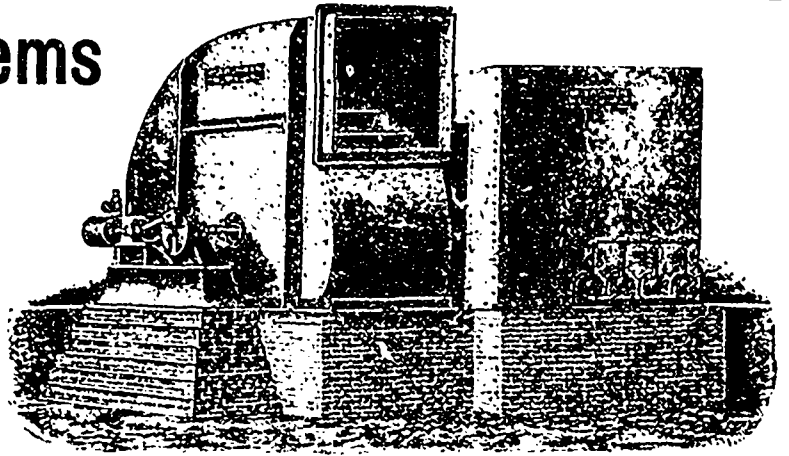
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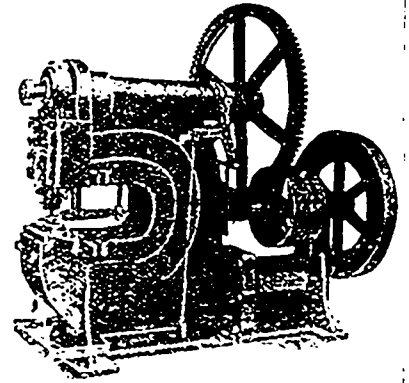
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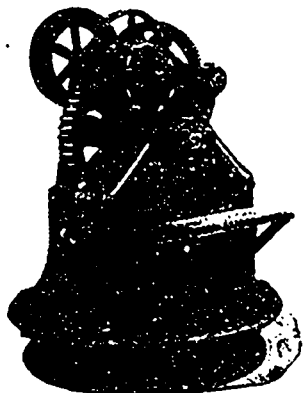
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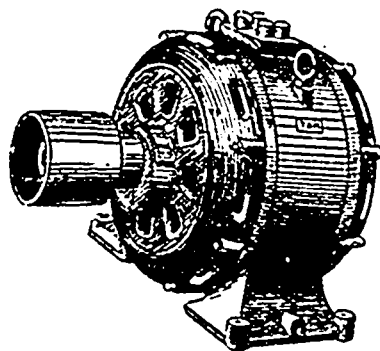
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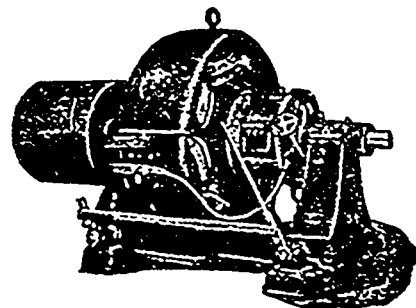
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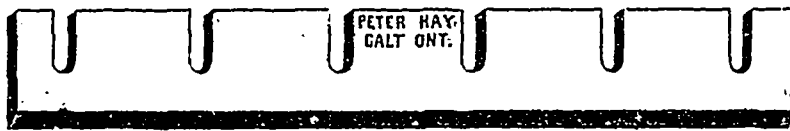


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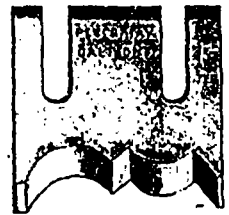
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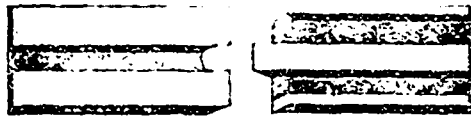
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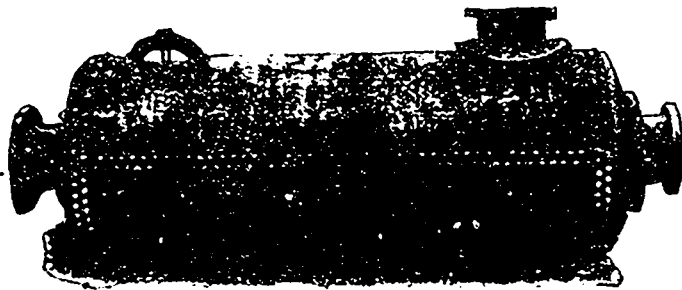
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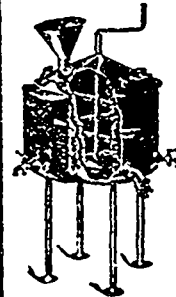
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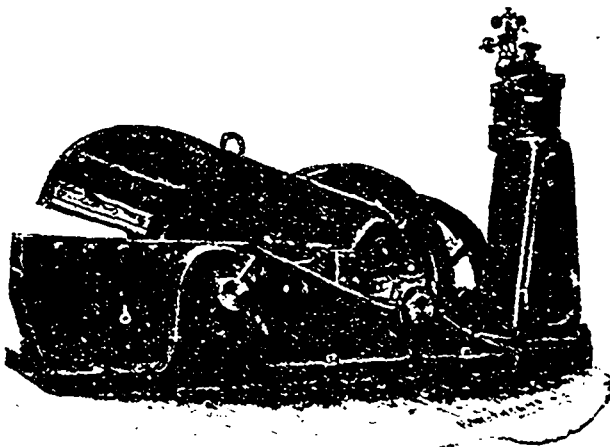
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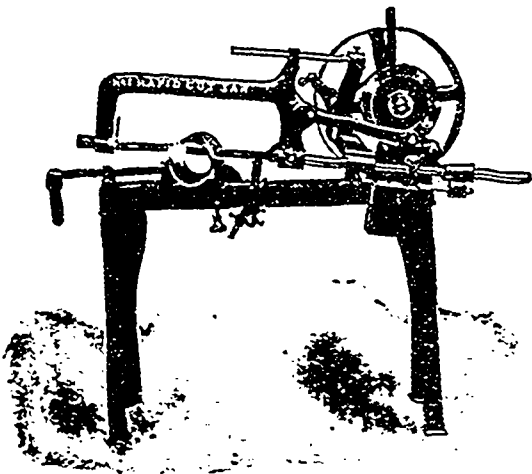
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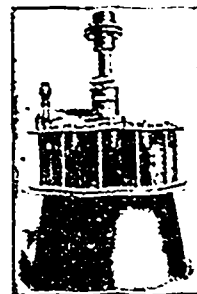
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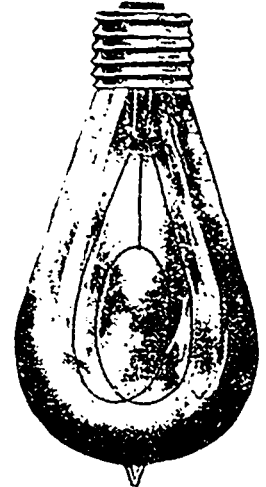
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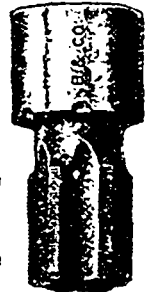
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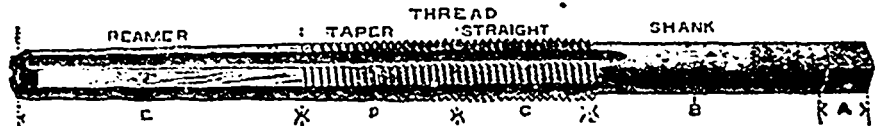
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THE TRANSCONTINENTAL RAILWAY.

One of the chief subjects of interest in Canada at present is the provision made at the last two sessions of the Dominion Parliament to secure the construction and operation of an entirely new railway across the continent from the Pacific Ocean to the head of the Bay of Fundy, and entirely within Canadian territory. This, when completed, will be one of the great railways of the world—in fact, there will be none longer except Russia's Siberian line, and that will fall far short of it for many years to come in standard of construction and efficiency of equipment. The following account of this vast project and of the means devised to carry it out will give a fair and impartial view of the whole matter.

The proposed railway is to run from some port, not yet selected, on the Pacific coast to Moncton, the head quarters of the Intercolonial Railway. From Moncton four sections of that road radiate in as many different directions, namely, to Sydney and Halifax, in Nova Scotia; to St. John, in New Brunswick, and to Montreal, in Quebec. It would be a waste of outlay to carry the Transcontinental line beyond Moncton. The main line is divided at Winnipeg into two divisions, the eastern, between Winnipeg and Moncton, the western, between Winnipeg and the Pacific. In spite of this subdivision the road is to be operated as a whole. It is intended that branches shall be sent out at many points from the main line, two of the more important being projected to the head of Lake Superior, and to Hudson's Bay, respectively. These, however, form no part of the scheme as aided in different ways by Parliament. It is expected that by means of low grades, easy curves, good track, and improved rolling stock the Transcontinental Railway will be able to carry grain from the Rocky Mountains to Atlantic ports, in competition with the part rail and part water routes. The standard of the eastern division will be as high as the Government's chief engineer, and the Grand Trunk Pacific's chief engineer can agree in raising it; the standard of the

western division is to equal that of the Grand Trunk Railway between Toronto and Montreal.

This gigantic work has been undertaken on the joint credit of the Dominion Government, the Grand Trunk Railway Company, and the Grand Trunk Pacific Railway Company. The last named corporation is to construct the western division and to operate the whole line after it is completed.

The eastern division is to be constructed by the Dominion Government through the medium of a commission which was organized some weeks ago and is already at work. The whole cost of constructing the division is to be met by the Government, as the cost of other public works is met, either by borrowing the necessary capital or by taking it out of surplus revenue. After it is completed it will be taken over and operated by the Grand Trunk Pacific Company, which will pay yearly 3 per cent. on the cost of construction for the privilege. It is expected that the money to construct the line will be obtained by the Government at the same rate, so that the country will for all practical purposes be financing that part of the road without either loss or gain. At the end of the lease, which runs for fifty years, the Government will own the whole eastern division.

The length of the eastern division is estimated at 1,875 miles, and the estimates of cost per mile vary from \$31,250 to \$40,000 per mile. The former of these sums is the estimate of Mr. Fielding, the Minister of Finance, the latter is the estimate of Mr. Borden, the leader of the Opposition. It is impossible at present to decide which of these is the more correct, but this becomes a matter of minor importance in view of the fact that the railway company pays yearly 3 per cent. on the cost of construction, whatever that may be. As the company is interested in keeping down the capital expenditure, and the Government is equally interested in doing so, this feature of the contract may fairly be described as the most ingenious provision imaginable to secure the greatest possible efficiency at the least possible cost.

The length of the western division is estimated at

1,480 miles, of which 1,000 miles are across the prairie and 480 miles are through the mountains of British Columbia. For these two sections the Government guarantees the bonds of the Grand Trunk Pacific Company to three-fourths of the cost of the mountain section without limit, and to three-fourths of the cost of the prairie section within the limit of \$13,000 a mile. It is estimated that the guarantee on the mountain section will not exceed \$21,221,052, and on this part of the cost the Government is to pay for seven years the interest it guarantees. The railway company pays from the start the interest on the prairie section.

For the first seven years after the completion of the eastern division the railway company has the privilege of operating it without paying any rental. This period of seven years may be extended to ten if the traffic of the road is not sufficient to enable it to earn the required 3 per cent.; but in that event the arrears are to be added to the capital sum representing the cost of construction. This cost of construction is to include the capitalized interest on the outlay during the years of construction, which thus becomes part of the amount on which 3 per cent. is to be paid. The Finance Minister, in the course of debate on the agreement of 1903, and the amended agreement of 1904, gave the House of Commons a statement showing that in order to meet the seven years' interest on the mountain section of the western division, and the seven years' rental of the eastern division, it would suffice to set apart now the sum of \$14,000,000, and these are the only financial aids given to the company by the Dominion Parliament. The whole line is to be constructed and operated without either mileage subsidy or land grant. In other words, if the surplus revenue of the last financial year were invested it would at the end of the seven years above mentioned more than meet all the payments to be made by the Government on account of the obligations it has incurred under the contract.

The objects of the undertaking are many, but four may here be specified as peculiarly important. The first is to have a transcontinental railway through Canadian territory from ocean to ocean; so that in dealing with the United States in regard to international trade arrangements Canada may not find herself handicapped by the want of a through route of her own. The second is to provide another transcontinental railway not merely to supply increased transportation facilities to meet the needs of expanding settlement, but to secure effective competition between the Canadian Pacific Railway, which is comparatively independent of all control in the matter of rates, and a new railway which will be completely under the control of the Railway Commission. The third is to promote settlement in northern British Columbia, across the comparatively uninhabited part of the Northwest Territory and Manitoba, in Northern Ontario and Quebec, and through the central part of New Brunswick. The fourth is to make this an important part of a new traffic route from western Europe to eastern Asia, equipped with both transatlantic and transpacific steamships. The project, as developed

in the agreement between the Dominion Government and the Grand Trunk Pacific Railway Company is admirably adapted to secure all these ends. It will give an absolutely all-Canadian traffic route; it will create a strong business rival to the Canadian Pacific; it will practically double the width of the Dominion by carrying settlement in Ontario and Quebec over the height of land and far toward Hudson's Bay; and it will eventually lead to the establishment of another Pacific trade route to rival those passing through San Francisco and Vancouver. Incidentally, by securing the expenditure of a large amount of capital annually for some years to come, it will help materially in tiding Canada over the period of commercial and industrial depression which has already begun to make itself felt in the United States.

Under the agreement between the Dominion Government and the Grand Trunk Pacific Railway Company, the latter admits that the aid given by the Government is for the express purpose of encouraging the development of Canadian trade and the transportation of goods through Canadian channels. The company "accepts the aid on these conditions, and agrees that all freight originating on the line of the railway or its branches, not specifically routed otherwise by the shipper, shall, when destined for points in Canada, be carried entirely on Canadian territory or between Canadian inland ports;" that "all such traffic not specifically routed otherwise shall be carried to Canadian ocean ports," and that "the through rate on export traffic from the point of origin to the point of destination shall at no time be greater by way of Canadian than by way of United States ports."

The company further "agrees that it shall not, in any matter within its power, directly or indirectly, advise or encourage the transportation of such freight by routes other than those above provided, but shall in all respects in good faith use its utmost endeavors to fulfill the conditions upon which public aid is granted, namely, the development of trade through Canadian channels and Canadian ocean ports." By the contract the company is bound also to "provide shipping connections on both the Atlantic and Pacific Oceans" adequate to "take care of and transport all its traffic, both inward and outward, at such ocean ports within Canada" as may be agreed upon from time to time. Lastly, the company agrees that it will not "divert, or, so far as it can lawfully prevent, permit to be diverted, to ports outside of Canada any traffic which it can lawfully influence or control, upon the ground that there is not a sufficient amount of shipping to transport such traffic from or to such Canadian ocean ports." In other words, the company, if not required to use the ports of Québec, St John, Halifax, or Sydney for ocean traffic, is bound to provide shipping for the purpose, and not to refuse the traffic because the shipping is insufficient.

There is ample means provided for the enforcement of these stipulations. Both the Grand Trunk Pacific Co and the Grand Trunk Co. come under the jurisdiction of the Railway Commission, and in the last resort

Parliament, which enacts the agreement, can say whether or not the company is living up to it.

The National Transcontinental Railway legislation of 1903 had the appearance of having been sprung on Parliament and the country, but a slight acquaintance with the situation will serve to show that this is a delusion. Several occurrences led up to this outcome. One was the application of the Grand Trunk Pacific Co. for a charter to build a railway from North Bay to the Pacific Ocean on condition of receiving a large amount of Government aid in money or land; another was the application of the Trans-Canada Railway Co. for a charter to construct a railway from the Pacific Ocean to the lower St. Lawrence, on a similar condition. Neither offer was accepted by the Government, which had announced its determination to give no more land subsidies. The course of Parliamentary discussion showed that in order to make the railway really transcontinental it would be necessary to bring the line into as close connection as possible with the Canada Atlantic ports, and the present scheme is the outcome of the resulting negotiations. As adopted by Parliament in 1903 it was not acceptable in all respects to the Grand Trunk shareholders, who had to take the responsibility of guaranteeing the bonds of the Grand Trunk Pacific Co. to an indefinite extent, and some amendments were made in it during the session of 1904. These did not affect the main features of the scheme, which remain as they were under the previous legislation. They may with absolute accuracy be thus summarized:

1. The Grand Trunk Pacific Co. finds all the capital and does all the work of construction for the part of the Transcontinental Railway west of Winnipeg.

2. The Government guarantees the interest on the company's bonds to the amount of three-fourths of the cost of the western division, with a limitation on the prairie section to \$13,000 a mile, and it pays for seven years the interest it guarantees on the mountain section.

3. The Government constructs at its own expense the part of the line east of Winnipeg, but it leases it to the Grand Trunk Pacific Co. at a yearly rental of three per cent. on the cost of construction. As the money to build the road is to be borrowed at 3 per cent. by the Government, and as the latter will own the eastern division at the end of the company's tenure of it, the transaction is not merely safe for the Government, but indirectly profitable for the country, which it will so greatly aid in developing.

THE CHAMBERLAIN TARIFF COMMISSION.

The London Ironmonger sizing up the report of Mr. Chamberlain's tariff commission, says:

The commissioners are of opinion that the situation with regard to the iron and steel trades can be dealt with only by the combination of three principles in the arrangement of the British tariff. They think there should be three grades of tariff—viz., the general tariff, the preferential tariff, and the maximum tariff.

With regard to the general tariff, the United Kingdom should always be ready to meet any country which will

grant reciprocal treatment. But, as foreign countries have adopted their tariffs for the express purpose of safeguarding labor and fostering their national industries, it is not reasonable to expect that they can be induced to subject those industries to the full force of British competition. In these circumstances a general tariff consisting of a low scale of duties is necessary, the object of which should be the increase of employment and the maintenance of fair conditions of competition with countries which grant reciprocal treatment to the United Kingdom.

With a view to securing freer trade within the Empire this general tariff should be subject to modification in the case of the colonies. There is a strong and widespread appreciation of the benefits derived from the preferential tariffs of the colonies. We should do whatever is necessary to encourage trade within the Empire, and under a system of mutual preference we may anticipate a rapid and substantial increase of the exports of British manufactures to the colonies.

A maximum tariff, consisting of comparatively higher duties than those of the general tariff, will be necessary in the case of countries which shut out British goods by practically prohibitive duties, and refuse to negotiate on the basis of fair and reciprocal treatment.

Finally the commission agrees on the following conclusions:—The inquiry has shown:—1. That the iron and steel industry of this country has declined relatively to that of other countries. 2. That our export trade to foreign countries has diminished, while that to the colonies has increased. 3. That, although our trade with the colonies has increased, the colonial market is increasing much more rapidly, and that foreign countries are securing a growing proportion of this colonial trade. 4. That the relative decline of the British iron and steel industry is not due to any natural British disadvantages or want of skill and enterprise on the part either of British manufactures or of British workmen. 5. That it is due to the fact that the manufacturers of the United States and Germany, having secured control of their home markets by means of high tariffs and an organized system for the regulation of their export trade, are in a position to dump their surplus products upon the British and other markets, irrespective of cost. 6. That the practice of dumping could not be carried on by foreign countries but for the British system of free imports. 7. That the British fiscal system should be revised in such a manner as to check this practice, to maintain so far as possible our export trade to foreign countries, and develop our colonial market and increase the employment of the working classes. 8. That these objects can be obtained by means of a system of tariffs arranged as follows:

(a) A general tariff, consisting of a low scale of duties for foreign countries which admit British wares on fair terms.

(b) A preferential tariff, lower than the general tariff, for those of our colonies which give adequate preference to British manufactures, and framed with a view to securing freer trade within the British Empire.

(c) A maximum tariff, consisting of comparatively higher duties, but subject to reduction by negotiation to the level of the general tariff.

The report concludes as follows: The following provisional scale of duties for the general tariff, in the calculation of which due consideration has been given to the proportion of labor involved at all stages of manufacture, has been prepared as an indication of the nature of the scheme which may hereafter be recommended for the iron and steel industry when the inquiry into other trades and interests has been completed. This provisional scale is concerned only with the iron and steel industry. The engineering, machinery, shipbuilding, and the hardware, hollowware, and cutlery trades will be the subjects of subsequent reports.

Iron ores, free. Pig iron, 5 per cent. ad valorem. Puddled bars, ingots, blooms, billets, slabs, sheet bars, tinplate bars, or similar partly manufactured materials; rails, sleepers, and fish-plates, girders, joists, and beams; bars, round, square, flat, and sections other than above enumerated; and slit rods, $6\frac{1}{4}$ per cent. Wire rods, plates, $7\frac{1}{2}$ per cent. Sheets, 10 per cent. Nails, screws, and rivets, bolts and nuts, tires and axles, railway wheels and axles, crucible steel and manufactures of iron and steel unenumerated, duties in no case to exceed 10 per cent.

It is added that the duties are stated as ad valorem rates for convenience only, and without prejudice to the question whether the duties to be ultimately recommended by the commission are to be ad valorem or specific.

MANUFACTURERS vs. LABOR UNIONS.

It was noticeable that while the annual meeting of the Canadian Manufacturers' Association was in session in Montreal in September, the Dominion Trades and Labor Congress was also in session at the same time in that city. The secretary of the Manufacturers' Association stated that their membership included some 1,500 manufacturers. Mr. Drummond, the retiring president of the Association, quoting from an advance copy of the census returns for 1901, offered the computation that the aggregate value of the output of the manufacturing establishments in Canada in that year was over 481 million dollars, which was the result of the efforts of 344,095 workpeople. Mr. Drummond did not give the number of manufacturing establishments in which this large number of workpeople found employment; neither did he give the number of workpeople employed by the 1,500 manufacturers included in the Association, but we presume that an assignment of an average of 200 to each might be approximately correct. If it is correct, the members of the Association give employment to some 300,000 workpeople, leaving less than 50,000 to find employment in non-association manufacturing establishments. There are about 12,000 manufacturing establishments in Canada, and were the 344,000 workpeople Mr. Drummond speaks of allotted equally among them, the average would be less than 30 employes each.

Mr. P. M. Draper, the secretary of the Trades and

Labor Congress, stated in his report that there were 22,000 members included in 48 councils and 23 federal unions included in the Trades and Labor organization, and 21 unions not affiliated with it. This means that these labor organizations would have an average membership of about 310 each, all the labor unions of Canada having an aggregate of less than 30,000 members, or, to be exact, 28,520.

These figures show that of the nearly 350,000 workpeople employed in manufacturing establishments in Canada, only about 8 per cent. of them are organized into unions, and that these unions are able and do raise the devil generally with about all the manufacturing and other industrial pursuits of the country.

THE AGE OF CONCRETE.

A booklet on "Concrete Construction," issued by the Engineering Co. of America, is something more than an ordinary trade publication and deserves special consideration upon its individual merits. From its enumeration of the qualities of concrete and its setting forth of the claims of concrete to employment by the modern engineer we extract the following as of general interest to the mechanical reader:

Concrete may be defined as an artificial stone. It can be used for all structural purposes as a substitute for stone, and in addition it has a wide variety of applications where the use of stone is impracticable. A typical concrete is made as follows: To one barrel of a standard Portland cement are added three barrels of clean sharp sand. The two are intimately mixed—either manually or by a mechanical mixer—and then enough water is added to bring the mixture to a certain consistency, the proper amount of water being readily judged by one experienced in this work. Five barrels of broken stone are then added, the whole thoroughly intermixed, and the concrete thus formed is ready to be conveyed to the forms or the excavations prepared for it. Concrete made in the above proportions would be known as a 1:3:5 mixture. The permissible proportions, however, vary widely from 1:2:4 to 1:5:10, according to the nature of the ingredients and the service for which it is intended. In general, concrete with the smaller proportion of cement will not sustain the same strains as the concretes wherein the proportions are about as indicated in our typical mixture.

The composition of a properly proportioned concrete may be thus considered:—Sand fills up the interstices between the pieces of rock, and the cement in turn fills up the interstices between the particles of sand and between the sand and the rock. As 90 per cent. of a standard cement will pass through a sieve of 10,000 meshes to the square inch, it is evident that the cement will effectually fill up all voids. But the cement also performs an even more important function. It enters into chemical combination with the water used in mixing and acts as a binder, tenaciously holding the whole mass together. As soon as the cement is mixed with water this chemical change commences, or the concrete begins

to "set" as it is generally expressed. Therefore the concrete must be put in place immediately after mixing. At the end of about three or four days, the concrete is solid enough for the supporting forms to be removed, and after possibly thirty days it is ready for the loads for which it is designed. The hardening continues for months, and the concrete becomes stronger as time elapses.

The merits of concrete as a material of construction have been recognized for centuries. Some of the most enduring monuments of antiquity are constructed either wholly or in part of this material. The dome of the Pantheon, erected about the beginning of the Christian era, is built of concrete, as are some of the other historic structures of that period. Concrete has ever since been used to a greater or less extent. With the discovery and application of the methods of making Portland cement, which we may ascribe to the period 1820-50, concrete assumed its place as one of the principal materials of engineering.

Concrete will withstand enormous compression strains. When heavy strains other than those of compression are to be provided for, the concrete is so strengthened with steel that the metal takes the tensile and shearing strains and the concrete the compression strains. This construction, known as armored or re-enforced concrete, is rendered entirely feasible by the facts that concrete has considerable adhesion for iron and steel, and the coefficients of expansion (by heat) of the two materials are practically identical.

As regards the all-essential quality of ability to resist fire, concrete is absolutely and unqualifiedly superior to all other building materials. This has been shown many times in tests conducted by the building and fire departments of various large cities in this country and abroad.

In re-enforced concrete construction the steel is completely imbedded in the concrete, which absolutely protects it from fire, as indeed it does from rust and all other corrosive action. It has been demonstrated in several instances that gray iron piping which had been covered with a coat of liquid neat cement and buried underground for from ten to fifteen years, showed no signs of rust or other external deterioration. A lining of "rich" concrete has been found to be the only material which will withstand the corrosive action of the acids in the large storage tanks or vats in pulp mills.

The United States Government is using concrete in enormous quantities for all sorts of purposes. In the reconstruction of the fortifications around New York harbor during the last few years, concrete has been used to the practical exclusion of all other materials. In other words, the 13 inch guns which guard the city of steel-frame skyscrapers are mounted on concrete foundations and are protected from hostile projectiles by the same material.

Concrete becomes stronger with age, and the same is not true of any other material. Concrete is cheaper than stone or steel frame and terra cotta. It can be manipulated by unskilled labor to a greater extent than

any other material. There are many localities in the country where no stone suitable for building purposes exists but where there is much stone admirably adapted for being crushed and used for concrete. In short, the raw materials for concrete can be laid down at almost any point in the country cheaper than any other material, and the costs of putting it in place are less.

PROHIBITING SUNDAY LABOR.

The extent to which a province may go in the direction of prohibiting Sunday labor and the effect of such legislation upon various classes of occupations, is to be referred by the Dominion Government to the Supreme Court to determine. Representations have been made to the Government since the decision of the Privy Council in the Lord's Day case, advocating the enactment of a measure by the Dominion Parliament, and the draft of a bill which the Lord's Day Alliance considered would meet the case was submitted to the Federal Executive. The Minister of Justice, however, is not at all satisfied that the extent of the right of a province to legislate in the matter of Sabbath Day observance has been determined, and he wishes to see this settled before submitting legislation of the character proposed to Parliament. Accordingly he has recommended and the Government have approved of the submission of a number of questions to the Supreme Court.

The questions are as follows:

1. Has the Legislature of a province authority to enact a statute in the terms of the annexed draft bill.
2. If the provisions of the draft bill are beyond the jurisdiction of a province in part only, (a) which of the sections or which of the provisions thereof are ultra vires, and (b) to what extent are they ultra vires?
3. (a) Upon the repeal of the consolidated statutes of Upper Canada, chap. 104, would it be competent to the Legislature of Ontario to enact the said draft bill in its entirety or in part, and, (b) if in part only, what sections or provisions thereof, and to what extent?
4. Has a province jurisdiction to legislate prohibiting or regulating labor so as to prevent any work, business, or labor from being performed within the province upon the first day of the week, commonly called "Sunday," except work of necessity or mercy, and except work or labor of the character and to the extent prohibited in sec. 2 of the said draft bill?
5. Has a province power to restrict the operations of companies of its own creation to six days in each week by provisions in the charters or acts of incorporation of said companies, or otherwise, so as to render it unlawful for them, their servants or agents to do any work, business or labor within the province on the first day of the week?
6. Are the following classes of companies or corporations created by the Dominion, or any of them, and if so which, and the servants and agents thereof, subject to the laws of the province within which they operate in so far as the prohibition or regulation of labor upon the first day of the week is concerned:

(a) Those whose works are declared to be for the general advantage of Canada, but authorized to operate within one province only, and whose operations are confined to such provinces. (b) Those to which the companies act, 1902 (Dominion), applies. (c) Banks and banking companies. (d) Companies for carrying on the business of insurance or the business of a loan company. (e) Companies whose purposes or objects are the construction and operating of any of the works or undertakings mentioned in clauses a, b and c of the 10th enumeration of section 92 of the British North America Act, other than those falling under clause "a" hereof?

7. Had the Legislature of Ontario authority to enact (a) the second clause of sub-section 2 of section 14 of the revised statutes of Ontario, 1897, chap. 208? (b) section 136 of R.S.O., 1897, chap. 209? (c) section 6 of 63 Vic., chap. 49? (d) section 39 of R.S.O., 1897, chap. 237, and sections 2 and 3 of 1, Edward VII., Ontario, chap. 36? (e) section — of 4, Edward VII., chap. — ?

A RIFT IN THE LUTE.

In the Parliamentary elections just ended, Mr. A. E. Kemp, of the Kemp Mfg Co., and an ex-president of the Canadian Manufacturers' Association, was a candidate for re-election in the riding of East Toronto, in which he was opposed by Major J. K. Leslie. As is well known, Mr. Kemp served his country well during the last Parliament as member for East Toronto, and was a persistent advocate for adequate tariff protection to Canadian manufacturing industries. He has been an active member of the Manufacturers' Association for many years, and has helped to shape its tariff policy. Major Leslie, Mr. Kemp's opponent, is not a manufacturer, and is not, we believe, interested in any Canadian manufacturing industry, but he is, and has been, an avowed free trader. At a political meeting which was held in Toronto in the interest of Major Leslie, Mr. R. A. Donald, a manufacturer and chairman of the Toronto branch of the Canadian Manufacturers' Association, declared himself favorable to the election of the free trade candidate. He said that he had every opportunity to know the opinion of business men in Canada relative to the tariff, and that he had found no great or general demand for a change. He himself was opposed to changing it. The situation presents some queer anomalies. Mr. Kemp, a past president of the Association and an ardent supporter of its tariff declaration demanding an entire revision of it, found himself opposed by a free trader in whose behalf Mr. Donald, the chairman of the Toronto branch of the Association, was taking a most active interest. It looks like a little rift within the lute. Mr. Donald is certainly not in harmony with the tariff policy of his Association.

EDITORIAL NOTES.

The first lead pipe ever made in Canada from Canadian lead has just been produced at Trail by the Canadian Smelting Works. Any dimensions required are made up to four inches in diameter.—Commercial Intelligence.

Our London contemporary is badly informed. For many years lead pipe of the best quality has been made in Canada by a half dozen or more responsible concerns.

The recent elections show that the Canadian Manufacturers' Association has become a sort of vermiform appendix to the Dominion Government.

The National Transcontinental Railway will be constructed without delay. Manufacturers and merchants must be in readiness to meet the opportunities which so great an enterprise brings near. Millions of acres of wilderness will be traversed by this railway, and millions of people will find homes there and make the desert blossom and throb. What that will mean to Canada, both in material prosperity and in moral power, will, to a degree, depend on the strength and steadiness with which Canadians meet the occasion.

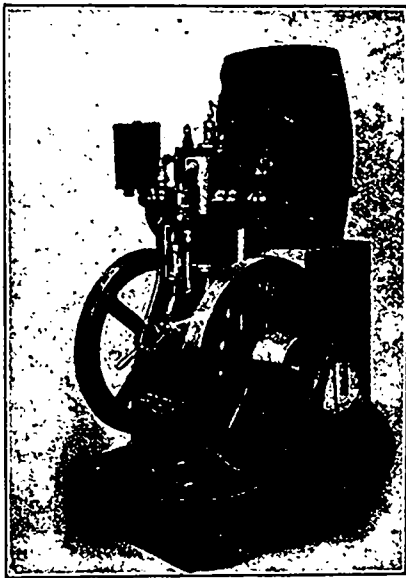
The manufacturers of Canada, as the association's resolutions show, want adequate protection for their industries and also a tariff preference in favor of the British manufacturer. They have never shown how the two things are to be combined. The combination is practically impossible. Any preference that Great Britain would be justified in agreeing to would be one which would gain for her manufacturers some advantage in Canadian markets. Her statesmen are not looking for an outlet for foodstuffs.—Montreal Gazette.

It is a mystery past finding out why Canadian manufacturers declaim so loudly in favor of tariff preference for British goods while Great Britain shows no inclination whatever to give Canadian products any favor in the British market. Is Canada in debt to Great Britain? If so, the debt should be liquidated. Why should British manufacturers be shown any particular favors? Why should Canadian manufacturers be made to suffer because their British competitors are not able to compete with American manufacturers?

Take the Saturday and Sunday editions of almost any of the great city newspapers and study their advertising columns. Leaving out of account the department store announcements and the want columns, consider what a large part of the remaining advertisements bear the mark of almost obvious fraud. During the past few flush years, says the Atlantic, these papers have been crowded with alluring advertisements of corporations with enormous capitalization, whose stock is issued, generally in small denominations, to place it within the reach of "small investors;" tempting gold and copper mines for the discontented janitress and ambitious elevator man, corporations with new processes and machinery to revolutionize the manufacture of household articles or necessities, corporations exploiting startling inventions calculated, on paper, to reverse the ways of commerce. An investigation would probably show that a majority of these companies are created solely for the purpose of selling stock, and without the slightest intention on the part of their promoters or officers of doing any legitimate business with the money acquired.

ROBERTSON'S VERTICLE GAS OR GASOLINE ENGINE.

The cut here shown is of an improved model gas or gasoline engine, made by the Robertson Mfg. Co., Buffalo, N.Y. The picture was taken from an engine in use which shows its connections, also a water barrel used for cooling the cylinder. The cut shows very clearly all working parts, which are very few and are extremely simple, which is one of the main features of the engine, no complicated or delicate parts to get out of order. It is of the four-cycle type, taking in the charge of fuel on the down stroke of the piston, compressing on upward stroke, firing on the next and clearing the chamber of burnt gases on the fourth. The exhaust valve is operated by a cam, being geared positive and reliable. The air and gas mixing valve is arranged to operate automatically and only allows fuel to be taken in when the load demands it, insuring



ROBERTSON'S VERTICAL GAS OR GASOLINE ENGINE.

economy in running. Another very important feature appreciated by inexperienced users, there is not a single joint in the cylinder, the head being cast solid with the cylinder and water jacket extending below the heat line, makes it an impossibility to be troubled with leaks. The bed and upright supports are cast in one piece, being planed off on ends where the cylinder flanges are bolted on. A very efficient muffler is furnished, almost entirely dispensing of the explosion report. Electric igniter is used with dry batteries. All parts are made of the best material procurable, with good workmanship throughout. The company having all special tools for rapid and accurate production are enabled to make extraordinary low prices. Any one requiring power should investigate by writing the above company for prices, etc. They also make horizontal engines for stationary purposes and a line of marine motors in single and double cylinders, from 1½ h.p. up. The factory is equipped with all modern machinery for the production of these engines, every part being made by gig and templet insures accuracy and the furnishing of duplicate parts made simple. Parties about to put in power or

equipping a launch should write the above company for prices, etc. In addition to the above line they also manufacture a line of power metal saws, emery grinders, etc.

A MANUFACTURERS' GANG DRILL.

Drilling machines having more than one spindle can certainly be considered as among the most modern and most useful machine tools. They serve an excellent purpose in saving of both time and labor in drilling or reaming, particularly on multiple or duplicate pieces of work. The accompanying illustration represents a multiple spindle drilling machine, designed and built by the B. F. Barnes Co., Rockford, Ill.

This company make a specialty of gang drills of various styles and sizes. The manufacturers' type of gang drill here shown, however, has some superior and desirable features not found in other gang drills. It is built in 14 inch and 20 inch sizes.

The spindles are independent and self-operating. There are no feed levers to bother with. All the operator has to do is to throw the trip lever (which takes but a moment) and immediately the spindle descends rapidly to the work, drills or reams through or to required depth, then quickly returns automatically ready for the next operation. A four spindle machine on ordinary work will keep one operator busy taking work to and from the jigs. The machine is built in from two to six spindles as desired.

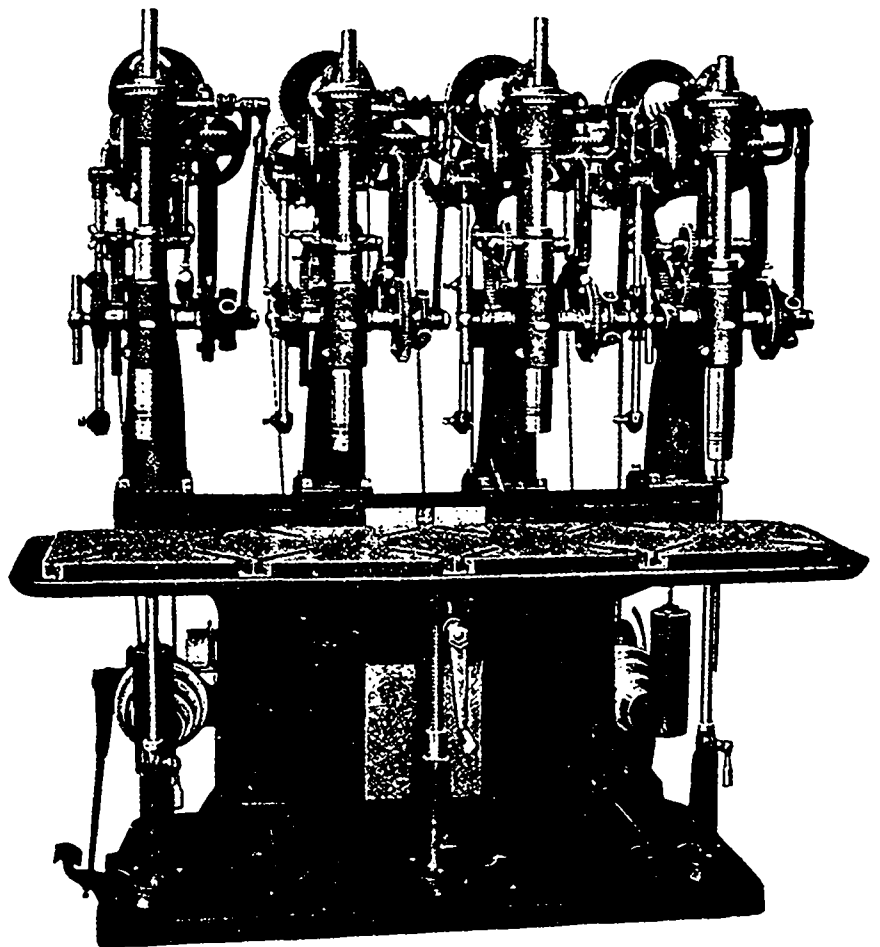
It is one of the fastest working gang drills ever built. The makers have sold many

domestic customers three and four spindle machines and one of these users have recently installed a six-spindle 20-inch manufacturers' drill. This certainly speaks well of the merits of the machine, as a modern time and labor saver, hence a reducer of production costs, on a wide variety of work within the capacity of the machine.

The B. F. Barnes Co. have their six-spindle 14 inch and four-spindle 20 inch manufacturers' drills on exhibition at the World's Fair in St. Louis this year, besides they show a full line of their Twentieth Century Machine Tools.

CANADA'S EXPORTS OF PULP.

Railroad men report an unprecedented rush of wood pulp and pulp wood from Canadian points to American mills. An official of the Canada Atlantic Railway says that wood pulp was being shipped at the rate of 1,000 tons a day from points along the Canada Atlantic Railway and the Great Northern Railway, a connecting line running through Quebec province. All this is being forwarded to American mills. Another railway official says that he knows that over 50,000 tons of wood pulp had been contracted for in Canada by American paper manufacturers. This will be sent forward from Eastern Ontario, New Brunswick and Quebec, and in some instances it will represent the output of the mills up to March 1 next. The mills in the Lake St. John district, Quebec, are foremost on the list of those that are shipping wood pulp to the American mills.



A MANUFACTURERS' GANG DRILL.

Large quantities of spruce and poplar are being forwarded to American mills from points in the Pontiac and Gatineau districts above Ottawa. This season the firm of McFarlane Bros., of Campbell's Bay shipped 2,000 cords. Next winter they expect to contract with jobbers for the cutting of 7,000 cords, mostly poplar and bass. Next year it is expected that the Canadian Pacific Railway Co. will build an extension in the Pontiac country, which will make marketable large areas of poplar and bass suitable for pulp making.

STEAM OR WATER-JET AIR COMPRESSORS AND EXHAUSTERS.

The Schutte & Koerting Co., 12th and Thompson Streets, Philadelphia, Pa., are sending out a circular having reference to steam or water-jet air compressors and exhausters manufactured by them. These apparatus are described as being much used in chemical and other works for compressing and rarifying gases of any kind. The admissible vacuum and counter pressure to which these machines are constructed is the rarefaction up to 20 inches of mercury and above, or a counter pressure up to one-seventh of the steam pressure.

Compared with air pumps these apparatus have advantages which give them the preference wherever they are applicable, viz:—

1. They have no moving parts.
2. The cost of the jet apparatus, compared with air pumps, is very much less.
3. The jet apparatus may be simply inserted in the course of the pipe, while air pumps as a rule require foundations.

Low prices, simplicity, reliability and durability, the makers say, have made their jet apparatus almost indispensable. The different purposes to which it is principally applied are:—

1. For oxidizing caustic liquids in alkali works.
2. To quicken the filtering process.
3. To draw gases through liquids.
4. To rarify creosoting tanks.
5. To lift tar, hydrochloric acid, etc.

Other specialties which this company manufacture include injectors; steam jet syphons, acid syphons for lifting liquids, water-jet eductors for lifting water, for cellar draining, in mines, etc.; sand and mud eductors; water heaters, noiseless working; steam and waterjet apparatus for moving air and gas; furnace blowers, gas producer blowers, steam or water-jet ventilators, blast nozzles for chimneys, exhausters and compressors, sulphur furnace, oil bleacher, gas exhausters, exhausters for starting pumps and steam engines, agitators, water-jet air pumps, laboratory vacuum pumps, water-jet air compressors; condensers; spray nozzles, humidifying plants; oil burning plants for stationary boilers and for steamships; smoke burning apparatus; automatic water softening plants; valves, stop check valves, balanced valves, free exhaust valves, hydraulic valves, etc., blow-off valves and swing joints; steam traps and test pumps, etc.

The Ontario Pipe Line Co., Hamilton, Ont., have awarded contracts for the pipe required to pipe Hamilton for natural gas. The order included 190,000 feet of one and two-inch pipe, 60 miles of three-inch pipe, and five miles of eight-inch pipe.

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 on these pages, and to every concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses also.

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

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

The Sapphire Corundum mine, in Peterborough county, Ont., which has been closed for some time, will, in the near future, be opened up and operated by a company composed of Peterborough and other capitalists. Mr. L. A. Morrison, Toronto, formerly manager of the mine, who is a practical mining engineer, has charge of the formation of the new company. Mr. Morrison says that the corundum in the Sapphire mine was the richest in any mine in existence. The machinery of the mine was recently sold to a Peterborough man, and is still at the mine. The prospects at present are bright for the early resumption of work upon a business-like basis.

The Perth Flax & Cordage Co., Stratford, Ont., inform us that they have completed their new factory, which they have equipped with the newest and most modern machinery obtainable for twine making, and have now one of the most complete plants in the country for the making of every description of twines, cords, fish lines, plow lines, etc., from flax, jute and hemp, polished, unpolished, dyed and bleached. They are also well equipped in the matter of putting up the twine and do this in either balls, hanks, coils or on paper spools, and in any weight of package required.

The W. A. Dunn Lumber Co., Ottawa, have changed their name to the W. Booth Lumber Co.

The Vehicle Trade Publishers, Limited, Toronto, have been incorporated with a capital of \$50,000, to carry on a publishing business, etc. The provisional directors include P. G. Van Vleet, J. S. Murray and E. M. Wilcox, Toronto.

The Locomotive & Machine Co., Montreal, are building a 4-wheel saddle tank locomotive for the International Harvester Co., Hamilton, Ont.

The Welsh Tanning Co., Hastings, Ont., have been incorporated with a capital of \$200,000, to carry on a general tanning business, etc. The provisional directors include J. Welsh, and T. H. Quigley, Hastings, and J. A. McGrail, Ottawa.

The Rainy River International Telephone Co., Rainy River, Ont., have been incorporated with a capital of \$50,000, to carry on the business of a telephone company. The provisional directors include D. Robertson, J. A. Mathieu and P. T. Roberts, Rainy River.

The McClary Mfg. Co., London, Ont., will enlarge their works by the erection of a building 240x100 feet.

The London, Ont., post office building will be enlarged at a cost of \$20,000.

A household science building will be erected in connection with the Toronto University at a cost of about \$80,000.

The International Stock Food Co., Toronto, have purchased a site upon which they will erect a new factory.

S. Luke, Bradford, Ont., will install new machinery in his flour mill.

Messrs. Stuart Bros., Mitchell, Ont., are erecting another flour mill of 150 barrels capacity at New Hamburg, Ont. The new plant will be operated by both steam and water power. The equipment was furnished by the Stratford Mill Building Co., Stratford, Ont.

The Campbell Milling Co., Toronto Junction, Ont., are remodeling and overhauling their mill. Additional rolls are being put in and four large size gyrators are being installed, also new dust collectors and other machinery.

W. H. Meldrum, Fenelon Falls, Ont., has been remodeling his mill and increasing the capacity to 125 barrels a day. New machinery, including a scroll machine and a double Thompson purifier, has been installed.

The Central Press Agency, Toronto, have purchased the property now occupied by the Wrought Iron Range Co., to which they will make extensive improvements.

The Allis-Chalmers Bullock Co., Montreal, have prepared plans for the Keewatin Flour Mills Co.'s 3,500 barrel flour mill to be erected at Keewatin, Ont. A 1,000,000 bushel elevator will also be built.

The Stratford Mill Building Co., Stratford, Ont., have installed sifters and other machinery in J. Hamilton & Son's mill at Shelburne, Ont.

The East Templeton Lumber Co., Brockville, Ont., have been incorporated with a capital of \$300,000, to manufacture lumber, furniture, etc. The provisional directors include W. C. McLaren, Brockville, J. E. Vallillec, Buckingham, Que., and J. F. Orde, Ottawa.

An American Syndicate are negotiating with the town council of Peterborough, Ont., for the establishment of steel car works there. For further information apply to the Mayor of Peterborough.

The American Appraisal Co., with offices in Toronto, Montreal, and other Canadian manufacturing centres report a rapid growth of their Canadian trade. This company

stands at the head in this line of work and have made appraisals for many leading Canadian concerns.

The Imperial Construction Co., Toronto, have been incorporated with a capital of \$40,000, to carry on a general contracting business, etc. The provisional directors include H. W. Middlemist, H. L. Dunn and A. D. Crooks, Toronto.

The John Knox Co., Hamilton, Ont., have been incorporated with a capital of \$200,000, to manufacture smallwares, etc. The provisional directors include J. Knox, D. McMurtrie and A. Finlayson, Hamilton.

Superintendent Ripley of St. Mary's Falls canal has completed the figures showing the traffic through the American and Canadian canals for the month of October. They show an increase for this month over October, 1903, of 1,097,934 tons, the figures for 1903, east and west bound combined being 4,475,956 tons, and for 1904, 5,573,909 tons.

The Fair buildings at Port Perry, Ont., were destroyed by fire November 6. Loss about \$6,000.

The Windsor Gas Co., Windsor, Ont., have been incorporated with a capital of \$200,000, to manufacture and supply gas to the city of Windsor and the town of Walkerville, Ont. The provisional directors include S. A. King, W. C. Kennedy, Windsor, and I. C. Baxter, Detroit, Mich.

The Toronto Cast Stone & Concrete Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture cements, lime, artificial stone, etc. The provisional directors include J. R. Marshall, A. Nelson and W. R. Payne, Toronto.

The Canada Machinery Co., Point Edward, Ont., have been incorporated with a capital of \$100,000, to manufacture machinery, tools, etc. The provisional directors include D. Milne, Thos. Kenny and J. H. Kittermaster, Sarnia.

The Sylvester Mfg. Co., Lindsay, Ont., have recently equipped their large implement factory with Chapman double ball bearings.

The King Suspender Co., Ltd., Toronto., have been incorporated with a capital of \$40,000, to manufacture clothing, etc., and to acquire the business of the King Suspender Co. The provisional directors include A. McL. Macdonell, T. H. Barton and F. D. Byers, Toronto.

Messrs. J. Walshaw & Son have equipped their new woolen mill at Bolton, Ont., with Chapman double ball bearings.

Messrs. P. Koch and J. Weill, Paris, France, representing the Compagnie General des Produits Metallurgiques de France, were in Ottawa a few days ago with regard to prospects of a market for the manufacture of steel and steel products. The company which they represent have large factories in the south of France and they would extend their business to Canada if the outlook seemed favorable.

While excavating for the new foundation of No. 3 water works engine at Toronto, the workmen found imbedded in the old foundation a barrel of cement, which had been deposited there for 14 years. When the barrel was broken up it was found that the cement had become as hard as the best quality of limestone.

The Acme Lathe & Product Co., Manchester, England, will establish a branch works in Toronto with Mr. E. D. Cleghorn as managing director. Mr. Wayland Williams is the Montreal representative of this firm.

The permanent masonry dam for the Toronto & Niagara Power Co. at Niagara Falls, Ont., has been completed.

Messrs. Jas. Bain & Son, Hamilton, Ont., have installed Chapman double ball bearings in the new canning factory recently erected by E. D. Smith at Winona, Ont.

The wardens of the counties of Waterloo and Oxford will meet at Galt, Ont., this week to discuss the erection of a joint sanitarium for tuberculosis.

Mineral paint in paying quantities has been discovered on the premises of Alfred Cooper, near Fort William, Ont. The location of the paint bed is in the Slate River district, and experts who have examined the article pronounce it to be first class.

Messrs. Watt Bros., Gananoque, Ont., are equipping their new machine shop with Chapman double ball bearings.

The Owen Sound Iron Works Co., Owen Sound, Ont., have secured the contract for the construction of two wash mills for the Superior Cement Co. at Orangeville, Ont.

The Parks and Exhibition Committee of the Toronto City Council have approved of the proposed expenditure of \$300,000 for the erection of new buildings on the exhibition grounds, this city, and a by-law will be submitted to the ratepayers to raise the amount.

The Chapman Double Ball Bearing Co. of Canada, have recently equipped the line shafting in R. A. Sabiston's blanket factory, Toronto.

The Levy, Weston & McLean Machinery Co., Toronto, have received an order from New Ontario for engine and boiler and a saw mill equipment.

The Durant-Dort Carriage Co., a United States firm will establish their Canadian works at Sarnia, Ont.

T. E. O'Brien's grist mill at McIntosh Mills, Ont., was destroyed by fire November 10. Loss about \$20,000.

Messrs. R. G. McLean & Co. have recently installed the Chapman double ball bearings on the shafting in their printing office, Toronto.

Wm. M. Drader's stove and heading factory at Chatham, Ont., were destroyed by fire November 10. Loss about \$20,000.

W. G. Field's pump factory at Guelph, Ont., was destroyed by fire November 10. Loss about \$3,000.

G. A. Proctor, Sarnia, Ont., has been awarded the contract for the erection of a drill hall at Chatham, Ont., at a cost of \$60,000.

Messrs. Beardmore & Co., are building a large addition to their present tannery at Acton, Ont. The Chapman Double Ball Bearing Co. of Canada are equipping them throughout with their ball bearings.

The Woodstock Wagon Mfg. Co., Woodstock, Ont., have made arrangements with the Frost & Wood Co., Smith's Falls, Ont., whereby the latter firm will handle the out-

put of the Woodstock concern for Ontario and the Lower provinces.

Messrs. Nagle & Mills, Ingersoll, Ont., have been awarded the contract for the erection of the Woodstock armory.

Messrs. Duncan, Dunfield & Wilkinson, Petrolia, Ont., have struck a large oil gusher in Moore township.

The Chapman Double Ball Bearing Co., Toronto, have now installed their bearings in over fifty Canadian factories. Among the recent installations are the following:--Gutta Percha & Rubber Co., Toronto, Kerr Milling Co., Dundas, Ont., A. A. McFall, Bolton, Ont., Harris & Co., Rockwood, Ont., Benjamin Mfg. Co., Yarker, Ont., and Berlin Furniture Co., Berlin, Ont.

The Uxbridge Piano Co., Uxbridge, Ont., are negotiating with the town of Brooke, Ont., for the establishment of their piano works there.

The Gould Storage Battery Co., Depew, N.Y., have just installed for the Preston & Berlin Street Railway Co., Galt, Ont., a storage battery of the latest and most approved type at a cost of about \$10,000. The battery is a 230-cell one, the size of the elements being 13 plates 10½x10½ inches, which will give a line voltage of 480 volts normal load, or a capacity of 250 h.p. per hour.

The Brantford Electric & Operating Co. are applying to the city of Brantford, Ont., for a ten years' franchise for installing an alternating and closed arc system of lighting in that city at a cost of \$15,000.

F. H. Clergue and associates will build a coking plant at Sault Ste. Marie, Ont., that will consume about half a million tons of coal annually.

The Canadian Pacific Railway Co. are installing an electric crane in their shops at Galt, Ont., for the handling of heavy machinery.

The work of the Electrical Development Co. at Niagara Falls, Ont., is proceeding with great activity, but they will not be in a position to generate power at the Falls until after the completion of the cables and necessary apparatus for transmitting the energy.

The Clifton House Hotel Co., recently incorporated for the purpose of erecting a large hotel at Niagara Falls, Ont., at a cost of \$500,000, will proceed with construction work at once.

The dam at Ragged Rapids on the Severn River, a few miles from Orillia, Ont., which was destroyed a few months ago, has been rebuilt and power is now being supplied to that town.

Messrs. Osler & Hammond, Toronto, will erect a large office building in this city.

The Star Printing Co., Toronto, have purchased the property known as the North of Scotland Chambers, where they will erect a new office building.

A by-law has been passed at Toronto, authorizing the committee of the Island Club house to raise an amount sufficient to rebuild the club-house which was destroyed by fire recently.

The Canadian Westinghouse Co., Hamilton, Ont., have sold to the Granby Consolidated Mining, Smelting & Power Co. an electric locomotive to replace the steam locomotive

for the haulage of ore from the Ironside mine to the rock breaker.

The Bertram Engine Works Co., Toronto, have completed three large locomotive boilers, 5½ feet diameter, and 23 feet long, for a steam pressure of 180 pounds to the square inch, for the Canada Atlantic Railway Co.

The James Bay Railway Co., Toronto, have invited tenders for 200 flat cars, 60,000 pounds, four cabooses, and five 10-wheel locomotives.

The Intercolonial Railway Co. have placed the following orders for equipment: 10 first-class cars and 100 platform cars from Rhodes, Curry & Co., Amherst, N.S.; four second-class sleeping cars, four postal cars, four baggage cars, four parlor cars, and 50 box cars from the Crossen Car Mfg. Co., Cobourg, Ont.

An invention in the way of a railway appliance was given a successful test on the Niagara, St. Catharines & Toronto Railway between St. Catharines, Ont., and Niagara Falls, Ont. The appliance, which is very simple in its construction, was the invention of Mr. J. Doyle, Niagara Falls. It is an automatic brake, which is fitted to the sides of the locomotive, and is aimed to prevent engineers from running their trains past closed semaphores. The brake opens the air valve and applies the brakes, and at the same time shuts off the steam. It is applied by means of a "trip" set beside the track a short distance outside the semaphore. This trip strikes a projection on the brake on the engine and the brake acts immediately. If the semaphore is up or open the trip does not strike the brake projection, as the trip is regulated by the semaphore, being connected with it.

Messrs. Ford & Greer's saw mill at Stoneleigh, Ont., was destroyed by fire recently.

The Polson Iron Works Co., Toronto, have commenced the construction of a hydraulic suction dredge for the Dominion Government. The dredge is being constructed on similar lines, and will be practically the same size as the J. Israel Tarte, which was built at the Polson works in 1902. The hull is expected to be ready for launching before ice forms and the dredge will be completed ready for work in the spring.

Capt. P. McGlade will build a steamer at Kingston, Ont., to run between Kingston, Ganouque, Ont., and possibly Clayton, N.Y.

The Minister of Marine has given instructions that buoys, lights and other aids to navigation on the upper lakes and Georgian bay are to be maintained in operation until the middle of December.

If the ice-breaking steamers on the St. Lawrence River and gulf are successful in keeping an open waterway there one or more will be built for use on the upper lakes.

Capt. A. E. Foster, Smith's Falls, Ont., will have a new steamer built for the Rideau Lakes trade.

W. Thompson, Orillia, Ont., has placed an order with Davis & Sons, Kingston, Ont., for a steamer 82 feet long and 16 feet beam.

The Canadian Pacific Railway Co. have placed the following orders for new equipment: 20 freight locomotives from the American Locomotive Co.'s Schenectady works; 20 switching locomotives, four colonist cars, two first-class cars, two baggage cars, 14

snow plows, 170 box cars, 27 stock cars, 138 flat cars, and 12 flangers, at their Angus shops; and 34 vans at their Farnham, Que., shops.

The Quebec Electric Co. are about to let contracts for the construction of a large water power plant at St. Anne and Seven Falls, Que. The construction of the dams necessary and the foundation work in connection with the power houses at each of the falls will be commenced with the least possible delay. Water will be taken from Seven Falls at 374 feet. The two falls will develop, at low water, between 22,000 and 25,000 h.p.

The Locomotive & Machine Co., Montreal, are building 11 locomotives for the Canadian Pacific Railway, 10 for the Grand Trunk Railway, and two for the Halifax & South-western Railway.

The International Bolt Co., Montreal, have been incorporated with a capital of \$100,000, to manufacture bolts, hardware, etc. The provisional directors include H. L. Dinning, LaSalle, Que.; Wm. Eckenstein and C. A. Duclos, Montreal.

The Eastern Townships Bank are erecting new bank buildings at Coaticook and Rock Island, Que., at a cost of about \$50,000.

The Grand Trunk Railway Co., have completed a new station at Coaticook, Que., at a cost of \$10,000.

The American Axe & Tool Co., Glassport, Pa., who have an office in Montreal, will establish branch works in Canada.

Hon. J. D. Rolland, president of the Rolland Paper Co., Montreal, and also of the Northern Colonization Railway, reports that as a result of the construction of that railway through the country north of Montreal, 15 large pulp and lumber mills have been established along the line.

The Locomotive & Machine Co., Montreal, have appropriated \$100,000 to build an hotel at their works to accommodate about 75 men.

The following are the patents recently secured through the agency of Messrs. Marion & Marion, patent attorneys, Montreal and Washington, D.C.:—E. Renaud, Montreal, railway signal system, C. de Kando, Budapest Hungary, overhead trolley wire systems; A. Poirier, Normandin, Lake St. John, Que., clover hulling machine, L. Boudrais, Montreal shears; Messrs. Bleyne & Ducouso, Paris, France, electric inter-locking switch and signal system, S. Beauregard, Montreal, nail making machine; A. D. Leblanc, Montreal, handle for carpenter's brace.

The Standard Shirt Mfg. Co., Limited, Montreal, have been incorporated with a capital of \$1,000,000, to acquire the business of the Standard Shirt Co., and to manufacture shirts, collars, etc. The provisional directors include D. Yuile, C. B. Gordon and W. Y. King, Montreal.

The Lilley & Cameron Cartage Co., Limited, Montreal have been incorporated with a capital of \$50,000, to manufacture wagons, carts, etc., and to acquire the business of the Lilley & Cameron Cartage Co. The provisional directors include R. A. Brock, J. J. Riley and K. Cameron, Montreal.

The Robb Engineering Co., Amherst, N.S., have about completed the erection of an addition to their machine shop. The market for the products of this company is extending and is not confined to the Do-

minion. Several large orders have lately been received from foreign countries. Among the recent contracts are one from San Francisco for a 150 h.p. Robb-Mumford boiler, one from a paper mill in New York State for two large boilers, one from a tannery, at Salem, Mass., and another order for a boiler from Springfield, Mass.

The Eastern Portland Cement Co., Halifax, N.S., have been incorporated with a capital of \$300,000, to manufacture Portland cement, etc. The provisional directors include S. M. Brookfield, W. H. Brookfield and W. G. Brookfield, Halifax.

The Eastern Canada Reduction Co., Halifax, N.S., have been incorporated with a capital of \$500,000. The charter members include H. Sanders, J. C. Mahon and G. E. Kingsley, Halifax.

The Century Light Co. of Eastern Canada, Halifax, N.S., have been incorporated with a capital of \$200,000. The charter members include S. H. Holmes, L. J. Mylius and C. D. McAlpine, Halifax.

The Sutherland Rifle Sight Co., Westville, N.S., have been incorporated with a capital of \$100,000.

The plant of the Westlake Gold Mining Co. at Mount Uniacke, N.S., was recently destroyed by fire. Loss about \$10,000.

Messrs. Rhodes, Curry & Co., Amherst, N.S., have received a contract from the Dominion Government for building a station at Pictou and another at Antigonish, N.S., to cost \$40,000 and \$12,000 respectively.

The Copper Crown Smelting Works at Pictou, N.S., which have been closed for some time will be enlarged and put in operation shortly.

The Moneton Pasteurized Milk Co., Lewisville, N.B., have been incorporated with a capital of \$15,000, to manufacture condensed and pasteurized milk. The provisional directors include G. R. Jones, C. L. Jones and F. C. Jones, Lewisville.

The Department of Public Works, Fredericton, N.B., are inviting tenders for the erection of Tootleton wharf at Kars, N.B.

Messrs. Jas. A. Tufts & Son, Ltd., St. John, N.B., have been incorporated with a capital of \$25,000, to manufacture stationery, fancy goods, etc., and to acquire the business of J. A. Tufts & Son. The provisional directors include J. A. Tufts, F. L. Tufts and M. H. Dunlop, St. John.

The St. John Times Printing & Publishing Co., St. John, N.B., have been incorporated with a capital of \$100,000, to carry on a printing and publishing business. The provisional directors include J. Russell, W. H. Murray and J. E. Moore, St. John.

The Imperial Wine & Spirit Co., Hampton, N.B., have been incorporated with a capital of \$25,000, to manufacture wines, tobaccos, etc. The provisional directors include D. A. McLeod, W. A. Cathers and Jas. McCarthy, St. John.

The town of Pincher Creek, N.W.T., will install a waterworks system. The water will be brought from a canyon two and a half miles away from the town.

The Winnipeg, Man., city clerk, is inviting tenders for the supply of 42,300 feet of sewer pipe.

The Anglo-Canadian Elevator Co., are building elevators having a capacity of 50,000

bushels each, at Drinkwater, Milestone and Borham, N.W.T.

H. F. Compton has taken over the mill and elevator recently purchased at Headingly, Man., and will put the plant in operation.

The Guide Co., Winnipeg, Man., have been incorporated with a capital of \$25,000, to carry on a publishing and book binding business. The provisional directors include G. N. Morang, Toronto, J. Stovel and A. M. Nanton, Winnipeg.

The Manitoba Iron Works, Winnipeg, Man., report a very busy season during the past summer, in which they have in addition to their regular large business in boilers, engines, sawmill and elevator machinery and general foundry work, supplied the structural steel and cast iron work to the following buildings: Occidental hotel, Wilson block, Zion church, Young Liberal club, Dominion Express stables Pulford block, Steel Furniture Co., Avenue block, Ashdown's improvements, Miller & Morse block, Allman block, Hood block, North Fire Hall, Bell Telephone building, Winnipeg; St. Norbert block, St. Boniface, Man.; Hudson's Bay block, Empire block, Bank of Commerce building, Edmonton, N.W.T.; Central school, Calgary, N.W.T.; waterworks, Moose Jaw, N.W.T.; court house, Morden, Man., Bank of Commerce building, Oddfellows' block, Canadian Northern Railway station, Portage la Prairie, Man.; and smaller amounts to many other buildings in Winnipeg and outside towns.

The Miller-Morse Hardware Co., Winnipeg, Man., have been incorporated with a capital of \$1,000,000, to manufacture hardware, plumbers' supplies, machinery, etc. The provisional directors include H. Miller, F. W. Morse and F. M. Morse, Winnipeg.

Mr. T. M. Kirkwood's iron rolling mill at Winnipeg, Man., is about completed and will be in operation in a few days. He will manufacture all kinds of steel and iron supplies for railways, etc.

The asphalt plant owned by the city of Winnipeg, Man., was destroyed by fire November 6. Loss about \$20,000.

The Alberta Hotel at Cardston Centre, N.W.T., was destroyed by fire November 5. Loss about \$20,000.

The Northern Elevator Co., Winnipeg, Man., will erect a large grain elevator at Fort Rouge, Man.

The St. Andrew's Society, Winnipeg, Man., will erect a new building at a cost of about \$20,000.

Messrs. Armstrong, Morrison & Co., Vancouver, B.C., will erect a plant in that city for the manufacture of cement blocks and bricks for building purposes.

Preparations are being made for the establishment of zinc-enriching works at Rosebery, on Slovan Lake, B.C. A contract has been let for the erection of the buildings, which are to be completed within four months.

Announcement has been made that during the winter a stamp mill will be erected by the Great Northern Mines Co. at Poplar Creek, B.C., to treat the gold ores of the Lucky Jack and Swede group properties.

The last generator of the installation of the Vancouver Power Co., on the original contract for three 1,500 k.w. (2,000 h.p.) has just been delivered and is being placed

in position. The three-mile tunnel of the company from Coquitlam River to Trout Lake, B.C., is nearing completion.

Mr. E. H. Thurston, owner of the Carmi, on the west fork of the Kettle River, B.C., has installed a stamp mill and concentrator at this mine.

Contracts have been let for cutting a right-of-way for a tramway from the Sullivan mine to the railway at Kimberley, B.C. Operations are to be resumed at the mine, which is stated to have about 300,000 tons of ore in sight, as soon as the roasters at the new smelter, now approaching completion, shall be ready to receive it.

The Ellwood Tinworkers Gold Mining Co., owning the Silver Dollar mine, near Camborne, B.C., will install a compressor plant on that property.

The Kootenay Ore Co., Kaslo, B.C., have commenced the erection of an addition 100x80 feet to their works, in which will be installed machinery for zinc separation.

The Britannia Copper Syndicate, Howe Sound, B.C., of which Mr. G. H. Robinson is managing director, are engaged in installing their aerial tramway and mining buildings. They are developing a water power and will have available 500 h.p. under an effective head of 1,000 feet. They have contracted with the Pelton Water Wheel Co., San Francisco, for Pelton type wheels and have purchased from the Canadian Westinghouse Co., Hamilton, Ont., three-phase alternating current generators to be direct connected to the Pelton wheels. This involves two 200 k.w. 6,600 volt generators. They have also purchased ten induction motors, the largest of which is 150 h.p. to be installed at the mine three miles from the power house, which drives a compressor. The Hinton Electric Co. are the contractors for the erection of the transmission line and machinery. Mr. W. Meredith, who is consulting engineer of the Vancouver Power Co., is retained as electrical consulting engineer.

The Canadian Oil Co. will erect a new warehouse at Nelson, B.C.

The tramway and buildings at the Chapleau Mine, Slovan, B.C., which were recently destroyed by fire will be rebuilt.

The Perry Creek Hydraulic Mining Co. have completed the work of installing an important plant at Perry Creek, East Kootenay, B.C., by which the stream has been diverted from its course into a flume, 4x4 feet, and carried a distance of about four and a half miles with a fall of approximately 600 feet. It is now proposed to work the creek bed which has been systematically prospected. The company have expended \$100,000 on the work to the present time.

About 40 men are employed at construction work at the Sullivan Mining Co.'s smelter at Marysville, B.C., which is being pushed on towards completion. It is stated that an aerial tramway from the Sullivan Group mine to the smelter will be built shortly.

The Laurie Lumber Co.'s mill at Marysville, B.C., was destroyed by fire recently. Loss about \$5,000.

The Ladysmith Iron & Stove Works Co., Ladysmith, B.C., have been incorporated with a capital of \$50,000, to acquire the business of the Ladysmith Iron Works and to manufacture machinery, stoves, etc.

The following is a description of the recently completed concentrator at the Alice mine, Creston, B.C.: The mill is connected with the mine by an automatic tramway, which dumps the ore into the upper ore bin. The ore is first passed through a 10x7 inch Blake rock crusher from which it falls into a lower bin. From here it is fed by a Gates feeder into the coarse rolls, where its size is reduced. Then it is taken to the elevator, which elevates it to the top of the mill. From there it is fed into a series of three trommels, where it is sized for the jigs. There are two double three and two double two compartment jigs. The middlings from the jigs are crushed by two more sets of rolls and again elevated to the trommels. The undersize from the last trommel passes through the classifier, which supplies the zinc jig, and then through three spitzkasten, which in turn supply three Overstrom tables. The concentrates from the jigs are collected in bins on the lower floor and those from the tables in a separate bin, which is also located on the lower floor. From these bins the concentrates are loaded in bulk on the cars for shipment to the smelter. The mill is provided with an Ames 1.4x18 automatic engine, which is supplied with steam from a 192x66 horizontal return tubular boiler, in which steam is kept up using wood. There is also a Webster feed water heater which heats water for the boiler, which water is pumped from the heater to the boiler by a Knowles feed pump. The mill and its equipment are very complete and are doing effective work.

The capacity of the Oyster-Criterion mill at Camborne, B.C., will be increased by the installation of ten additional stamps.

Two tugs are under construction at Vancouver, B.C., one 60 feet long for sea service, and the second 45 feet long for river work.

If experiments now being made with the concrete superstructure for the piers along the government ship canal at Sault Ste. Marie, prove satisfactory it is probable that in the future the piers will be made of concrete above the water line as fast as repairs are made. The estimated cost of the work is about \$20 per foot and as there are about three miles of piers altogether the cost would figure something over \$300,000. Another improvement that will be begun at Sault Ste. Marie as soon as the rivers and harbors bill passes will be the widening of the ship canal above the locks. This has long been needed and the cofferdam has already been constructed so that it will be possible to start the work as soon as the money is forthcoming. The widening of the canal will do away with much of the current occasioned by the filling of the locks and will give more room for vessels. The building of so many big boats of late and the prospect of more in the future makes the improvement imperative.—Marine Review.

Steel furniture is to be installed in all the cruisers and battleships of the United States Navy. The use of such furniture is extending in financial institutions, courthouses, government departments, libraries and business offices—in fact, in every place where valuable publications or papers must be guarded as effectively as possible from fire. Record cases tables, counters, desks, wardrobes, etc., are now made in steel, and in some recent experiences, in which so-called fireproof buildings

were damaged through the ignition from the intense heat of their inflammable contents, demonstrated that non-combustible furniture is essential to rendering a building practically proof against damage or destruction by fire.

The C. W. Hunt Co., West New Brighton, N.Y., were notably successful at the World's Fair, two of their three exhibits securing highest awards. The Hunt industrial railway received the gold medal for narrow gauge railways, and the electric storage battery locomotive built by that company received the silver medal, being the highest award for this type of locomotive.

The increasing demand for mechanical draft continues, not only in the United States but in other countries. The power plant for the new shops of the Mexican Central Railway Co., at Aguascalientes, Mexico, contains a Sturtevant induced draft apparatus consisting of two steel plate fans, each driven by a Sturtevant vertical engine. Each fan is capable of maintaining a draft pressure in the flue connection of each boiler equal to three quarters of an inch of water when handling all the gases of combustion burning 35,000 pounds of coal per hour with a flue temperature of 600° F. The ring oiling fan bearings next to the fan are water-jacketed to prevent over heating. A counter balanced sliding damper permits either fan to be cut off from the flues or both may be operated at the same time. The engines are provided with regulating valves which automatically control the steam pressure.

ELECTRICITY.

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

Mr. Worby will erect an electric lighting plant at Sherman Falls, Que.

The city of St. Thomas, Ont., have purchased the gas, electric light and power plant of the St. Thomas Gas & Electric Light Co., at a cost of about \$196,366.

Mr. Kiscock has acquired the electric lighting plant at Paisley, Ont., and will install new machinery.

Signor Marconi, the inventor of wireless telegraphy, is thus quoted in a Washington despatch of recent date. "No matter where a British warship may be on the Atlantic ocean or in the Mediterranean, the British admiralty can communicate with it at any moment. Eighty of the British warships, including all the principal vessels of the home, the Mediterranean and the channel fleets, are equipped with my long-distance wireless apparatus. No matter where these vessels may be, they are constantly within reach of the British admiralty. The British Government is installing this system as rapidly as possible on all of its vessels. A long distance wireless communication between England and her most important fortress, Gibraltar, has been in uninterrupted service for many months, despite the fact that besides crossing the English channel the messages traverse a thousand miles of Spanish territory."

The Winnipeg General Power Co., Winnipeg, Man., have awarded a contract to the Canada Foundry Co., Toronto, for the supply of 750 steel towers, which will support the

power lines from a power station 80 miles outside of Winnipeg to the Winnipeg Street Railway & Lighting Co.

The Marconi wireless telegraph station at Cape Race, Nfld., was completed a few days ago. The Allan Line steamer Tunisian was the first ship to speak with it. The vessel remained in communication with the station nine hours. The Canadian steamer Minto tested the efficiency of the station from a point 150 miles to seaward. This was one of a series of tests maintained by the Canadian Government in the interests of the St. Lawrence route.

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 output from the Dominion Coal Co.'s collieries at Glace Bay, N.S., for the month of October shows an increase over that of September of 18,340 tons.

The steamers Siff and Alderney, left Sydney, N.S., November 8 with 5,000 tons of coal each for Montreal. This will probably be the last shipment of the season to the St. Lawrence. Shipments of coal from Nova Scotia to Montreal this season have reached the total of 1,500,000 tons.

The Lackawanna Steel Co. have found that there is a plentiful supply of gas in their plant at Stonypoint, Buffalo, N.Y., and will soon make a change in the construction department by the substitution of natural gas for coal and coke as fuel in their furnaces.

Excellent progress is being made at the new colliery, Dominion No. 6 of the Dominion Coal Co., at Glace Bay, N.S. One of the slopes is driven about 500 feet and two mining machines are in use. About 37 tons of coal per day are being raised.

The Newcastle Collieries Co. have commenced at Port Morien, N.S., the work of drilling for the six-foot or Spencer seam of coal which underlies the Gowrie seam. It will probably take over two months' boring to reach the seam, which is 800 feet below the surface. The Spencer contains about six feet of good clean coal and should everything turn out as expected a considerable impetus will be given to mining in Port Morien.

The Canadian Pacific Railway Co.'s anthracite coal mine near Banff, N.W.T., is now sufficiently developed to allow of the coal being placed on the market for sale. The coal is stated to be smokeless and particularly clean, and more efficient for domestic purposes than any of the soft coals on the local market.

A report by Dr. R. W. Ellis, of the Geological Survey, Ottawa, on the Quilchesma coal basin, in Nicola Valley, B.C., is another evidence of the wonderful extent of the mineral resources of the Pacific province. Diamond Vale, as the new field is called, is situated 46 miles to the south of Kamloops, B.C. As a result of investigations made by R. A. Johnston and himself, Dr. Ellis is of the opinion that the Quilchesma coal basin comprises about 14 square miles. From an

examination of a number of outcrops, it appears that there are at least six seams of bituminous coal, and probably a seventh. It is the intention of Vancouver and New York capitalists to develop the property immediately. Good markets for the coal will be found in the towns and cities along the line of the Canadian Pacific Railway from Revelstoke to Vancouver, B.C.

For the first time in the history of the port of Montreal the total shipments of Canadian bituminous coal by the St. Lawrence route will this season reach close to the million and a half mark. The shipments up to the end of October totalled 1,170,095 tons. The total shipments for last season were 1,061,000. The feature of the season's shipments was the replacing of the large shipments of Scotch and Welsh coal by Canadian coal. Over a million tons of the total shipments have been made by the Dominion Coal Co. to fill the large contracts with the Canadian Pacific Railway, the Grand Trunk Railway, the Montreal Light, Heat & Power Co. The Nova Scotia Steel & Coal Co. was the next largest shipper. The shipments for October included the following.—Dominion Coal Co., 141,408 tons, Nova Scotia Steel & Coal Co., 16,985, Intercolonial, 5,596 tons, Port Hastings, 3,340.

The production of coal in Canada has maintained a steady increase of tonnage for the past ten years, says Bradstreet's, during which time the output of Canadian mines has increased from 3,783,499 tons to 7,996,634 tons. For about 50 years Nova Scotia has been a producer of coal, but it is only lately that there has been any marked expansion in the production. There are now about 20 shipping companies in that province, and all of them report greatly increasing production, and it is stated on good authority that the exporting of coal to England will, before long, be a great factor in the trade. In the West there are ten coal producing companies with a capacity of 2,500,000 tons for this year, and at least five other companies are developing.

The history of mining in British Columbia, particularly that of recent years, affords a striking instance of industrial evolution. Although coal was discovered on Vancouver Island as far back as 1835, and the first gold discoveries were made in 1851, metalliferous lode mining, which has now come to be regarded as the most important industry of the country, according to a bulletin of the General Review of Mining in British Columbia, was not seriously engaged in until 1891, when the rich quartz discoveries in the Nelson, Slocan, and Rossland districts began to attract the attention of capital. The initial developments of these new fields were carried on under almost incredible difficulties; for the regions in which the discoveries were made were mountainous, heavily timbered and inaccessible. The first mines to become productive were those of the Slocan, the circumstance being attributable to the exceptionally high grade quality of the galena ores found in that district, which enabled, in many instances, the original discoverers to profitably work the properties without the assistance of capital. Thus, before railways were constructed through this district, a relatively large quantity of ore was mined and "packed" out on horseback a distance of 17 miles, through thick forests, to a point on Kootenay Lake, at a cost of from \$40 to \$45 per ton.

It was then forwarded by road and rail to smelters in the United States at a further cost of \$20 a ton. Add to this the cost of mining and treatment, and it will be admitted that only remarkably high-grade ore could stand so heavy a tax and yet admit of profitable extraction. With the completion in 1894-95 of railways—the construction of which was not unattended with engineering difficulties, having regard to the high altitude and mountainous character of the country generally—an era of active mining development on a much more extensive scale was inaugurated each year thereafter until 1898, showing an increase of output of considerably more than 100 per cent. But in 1900 and 1901 conditions were less favorable. In the former year differences occurred between capital and labor which seriously restricted operations during that season, while in 1901 the American market was practically closed to the British Columbia product, and although notwithstanding this, the output in point of tonnage was very nearly equal to the record of 1897, the depreciation in metal prices rendered, however, a comparison of values less satisfactory.

DELIVERING COAL BY TROLLEY.

Freight transportation by trolley for short distances, say 40 or 50 miles, is big in possibilities, and no feature of it is more capable of extension than that of hauling coal. A recent example of this departure is the case of the Rhode Island Co., a street car system of Providence, R.I., which has placed three coal cars in use on their line for hauling coal to big manufacturing plants in the city and in Apponaug, a suburb to which the company's tracks extend. Another car is being built to include some modifications suggested by experience with the old ones, and others will be supplied as needed. The three cars already in use have a capacity of 17 tons each, and in some features they are unique among trolley coal cars. By means of huge sides and attached chutes, coal can be discharged from either side of the track as easily as it can be unloaded from a wagon, and it can be run from the cars into an engine-room just as it is dumped from a dealers' cart.

At one of the plants supplied by this system the trolley trucks end upon a trestle, from which the coal is discharged from either side of the car, on the one hand into the engine room and on the other into the yard for a reserve supply. At some of the largest plants in the city the location and arrangement of the boiler-rooms is such that it is impossible to receive coal by this method, a long haul through narrow passageways to the rear of the buildings being necessary, and this can only be done by team. In some instances owners of factories with boiler-rooms away from the street have come to realize the advantage of having coal delivered by trolley, and have either arranged to change the location of their boilers or make way for the laying of a side track through their premises. At present only two of the coal companies are making deliveries to their customers by the new system, but it is admitted that this method of transportation is bound to grow and will probably eventually do away to a great extent with the use of teams in Providence for delivering coal to large steam users. When this traffic becomes more extensive the trolley company will arrange

to make deliveries at night, when many of the passenger cars are withdrawn from service.

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.

There is an excellent opportunity for manufacturers of candies and other sweetmeats to increase their export trade to Honduras and other Spanish-American countries. The people of these countries are as a rule very fond of sweets, and candies suitable to the market should meet with a ready sale. About the only article of the kind manufactured there is a kind of coarse brown sugar made from sugar cane which resembles maple sugar in both taste and appearance. Occasionally some of the merchants there purchase and import from New Orleans, small quantities of candies, which generally sell well. As these are not suitable for the market there they can only be imported in small quantities. What is particularly desired is hard candy which will stand the climate. English manufacturers hold the most of the trade, which is mostly in peppermint drops, conversation lozenges, etc. They pack these candies in tin boxes and glass jars. Any kind of hard candy which is pleasant and agreeable to the taste and which will not melt easily in that hot climate will meet the requirements. The custom house there makes no distinction in regard to candies of various kinds and qualities. All pay the same duty, namely, 10 cents per one half kilo (kilo equals 2.20 pounds) on the gross weight of the package, or 10 cents for a trifle more than a pound.

M. G. Buhler, Plum Coulee, Man., is in the market for choppers or grinders.

Advices from Mexico City state that plans for the extension of the Federal District Tramway Co., which concern is controlled by the London financial house of Wernher, Beit & Co., have been submitted to the Government for approval. Fully 25 miles of new road will be constructed.

The work of constructing the extensive harbor improvements at Singapore, recently submitted by Coode, Son & Matthews, London, England, will be awarded by contract.

The Transvaal Mining Co., located in the State of Sonora, Mexico, will install a 100-ton plant. It is proposed later, to increase the capacity of the mill to 1,000 tons.

The construction of an extensive paper plant is projected in South Africa. It is proposed to utilize the waste paper, rags, etc. W. A. Haygood, manager of the South African Supply Co., Cape Town, is interested in the project.

A. J. Mairaszek, manager of the Orscha Wire Works, Russia, is in the market for machinery for making wire, wire nails, welded and welded chains, shovels, forks and horse-shoe nails.

The mayor of the town of Craiova, Roumania, which is carrying out a general system of water supply and sewerage, invites manufacturers of fittings and apparatus, especially makers of lead, cast iron and stoneware pipes, ferrules and fittings for pipeage, screwdown cocks and taps, ball cocks, garden and yard hydrants (underground and with standposts), waste preventers and automatic flushing tanks, douches and shower baths, mixing cocks, bath stoves (not heated by gas), lavatories, washing stands, stoneware sinks closets and latrines, urinals, baths, iron, porcelain and stoneware slopsinks, yard and cellar gullies, greasetraps, syphons and traps, reflux cocks, and self-acting reflux valves, and other apparatus, to send their illustrated catalogues and price lists, stating the discount allowed, to the Town Waterworks Office, Serviciul alimentarei orasului cu apa, 7, Strada Fratii, Craiova, (Roumania).

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.

"Graphite Lubricants" is the title of a new catalogue describing the many famous graphite lubricants manufactured by the Joseph Dixon Crucible Co., Jersey City, N.J. The introduction deals in a general way with the growth of the graphite industry, the theory of graphite lubrication, the special advantages of flake graphite in contrast to amorphous graphite and the practical relation of graphite to the theory of lubrication. "It is a fact worthy of emphasis that bearings absolutely cannot seize or cut whenever an infinitely thin film of flake graphite coats the friction surfaces. If Dixon's Flake Graphite could do nothing else for the operator of machinery its importance in averting troubles and shut-downs and perhaps disasters due to the seizure of bearings, cannot be over-estimated." The book further describes the various lubricating graphites and graphite lubricants of the Dixon Co., including their general uses and the retail prices of the different sized packages. Among them are mentioned Dixon's Ticonderoga Flake Graphite, Special Graphite No. 635, Heavy Graphite Machine Grease, Waterproof Graphite Grease, Graphite Cup Greases, Axle Grease, Automobile and Cycle Lubricants, Handy Graphite Rope Dressing, and Graphite Pipe Joint Compound. Copies of this interesting catalogue will be sent upon request to the Joseph Dixon Crucible Co., Jersey City, N.J.

The Garvin Machine Co., New York City, have sent us a brochure having reference to their solid extended milling machine knee, in which that improvement is fully illustrated and described, and its uses shown in connection with the milling machines made by them. The company have for many years made a leading specialty of such machines, which are well known all over the world, and are especially interesting to those manufacturing automobiles, sewing machines, hardware, electrical goods, brass workers and general manufacturing.

The Trust Company Idea and its Development, by Ernest Heaton, B.A., Toronto. Price One Dollar. The first six chapters are devoted to an explanation of the Trustee Company idea and a history of its origin and development in the United States, Canada, Australia, New Zealand, England and other countries, including a brief notice of Mexico and South Africa, with a short description of the laws governing Trust Companies and official individual trustees. In the last two chapters the author compares, from an independent standpoint, the functions of Trust Companies in Canada and Australia on the one hand and the United States on the other, and summarizes the advantages which are offered by a well-managed Trust Company.

At a recent meeting of the Board of Directors of the Canadian Forestry Association, held in Ottawa, arrangements were made for the publication of a forestry journal in the interests of the Association and for the advancement of the forestry movement generally. Dr. Wm. Saunders, Professor John Macoun and Mr. E. Stewart, head of the forestry branch of the Department of Agriculture, were appointed an editorial committee and R. H. Campbell editor and business manager. The new journal will include scientific and descriptive articles relating to the Canadian forests and their management, and such other related subjects, as are of public interest.

The Hart Corundum Wheel Co., formerly the Hart Emery Wheel Co., Hamilton, Ont., have sent us their new illustrated catalogue descriptive of the many lines of abrasive machinery and goods made by them, including corundum and emery grinding wheels, paper polishing wheels, machinery for corundum and emery grinding and polishing of every description, planer knife grinders, saw filers and gummers, etc. These goods, we are told, are the result of twenty-five years of experience in building, operating and selling grinding machinery.

The B. F. Barnes Co., Rockford, Ill., have sent us their new illustrated catalogue of Twentieth Century machine tools, special reference being made to their drills, lathes, water tool grinders, etc. The book is bountifully and beautifully illustrated throughout, in which many of their specialties are shown and accurate descriptions given.

The Canadian Westinghouse Co., Hamilton, Ont., have sent us brochures having reference to their Westinghouse Type C motors for alternating current service, and to their Westinghouse Type S motors for direct current circuits, both of which are fully illustrated.

The current number of the Franklin Institute Journal, Philadelphia, contains a discussion of the Individual Operation of Machine Tools by Electric Motors which should be of much interest to all users of such tools. One of the most thorough discussions on this subject that was ever held was that before the Institute, November 15, 1900, the opening paper being read by Prof. F. B. Crocker, and discussed by quite a number of scientific men. The meeting held on February 17, 1904, was arranged by Dr. Wm. H. Wahl, secretary of the Institute, his desire being to again discuss the same subject after the great progress made through

the intervening three years. On this date the opening remarks were made by Mr. Chas. Day, and the subject again fully discussed by a number of engineers who have made a specialty of this subject. Almost every phase was touched upon by some one of those who took part in the discussion, so that this issue of the Journal contains a summary of the situation at the present time, and should certainly prove of interest to all those who have such work in contemplation.

The Berlin Machine Works, Beloit, Wis., have issued a neat booklet entitled "The Seal of Quality," in which is illustrated the various types of wood-working machinery manufactured by the company.

Messrs. E. H. Stroud & Co., represented in Canada by R. E. H. Buchner, Toronto, have issued a new catalogue "Cyclone Disintegrators and Pulverizers." This line of machinery is in use by quite a number of Canadian concerns.

The Werner Instrument Co., Beloit, Wis., have issued a catalogue on the Cut-Meter, an instrument used to indicate the speed and cut of machine tools.

Mr. James M. Swank, manager of the American Iron & Steel Association, has favored us with the annual statistical report of the American Iron and Steel Association for 1903 which will be found upon examination to embrace all the leading features of previous reports and also many new features. Special attention has been paid to the statistics of United States imports and exports of iron and steel, iron ore, coal and coke. Tables are given which show annual imports of iron and steel and also of tinplates from 1872 to 1903; also annual exports of iron and steel for the same years. The tables relating to production of pig iron have been greatly extended. Coal and coke statistics are given in great detail. Full statistics are given of Bessemer, open-hearth, crucible and miscellaneous steel castings. Tables showing the prices of Bessemer rails in the United States and in Great Britain for a long series of years, and also showing the miles of railroads in operation in the United States since 1830 and the displacement of iron rails by steel rails since 1880, will be found valuable for reference. Canadian iron and steel statistics, compiled from reports made by the manufacturers, are full and complete. The report closes with statistical tables of the world's production of iron and steel and iron ore and coal in the latest years for which statistics have been received.

The Canadian General Electric Co., Toronto, have published a small brochure in which is given a few suggestions pertaining to the selection of incandescent lamps, written by the superintendent of their lamp works, embodying many valuable points which station managers will no doubt be interested in.

Underwriter fire pumps are described in Bulletin W 114, recently issued by Henry R. Worthington, 114 Liberty Street, New York City. These pumps are designed to meet the specifications of the insurance companies and are fitted with air and vacuum chambers, relief valves, pressure gauges and the other special devices required. All rubbing parts are of composition metal to pre-

vent rusting and sticking, and the pumps differ considerably from ordinary trade pumps. The back cover of the pamphlet shows the fourteen Worthington fire pumps supplied to the Louisiana Purchase Exposition for the protection of the buildings at St. Louis, Mo. The John McDougall Caledonian Iron Works, Montreal, are Canadian agents.

Mr. R. H. Campbell, Ottawa, secretary of the Canadian Forestry Association, informs us that the Association propose to publish a journal devoted to its interests, the first issue of which will be issued in January. It will be published quarterly, and be under the management of Mr. Campbell and a committee of able assistants.

The Chicago Pneumatic Tool Co., Chicago, Ill., publish a brochure entitled "Something Pneumatic," a copy of which has reached us. It contains a large amount of useful information regarding pneumatic tools and their uses.

The Robins Conveying Belt Co., New York, have just issued Bulletin No. 10, devoted to their belt conveying machinery. The frontispiece is a wash drawing of the works of the company at Passaic, N.J., and the book is illustrated throughout with photographs of installations of conveying machinery in various parts of the country by the company. Any concern that has much conveying to do will do well to write for this catalogue.

THE STORY OF THE LEAD PENCIL.

For a number of years the Joseph Dixon Crucible Co., Jersey City, N.J., have issued a little booklet called, "The History of a Lead Pencil." In this book is told the story of how the lead gets into the pencil, as well as can be described in print. It was intended at first mainly for commercial use, and for answering some of the many questions which are daily poured into the Dixon mail bags. It was gotten out to describe the pencils, their styles, shapes and sizes, and the erasers attached to them. It tells some facts about the works, and how they came to be where they are, and also how the leads are put into the cedar, and how the pencils are stamped and finished.

To further supplement this little book, the company issued last year what is called the Dixon "Pencil Guide." This is a little larger book than "The History of a Lead Pencil," and is illustrated with drawings made with the Dixon pencils. This book is used to classify as far as possible under the heads of the different grades of pencils, just which pencils are best for certain kinds of work. The "Guide" tells how to find pencils that are used by bank clerks, bookkeepers, carpenters, conductors, entry clerks, insurance agents, metal workers, railroad companies, salesmen, stenographers, telegraphers and a great many others. It tells why they should use these particular kinds of pencils, and it explains it so that it will be clear to every one. It tells why these pencils are made in different grades, and why a pencil of a certain grade, although it is excellent for one kind of work, is utterly useless for any other kind of work to which it is not adapted. This book is having a phenomenal success, and now to further supplement it, the Dixon Co. are about to issue another booklet, called "Pencil Geography." This little book is patterned after the old style geography that was in vogue in

the schools some forty or fifty years ago. It consists of a series of questions and answers, and in it is told in a few pages the story of the materials out of which the Dixon Pencils are made, where they come from, and how they are put together. This little book is illustrated with maps and original drawings made with the Dixon Pencils, and it will be one more added to the already large library of publications which the Dixon Co. are continually issuing.

Any of these books will be sent, free of charge, to anyone who writes for them.

PERSONALS.

Mr. Dan Coyle has sold out his interests in the Paisley House, Napanee, Ont., to Mr. M. Conger, while the well-known Campbell House has been acquired by Mr. Harry Taylor, late proprietor The Dunham, Cobourg, Ont.

Mr. R. H. Campbell, secretary of the Canadian Forestry Association, has been appointed to represent that association at the Forestry Congress to be held at Washington, D.C., in January next.

The Westinghouse Electric & Mfg. Co. on November 2 entertained at their works near Pittsburg, Pa., the members of the Iron and Steel Institute, showing them through the various works during the afternoon and tendering to them a banquet in the evening. The banquet was given in the largest aisle of the works, its length being one-third of a mile. The portion of the aisle set apart for the banquet was beautifully decorated by flags of the United States and Great Britain. The lighting effect was beautiful, the Bremer lamps being strung from the ceiling, and Cooper-Hewitt lamps suspended from the sides, the latter to make possible the taking of photographs. The lounging room was provided for the convenience of the guests, where writing material and souvenir postal cards, showing interior and exterior views of the works were provided. A most unique souvenir was given to each guest, it being in the form of an induction motor small enough to permit of its being carried in the pocket. The occasion was marked as being one of the most successful. Over 600 persons joined in the festivities.

We are in receipt of the programme of the fiftieth meeting of the American Society of Mechanical Engineers which is to be held in New York City, December 6 to 9. The headquarters of the Society are at 12 West 31st Street, New York, where the professional sessions of the meetings are to be held. Messrs. Ambrose Swasy is president and F. R. Hutton secretary. Scranton, Pa., has been fixed as the place for the spring meeting of 1905.

The department of the Ontario Government which deals with forestry and colonization matters will be known as the Bureau of Forestry, Colonization and Parks. Mr. Thos. Southworth will be the chief of the new department and Mr. Geo. Yates will be secretary.

The Chrome Steel Works, formerly of Brooklyn, N.Y., are now at Chrome, N.J., to which place all correspondence should be addressed.

Kenneth Falconer has opened an office at 224 St. James Street, Montreal, and will

act as Canadian manager for Gunn, Richards & Co., New York City.

AN IMPORTANT DEAL.

Arrangements have been concluded whereby the marketing of the several well known products of the Packard Electric Co., the Crocker Wheeler Co., and Brown, Boveri & Cie., in the Dominion of Canada, will be looked after by the selling organization of the Packard Electric Co., Limited, St. Catharines, Ont., Montreal and Winnipeg, Man.

The Crocker-Wheeler Co. are manufacturers and electrical engineers with their works and main offices at Ampere, N.J. Their line of manufacture includes electric generators and motors for every industrial lighting and power purpose. They are American licensees of Brown, Boveri & Cie., of Baden, Switzerland, celebrated designers and manufacturers of alternating current apparatus, whose efforts in this field have brought the alternating current machine to a point of standardization.

The reputation for excellence earned by Crocker-Wheeler apparatus during the past fifteen years, has spread beyond the United States, and it is to better serve their increasing trade in Canada that this arrangement has been made.

AN AMERICAN CRUCIBLE WORKS.

The works of the McCullough-Dalzell Crucible Co., Pittsburg, Pa., covering three acres of land, on the banks of the Allegheny River, constitute a most interesting exhibit of an industry which is unfamiliar, in detail, to most technical men.

Crucibles are made of plumbago, clay and a few other materials, the exact formula and process of mixing constituting one of the most jealously guarded of manufacturing secrets.

The clay basis of the McCullough-Dalzell crucibles comes from Klingenberg, on the Rhine, a most picturesque, old German town, exhibiting a varied landscape of sad-looking plains, vine-covered hills and green valleys, dotted with quaint, old-world houses. A ducal castle crowns one of the heights above the river. It is here that the famous Klingenberg clay is obtained. It is mined in a very primitive way, through long tunnels penetrating the hillsides—the digging being done by manual labor almost exclusively. The government arranges, a year in advance, what the output of the mines shall be for the coming twelve months; and prayers and threats alike would have no effect upon the mine management, should the supply prove inadequate to the demand.

Each lump of clay is stamped, in the thorough German fashion, with the royal cipher of the government; and then it is packed into huge casks, for shipment down the Rhine. Enormous iron barges carry the clay to the seaboard, where it is transferred to the transatlantic freighters for its final voyage to New York, consigned to the McCullough-Dalzell Co., who are, we are told, the only crucible manufacturers who import this clay direct.

Plumbago, the most important element entering into the composition of crucibles, comes from the Island of Ceylon, in the East Indies, where the finest deposits of the so-called mineral are obtained. It occurs

in large masses having a crystalline fracture and resembles lumps of coal, with a soft, silvery sheen. Covered sheds are provided for the storage of the plumbago and the clay.

During the past summer, a new dry house was added to the McCullough-Dalzell plant to take the place of an older one, formerly occupying the same site. It is one of the most complete buildings of this kind in the world and is the scene of the first process in the making of a crucible—drying out the clay.

The dryhouse consists of a series of deep pits, flanked by enormous furnaces. The clay is transferred to these pits as required, and left, for a certain time, exposed to the heated air. Natural gas is the fuel used here and wherever else heat or steam is required throughout the works.

After the clay has thoroughly dried, it is taken to the grinding room, where it is thoroughly broken up and pulverized by grinding mills of large capacity. Then it is stored, until needed, in warm, dry bins.

The plumbago is also reduced to powder, mixed with the clay and the other ingredients of the private formula, and then transferred, by chutes, to a mixing-tub on a lower floor. Here a set of "knives" cuts, stirs and kneads the mixture into the sticky, coal-black mass which forms the potter's raw material.

Now comes the most interesting part of the process of turning plumbago and clay into pots that will resist the fierce breath of the terrible furnaces. Where heat is measured in units of a thousand degrees, only a vessel immune as the proverbial salamander would last for any length of time. Plumbago is the one substance that possesses this mysterious quality of resistance to fire.

On one floor of the works a man stands at a peculiar-looking, round table. It is the "potter's wheel" of ancient times, fitted with modern improvements and now called a "jigger." A mould is set down on the wheel and securely fastened by clamps. The potter's helper comes along, with a great, black, plastic mass of plumbago-clay and dumps it into the mould. The potter pats it and rams it "home," so that it will fit close to the sides of the mould. Then grasping a lever, he actuates a knife, which descends swiftly to the bottom of the central part of the clay and helps form the inside wall of the crucible. The potter approaches his hands perilously near to the "knife"—which is, really, a blunt, iron shaper—dextrously avoids getting mangled, and unconcernedly turns to the next lump of material, after he has, with his hands and a wet sponge, beautifully smoothed or "finished" the first crucible.

The crucible, in its mould, is then set upon a shelf to dry. After a day here, it is removed to the drying-room, where the heat is warmer and left for another day. On the third day, it is polished, the next stage carries it to the kilns, where it is burnt to the required degree of hardness. Then comes another polishing, when the crucible is considered fit for the final drying and is thence passed into the storage rooms.

In all the peregrinations of the McCullough-Dalzell crucibles—from the moulding to the final shipment—they are constantly kept under cover. Nothing hurts a crucible more, it is stated, than moisture. Crucibles exposed to dampness, skelp and break up

after a few heats The McCullough-Dalzell Crucible Co. make other specialties, in addition to their crucible output. These include stoppers, caps, phosphorizers, teeming-pots, mufflers, etc.

Not the least pleasant feature of this busy works, is the extraordinary cleanliness maintained throughout the entire establishment. Nowhere is there a speck of unnecessary dirt, and the grime distributed by the plumbago has the curious effect of polishing everything with which it comes in contact. Common pinewood takes on the aspect of rare and venerable oak, blackened and polished by centuries of use.

The comfort of the employees is not forgotten. A large building, comfortably heated by steam in cold weather, provides necessary

hot and cold baths, lockers, etc., for which there are lively rushes at the end of the day's work.

CALIFORNIA.

The Chicago & North Western Railway has issued a new publication entitled "California". It contains a beautiful colored map of the state, a list of hotels at California tourist resorts with their capacity and rates; and a most interesting series of pictures showing California's resources and attractions. The prospective visitor and settler should be in possession of a copy of this profusely illustrated folder. Sent to any address on receipt of two cents in stamps. Low rates from all points. B. H. Bennett, 2 East King St., Toronto Ont

STATISTICS OF THE CANADIAN IRON TRADE FOR 1903.

The American Iron and Steel Association have received from the manufacturers the statistics of the production of all kinds of pig iron in Canada in the calendar year 1903. They show a decrease of 54,139 gross tons, or nearly 17 per cent., as compared with 1902, but an increase of 20,442 tons as compared with 1901.

The total production in 1903 amounted to 265,418 gross tons, against 319,557 tons in 1902, 244,976 tons in 1901, and 86,090 tons in 1900. In the first half of 1903 the production was 132,930 tons and in the second half it was 132,488 tons, a decrease of 442 tons. Of the total production in 1903 exactly 247,905 tons were made with coke and 17,513



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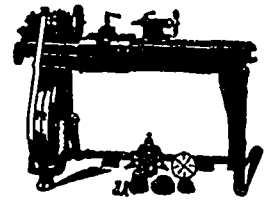


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tons with charcoal. Nearly one-half of the total production was basic pig iron, 126,892 tons. Less than 1,000 tons of Bessemer pig iron were made. Spiegeleisen and ferro-manganese have not been made since 1899.

The following table gives the total production of all kinds of pig iron (including spiegeleisen and ferro-manganese) in Canada from 1894 to 1903:

Year	Gross tons
1894	44,791
1895	37,829
1896	60,030
1897	53,796
1898	68,755
1899	94,077
1900	86,090
1901	244,976
1902	319,557
1903	265,418

On December 31, 1903, the unsold stocks of pig iron in Canada amounted to 19,168 gross tons, as compared with about 20,000 tons at the close of 1902, 59,472 tons at the close of 1901, and 12,465 tons at the close of 1900.

On December 31, 1903, Canada had 15 completed blast furnaces, of which nine were in blast and six were idle. Of this total 11 were equipped to use coke for fuel and four to use charcoal. In addition three coke furnaces and one charcoal furnace were being built or were partly erected on December 31, but work on at least two of the furnaces had been suspended for some time.

The statistics of the production of pig iron in Canada in the first six months of 1904 show a decrease as compared with either of the two halves of 1903.

The unsold pig iron held by manufacturers on June 30, 1904, amounted to 36,868 gross tons, as compared with 19,168 tons on December 31, 1903, and 13,585 tons on June 30, 1903.

During the first half of 1904 the total number of furnaces in Canada actually in blast for the whole or a part of the period was 10, of which seven used coke and three used charcoal. Of the 15 completed blast furnaces in Canada on June 30, 1904, seven were in Nova Scotia, three in Quebec, and five in Ontario.

The Association have also received from the manufacturers the statistics of the production of steel ingots and castings, and of rolled iron and steel in Canada in 1903. The total production of steel ingots and castings in Canada in 1903 was 181,514 gross tons, against 182,037 tons in 1902, a decrease of 523 tons. Almost all the open-hearth steel reported in 1902 and 1903 was made by the basic process. The direct steel castings made in 1903 amounted to 4,506 tons.

The following table gives the production of all kinds of steel ingots and castings in Canada from 1894 to 1903, in gross tons:

Year	Gross tons
1894	25,685
1895	17,000
1896	16,000
1897	18,400
1898	21,540
1899	22,000
1900	23,577
1901	26,084
1902	182,037
1903	181,514

The production of Bessemer and open-

hearth steel rails in 1903 amounted to 1,243 gross tons, against 33,950 tons in 1902. structural shapes, 1,983 tons, against 423 tons in 1902, cut nails made by rolling mills and steel works having cut-nail factories connected with their plants, 118,686 kegs of 100 pounds, against 114,685 kegs in 1902, plates and sheets, 2,450 tons, against 2,191 tons in 1902, all other finished rolled products, excluding muck and scrap bars, blooms, billets, sheet bars, and other unfinished forms, 118,541 tons, against 119,801 tons in 1902. The total quantity of all kinds of iron and steel rolled into finished forms in 1903 amounted to 129,510 gross tons, against 161,485 tons in 1902.

The following table gives the production of all kinds of iron and steel rolled into finished forms in Canada from 1895 to 1903.

Year	Gross tons
1895	66,402
1896	75,043
1897	77,021
1898	90,303
1899	110,642
1900	100,690
1901	112,007
1902	161,485
1903	129,516

On December 31, 1903, there were 18 completed rolling mills and steel works in Canada, one building steel plant, and one projected rolling mill. Of the completed plants two were equipped for the manufacture of steel castings only, five for the manufacture of Bessemer or open-hearth steel ingots and rolled products, and 11 for the manufacture of rolled products only. The building plant

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is being equipped for the manufacture of basic open-hearth ingots only. The projected plant is to be equipped for the manufacture of skelp and bar iron, the former for use in a wrought-iron pipe plant which was put in operation in May 1, 1903.

Of the 18 completed rolling mills and steel works on December 31, 1903, three were in Nova Scotia, five in Quebec, nine in Ontario, and one in New Brunswick. The building plant is in Nova Scotia and the projected plant is in Ontario.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., have completed a new coke blast furnace at Sydney Mines, N.S. The furnace was first blown in on August 30, 1904. It is 85x17 feet, is equipped with four Roberts stoves, and has an annual capacity of about 75,000 tons of forge and basic pig iron. The furnace is also equipped with one pig iron casting machine. The company are erecting a new open-hearth steel plant at Sydney Mines, which will be equipped with four 40-gross-ton basic furnaces, of which three are to be stationary Wellman furnaces, and one is to be a tilting furnace. Ingots only will be made, for which the plant will have an annual capacity of about 60,000 gross tons.

The Halifax Rolling Mills, near Halifax,

N.S., have been dismantled. They were built in 1878, were equipped with two heating furnaces, two trains of rolls, and twenty cut-nail machines. They were formerly operated by the Halifax Rolling Mills Co., but had been idle for years.

The Montreal Steel Works, of Montreal, are now equipped with two 15-gross-ton acid open-hearth steel furnaces, a second furnace having been added in 1903. The 3,000-pound modified Bessemer converter with which the plant is also equipped, was not operated in 1903. The works produce steel castings.

The Peck Rolling Mills, Limited, have succeeded Peck, Benny & Co., Montreal. The rolling mill of the company was partly destroyed by fire in 1903, but was rebuilt in the same year.

The Iron & Steel Co., of Canada, Limited, have acquired the rolling mill at Belleville, Ont., formerly operated by the Abbot-Mitchell Iron & Steel Co. M. Wright is president, D. Jackson vice-president, and J. F. Wills managing director, secretary and treasurer.

The Toronto Bolt & Forging Co., Limited, are now the owners of the rolling mill at Sunnyside, Toronto, formerly operated by the McDonell Rolling Mills Co. George Gillies is president of the new organization, T. H.

Watson is secretary and treasurer, John Stephens is general superintendent, and C. O. Jolley is assistant superintendent.

The Page-Hersey Iron & Tube Co., Guelph, Ont., who manufacture wrought iron pipe, did not install in 1903 the two trains of rolls for the manufacture of skelp and bar iron which they proposed adding to their works. The company are now uncertain when the rolls will be added.

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The following Canadian municipalities are offering inducements to secure manufacturing establishments. Inquiries should be addressed to the Mayor, Town Clerk or Board of Trade of the respective cities:

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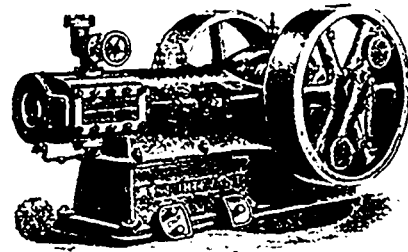
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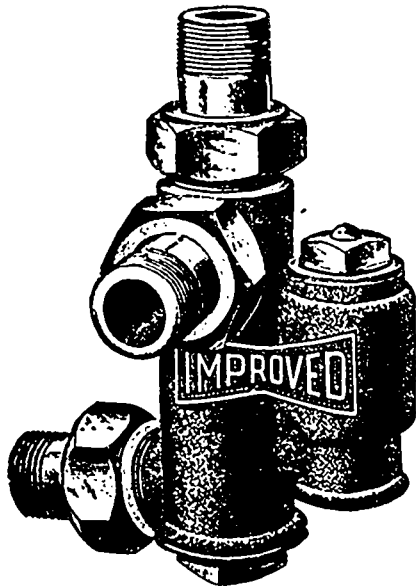
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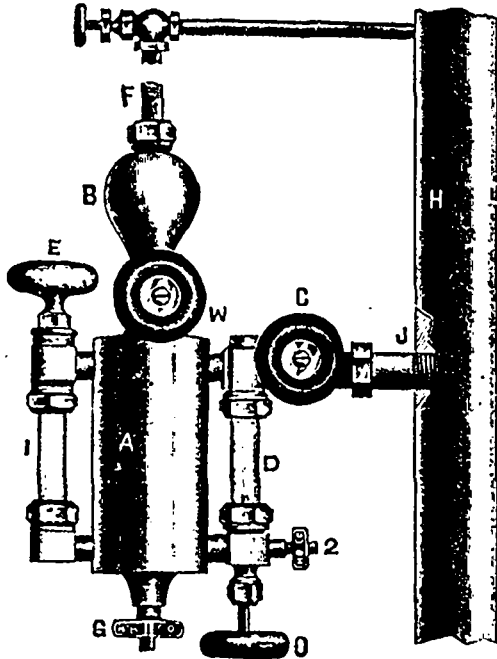
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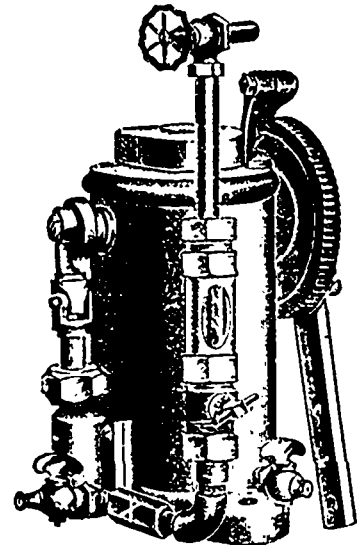
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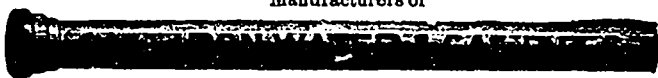
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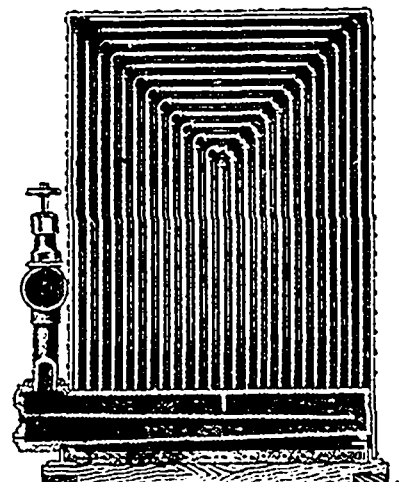
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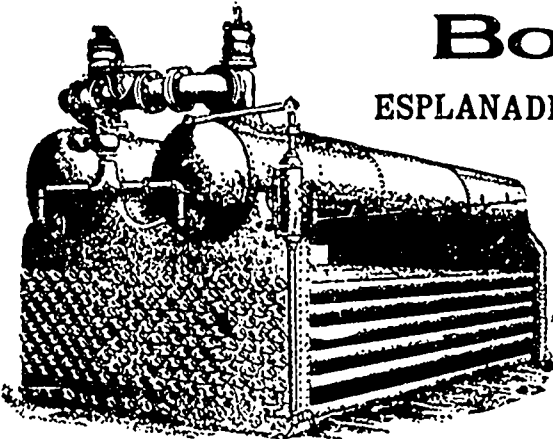
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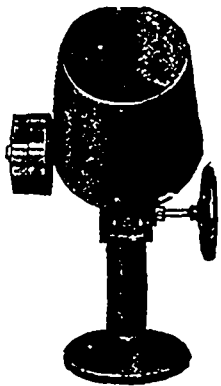
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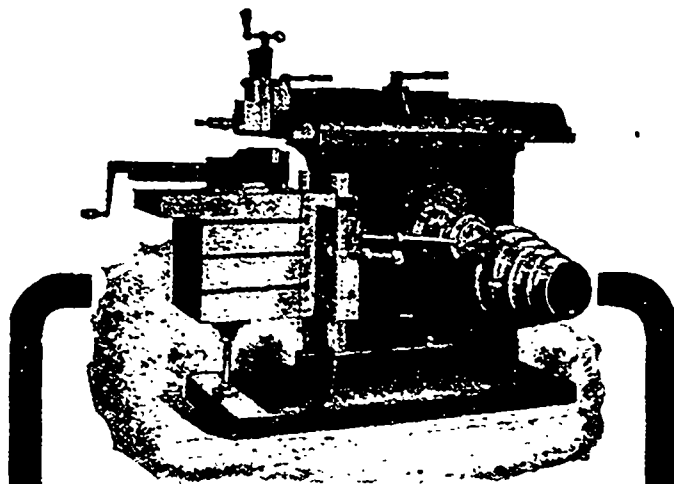


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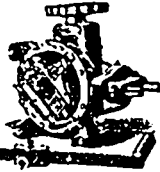
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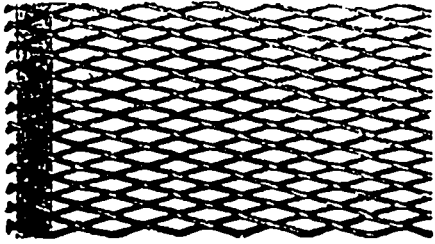
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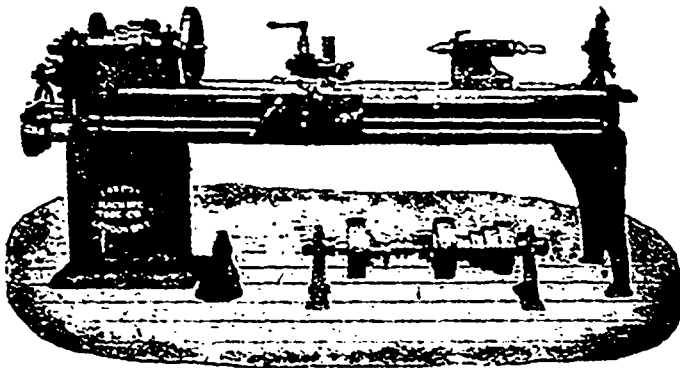
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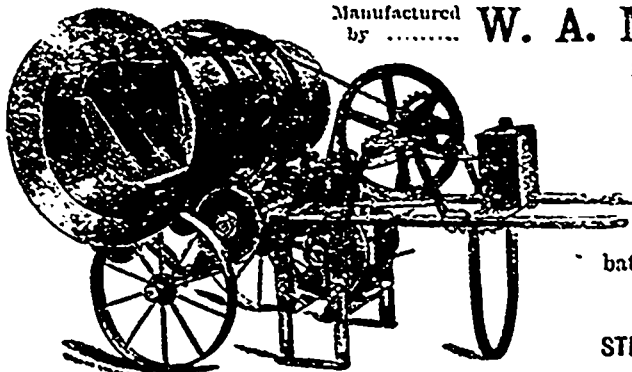
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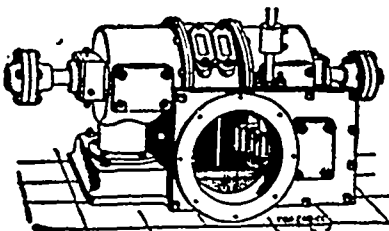
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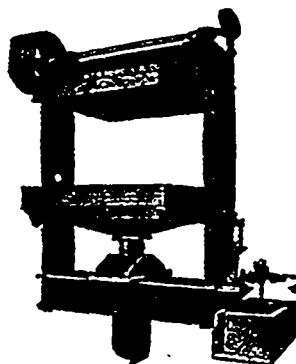
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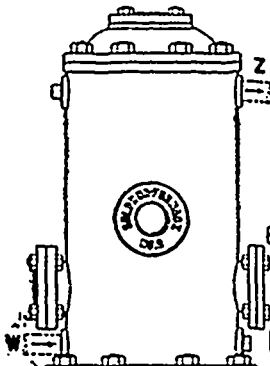
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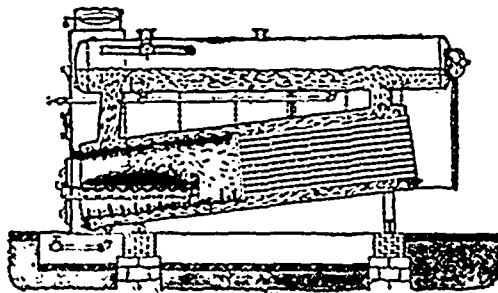
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Abrasives

Canadian Corundum Wheel Co., Hamilton, Ont.
Rice Lewis & Son, Toronto.
Williams, A. R. Machinery Co., Toronto.

Air Compressors

Allis-Chalmers-Bullock, Limited, Montreal.
American Steam Pump Co., Battle Creek, Mich.
Canada Foundry Co., Toronto.
Canadian Rand Drill Co., Sherbrooke, Que.
Corbett & B., Brooklyn, N.Y.
Darling Bros., 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

Bellhouse, Dillon & Co., Montreal.
Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Casella Color Co., New York City.
Geigy Aniline & Extract Co., New York City.
Klipstein, A. & Co., New York City.
McArthur, Cornelle & Co., 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.
Rice Lewis & Son, Toronto.

Architects

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

Axles

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

Babbitt Metal

Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
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.
Rice Lewis & Son, Toronto.

Belt Dressing

McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Rosendale Belting Co., 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.
Rosendale Belting Co., Toronto.
Williams, A. R. Machinery Co., Toronto.

Belting (Cotton)

Dominion Belting Co., Hamilton, Ont.
Fleming, W. A. & Co., Montreal.
Greay, Wm. & J. G., Toronto.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Rosendale Belting Co., Toronto.
Wilby, P. H., Toronto, Ont.

Belting (Leather)

Canadian Oak Belting Co., Brockville, Ont.
Fleming, W. A. & Co., Montreal.
Greay, Wm. & J. G., Toronto.
McLaren, D. K., Montreal and Toronto.
McLaren, J. C. Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Wilby, P. H., Toronto, Ont.
Williams, A. R. Machinery Co., Toronto.

Belting (Rubber)

Greay, Wm. & J. G., Toronto.
Gutta Percha & Rubber Mfg. Co., Toronto.
McLaren, D. K., Montreal and Toronto.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.

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Belting and Supplies

Bristol Co., Waterbury, Conn.
 Canadian Oak Belting Co., Brockville, Ont.
 Dominion Belting Co., Hamilton, Ont.
 Fleming, W. A. & Co., Montreal.
 Grey, Wm. & J. G., Toronto.
 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.
 Pittsburgh Shafting Co., Detroit, Mich.
 Rice Lewis & Son, Toronto.
 Rossendale Belting Co., Toronto.
 Wilby, P. H., Toronto.
 Williams, A. R. Machinery Co., Toronto.

Blast Furnace Brick

Dunbar Fire Brick Co., Pittsburgh, Pa.
 Hamilton Facing Mill Co., Hamilton, Ont.
 Harbison-Walker Refractories Co., Pittsburgh, Pa.
 Pennsylvania Fire Brick Co., Lock Haven, Pa.
 Pittsburgh & Buffalo Co., Buffalo, N.Y.
 Reese-Hammond Fire Brick Co., Bolivar, Pa.
 Stowe-Fuller Co., Cleveland, Ohio.
 Wynn W. H. & Co. West Decatur, Pa.

Blowers

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

Bobbins

Wilson Bros. Bobbin Co., Liverpool, England.

Boiler Compounds

Lord, Geo. W. Co., Philadelphia, Pa.
 Sleeth, D., Montreal.

Boiler Inspection

Canadian Casualty & Boiler Insurance Co., Toronto.

BOILERS (See Engines and Boilers)**Brass Founders**

Hamilton Brass Mfg. Co., Hamilton, Ont.
 Meadows, Geo. B. Wire, Iron & Brass Works Co., Toronto.
 McKinnon Dash & Metal Works Co., St. Catharines, Ont.
 Penberthy Injector Co., Windsor, Ont.

Brick and Bricklaying Machinery

Allis-Chalmers-Bullock, Limited, Montreal.

Building Iron and Steel

Bourne-Fuller Co., Cleveland, Ohio.
 Canada Foundry Co., Toronto.
 Expanded Metal & Fireproofing Co., Toronto.

Builders' Materials

Albert Mfg. Co., Hillsboro, Ont.
 Canada Foundry Co., Toronto.
 Canadian Otis Elevator Co., Toronto.
 Canadian Portland Cement Co., Deseronto, Ont.
 Expanded Metal & Fireproofing Co., Toronto.
 Gartshore, John J., Toronto.
 Hopkins, F. H. & Co., Montreal.
 Meadows, Geo. B. Wire, Iron & Brass Works, Toronto.

Metallic Roofing Co., Toronto.
 Owen Sound Portland Cement Co., Owen Sound, Ont.
 Pittsburgh & Buffalo Co., Buffalo, N.Y.
 Pittsburgh Shafting Co., Detroit, Mich.
 Rice Lewis & Son, Toronto.
 Sheldon & Sheldon, Galt, Ont.

Cables

Dominion Wire Rope Co., Montreal.
 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.

Caps

McCullough-Dalzell 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.
 Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
 Rice Lewis & Son, Toronto.
 Montreal Pipe Foundry Co., Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Castings (Iron and Brass)

Buhl Malleable Co., Detroit, Mich.
 Grey, Wm. & J. G., Toronto.
 Kerr Engine Co., Walkerville, Ont.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Cement Machinery

Allis-Chalmers-Bullock, Limited, Montreal
 Bradley Pulverizer Co., Boston, Mass.
 Grey, Wm. & J. G., Toronto.
 McDougall, John, Caledonian Iron Works Co., Montreal.

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.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Chemists

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

Clay Working Machinery

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

Coal and Coke

Alexander, John H., Windsor, Ont.
 Bourne-Fuller Co., Cleveland, Ohio.
 Brownlee, J., Galt, Ont.
 Ferguson, J. D., Hamilton, Ont.
 Hancock, J. M. & Co., Niagara Falls, N.Y.
 Hoffman, Jules G., Detroit, Mich.
 Milnes, James H. & Co., Toronto.
 Ohio & Michigan Coal Co., Detroit, Mich.
 Pittsburgh & Buffalo Co., Buffalo, N.Y.
 Pittsburgh Coal Co., Pittsburgh, Pa.
 Shawmut Coal & Coke Co., St. Mary's, Pa.
 Shepard, Charles G., Buffalo, N.Y.
 Shipman, O. W. Co., Detroit, Mich.
 Wick, H. K. & Co., Buffalo, N.Y.

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

Coil Chains

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

Coke Oven Brick

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

Collection Agency

Petrie, H. D., Hamilton, Ont.

Concrete Construction

Stevens, A. J., Toronto.

Concrete Mixers

Hopkins, F. H. & Co., Montreal
 McKelvey, W. A., Toronto.

Contractors' Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
 Carlin's, Thomas Sons Co., Allegheny, Pa.
 Gartshore, John J., Toronto.
 Hopkins, F. H. & Co., Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Sinclair, G. S. & Sons, Warton, Ont.

Contractor's Plants

Allis-Chalmers-Bullock, Limited, Montreal.
 Hopkins, F. H. & Co., Montreal.
 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.
 Borden & Selleck Co., Chicago, Ill.
 Buhl Malleable Co., Detroit, Mich.
 Canada Foundry Co., Toronto.
 Dodge Mfg. Co., Toronto.
 Grey, Wm. & J. G., Toronto.
 Jeffrey Mfg. Co., Columbus, Ohio.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Perrin, William R. & Co., Limited, Toronto.
 Pittsburgh Shafting Co., Detroit, Mich.
 Rossendale 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.

Correspondence Schools

International Correspondence Schools, Scranton, Pa., and Toronto.

Corundum

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

Covers

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

Crayons

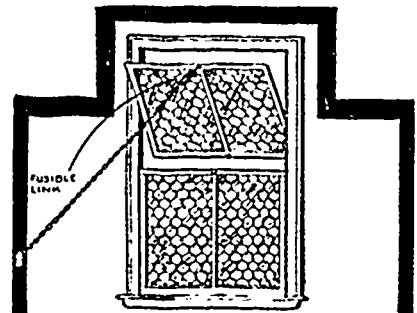
Lowell Crayon Co., Lowell, Mass.

Crucibles

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

Crucible Caps

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

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

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.

Drills

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto
Pittsburgh Shafting Co., Detroit, Mich.

Drills (Pneumatic and Rock)

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

Drills (Twist)

Cleveland Twist Drill Co., Cleveland, Ohio.
Pittsburg Shafting Co., Detroit, Mich.

Drop Forgings

Globe Machine & Stamping Co., Cleveland, Ohio.

Drop Forging Dies

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

Bellhouse, Dillon & Co., Montreal.
Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Casella Color Co., New York City.
Geigy Aniline & Extract Co., New York City.
Klipstein, A. & Co., New York City.
McArthur Cornelle & Co., 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

Volta Electric Repair Works, 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.
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.
Buhl Malleable Co., Detroit, Mich.
Canadian Otis Elevator Co., Toronto.
Greay, Wm. & J. G., Toronto.
Darling Bros., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.

Elevator Insurance

Canadian Casualty & Boiler Insurance Co., Toronto.

Emery and Emery Wheels

Canadian Corundum Wheel Co., Hamilton, Ont.
Forman, John, Montreal.
Petrie, H. W., Toronto.

Emery Grinders

Robertson Mfg. Co., Buffalo, N.Y. and Bridgeburg, Ont.

Engineers (Chemical)

Heys, Thomas & Son, Toronto.
Hunt Robert W. & Co., Chicago, Ill.

Engineers (Civil)

Delano-Osborn Engineering Co., Toronto.
Kelsch, R. S., Montreal.
Parke, R. J., Toronto.
Vogel, C. H., Ottawa.

Engineers (Consulting)

Delano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Electrical Supervision Society, Toronto.
Hunt, Robert W. & Co., Chicago, Ill.

Kelsch, R. S., Montreal.
Marion & Marion, Montreal.
Parke, R. J., Toronto.
Perrin, William R. & Co., Limited, Toronto.
Simpson, T. T., Deschenes, Que.
Vogel, C. H., Ottawa.
Volta Electric Repair Works, Toronto.
Von der Osten, E. & Co., Toronto.

Engineers (Contracting)

Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Electrical Construction Co., London, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

Engineers (Electrical)

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Delano-Osborn Engineering Co., Toronto.
Electric Engineering & Supply Co., Montreal.
Electrical Construction Co., London, Ont.
Electrical Supervision Society, Toronto.
Kelsch, R. S., Montreal.
Jones & Moore Electric Co., Toronto.
Marion & Marion, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Volta Electric Repair Works, Toronto.
Worth & Martin, Toronto.

Engineers (Mechanical)

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Borden & Sellick Co., Chicago, Ill.
Buhl Malleable Co., Detroit, Mich.
Darling Bros., Montreal.
Delano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Greay, Wm. & J. G., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.
Hunt, Robert W. & Co., Chicago, Ill.
Kelsch, R. S., Montreal.
Kerr Engine Co., Waukegan, Ont.
Marion & Marion, Montreal.
Robb Engineering Co., Amherst, N.S.
Sheldon & Sheldon, Galt, Ont.

Engineers (Mill and Hydraulic)

Buhl Malleable Co., Detroit, Mich.
Delano-Osborn Engineering Co., Toronto.
Vogel, C. H., Ottawa.

Engineers (Mining)

Buhl Malleable Co., Detroit, Mich.
Heys, Thomas & Son, Toronto.
Mills, S. D., Toronto.

Engineers (Municipal)

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

Engineers and Contractors

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

Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Bertram Engine Works Co., Toronto.
Canada Foundry Co., Toronto.
Canadian Heine Safety Boiler Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Goldie & McCullough Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Hopkins, F. H. & Co., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.

McEachren Heating & Ventilating Co., Galt, Ont.

Petrie, H. W., Toronto.
Petroleum Iron Works Co., Washington, Pa.
Pittsburgh Shafting Co., Detroit, Mich.
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

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

Factory Sites

Central Ontario Power Co., Peterboro, Ont.

Feed Water Heaters

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

Petroleum Iron Works Co., Washington Pa.

Files

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

Financial

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

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Filters (Oil)

Babcock & Wilcox, Limited, Montreal.
Burt Mfg. Co., Akron, Ohio.
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.
McDougall, John, Caledonian Iron Works Co., Montreal.

Fire Brick and Clay

Dunbar Fire Brick Co., Pittsburgh, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Habrison-Walker Refractories Co., Pittsburgh, Pa.
Pennsylvania Fire Brick Co., Lock Haven, Pa.
Pittsburgh & Buffalo Co., Buffalo, N.Y.
Reese-Hammond Fire Brick Co., Boliver, Pa.
Scioto Fire Brick Co., Sciotoville, Ohio.
Stowe-Fuller Co., Cleveland, Ohio.
Wynn, W. H. & Co., West Decatur, Pa.

Fire Escapes

Darling Bros., Montreal.
Meadows, Geo. B., Wire, Iron & Brass Works, Toronto.

Flour Mill Machinery

Goldie & McCulloch Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.

Forges and Blowers

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.
Cowan & Co., Galt, Ont.
Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
Goldie & McCullough Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Sinclair, G. S. & Sons, Warton, Ont.

Foundry Facings and Supplies

Hamilton Facing Mill Co., Hamilton, Ont.

Fuel Economizers

Babcock & Wilcox, Limited, Montreal.
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 & McCullough Co., Galt, Ont.
Morrison, T. A. & Co., Montreal.
Robertson Mfg. Co., Buffalo, N.Y. and Bridgeburg, Ont.

Gauges (Recording Pressure)

Bristol Co., Waterbury, Conn.

Gauges (Steam)

American Steam Pump Co., Battle Creek, Mich.
Penberthy 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.
Volta Electric Repair Works, Toronto.

Gloves, Mittens and Moccasins

Storey, W. H. & Son, Acton, Ont.

Glue Heaters

Advance Machinery Co., Toledo, Ohio.
Greay, Wm. & J. G., Toronto.

Glue Room Equipment

Advance Machinery Co., Toledo, Ohio.

Government Notices

Factory Inspectors.
Minister of Agriculture.

Graphite

Dixon, Jos., Crucible Co., Jersey City, N.J.
McCullough-Dalzell Crucible Co., Pittsburgh, Pa.
Pittsburg Crucible Works, Pittsburgh, Pa.

Grease Cups

Penberthy Injector Co., Windsor, Ont.

Grinding Machinery

Canadian Corundum Wheel Co., Hamilton, Ont.
Greay, Wm. & J. G., Toronto.

Grinding Pans

Carlins, Thomas Sons Co., Allegheny, Pa.

Hardware

Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Gartshore, John J., Toronto.
Globe Machine & Stamping Co., Cleveland, Ohio.
Hopkins, F. H. & Co., Montreal.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Rice Lewis & Son, Toronto.
Ryall Machine Screw Co., Montreal.
Stanyon Metallic Furniture Co., Toronto.

Heating and Ventilating Apparatus

Darling Bros., Montreal.
McEachren Heating & Ventilating Co., Galt, Ont.
Sheldon & Sheldon, Galt, Ont.
Stevens, Alfred J., Toronto.
Sturtevant, B. F. Co., Boston, Mass.

Holsting Engines

Bertram Engine Works Co., Toronto.

Hoists (Chain and Pneumatic)

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Hand 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.

Hydrants

Kerr Engine Co., Walkerville, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Accumulators

McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Machinery

Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin, William R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Wilson, J. C. & Co., Glenora, Ont.

Industrial Plants

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

Insulated Wires and Cables

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

Iron and Steel Specialties

Abbott, William, Montreal.
Armstrong Mfg. Co., Bridgeport, Conn.
Bailey-Underwood Co., New Glasgow, N. S.
Bourne-Fuller Co., Cleveland, Ohio.
Brown & Co., Paris, Ont.
Buhl Malleable Co., Detroit, Mich.
Canada Foundry Co., Toronto.
Cleveland Twist Drill Co., Cleveland, Ohio.
Leslie, A. C. & Co., Montreal.
Lysaght, John, Limited, Bristol, England and Montreal.
Meadows, Geo. B., Wire, Iron & Brass Works Co., Toronto.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.
Petroleum Iron Works Co., Washington, Pa.
Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Ryall Machine Screw Co., Montreal.
Sinclair, G. S. & Sons, Warton, Ont.

Injectors

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

Iron and Steel Inspection

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

Lamps—Electric

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

Cowdrey, C. H. Machine Works, Fitchburg, Mass.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.
Williams, A. R. & Co., Toronto.

Lathes (Wood-working)

Cowan & Son, Galt, Ont.
Goldie & McCullough Co., Galt, Ont.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Lubricators

Penberthy Injector Co., Windsor, Ont.

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Oil-Cloth, Stair Oil-Cloth, etc.

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Deposit, N.Y.

To Our Advertisers

Are your special lines mentioned in our
Classified Index?

If not, kindly inform us.

Do it now.

CLASSIFIED INDEX.

(CONTINUED).

Machinists

Bertram Engine Works Co., Toronto.
Buhl Malleable Co., Detroit, Mich.
Goldie & McCullough Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
London Machine Tool Co., London, Ont.
Worth & Martin Toronto.

Machinists' Supplies

Armstrong Mfg. Co., Bridgeport, Conn.
Buhl Malleable Co., Detroit, Mich.
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Goldie & McCullough 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.
Pittsburgh Shafting Co., Detroit, Mich.
Robertson Mfg. Co., Buffalo, N.Y. and Bridgeburg, Ont.
Ryall Machine Screw Co., Montreal.
Sinclair, G. S. & Sons, Warton, Ont.
Worth & Martin, Toronto.

Machine Tools

Abbott, William, Montreal.
Bertram, John & Sons Co., Dundas, Ont.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cowdry, C. H. Machine Works, Fitchburg, Mass.
Darling Bros., Montreal.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.
Robertson Mfg. Co., Buffalo, N.Y. and Bridgeburg, Ont.

Machinery Repairs

Bertram Engine Works Co., Toronto
Greay, Wm. & J. G., Toronto.

Malleable Iron Castings

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

Marine and Stationary Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
Bertram Engine Works Co., Toronto.

Mechanical Draft

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

Metal Stamping

Globe Machine & Stamping Co., Cleveland, Ohio.
Stanyon Metallic Furniture Co., Toronto.

Metalurgists

Mills, S. D., Toronto.

Mill Machinery and Supplies

Allis-Chalmers-Bullock, Limited, Montreal.
Armstrong Mfg. Co., Bridgeport, Conn.
Buhl Malleable Co., Detroit, Mich.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cowan & Co., Galt, Ont.
Darling Bros., Montreal.
Fleming, W. A. & Co., Montreal.
Gartshore, John J., Toronto.
Goldie & McCullough Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Gutta Percha & Rubber Mfg. Co., Toronto.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Hamilton, Wm., Mfg. Co., Peterborough, Ont.
Hay, Peter Knife Co., Galt, Ont.
Hopkins, F. H. & Co., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
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.
Penberthy Injector Co., Windsor, Ont.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Robb Engineering Co., Amherst, N.S.
Robertson Mfg. Co., Buffalo, N.Y. and Bridgeburg, Ont.

Ryall Machine Screw Co., Montreal.
Sinclair, G. S. & Sons, Warton, Ont.
Spence, R. & Co., Hamilton, Ont.
Wilson, J. C. & Co., Glenora, Ont.

Miners' Lamps

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

Mining Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Buhl Malleable Co., Detroit, Mich.
Canadian Rand Drill Co., Sherbrooke, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
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.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin, William R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
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.
Petrie, H. W., Toronto.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Volta Electric Repair Works, Toronto.

Moulding Sand

Hamilton Facing Mills Co., Hamilton, Ont.

Novelty Manufacturers

Worth & Martin, Toronto.

Nozzles

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

Office and Bank Fittings

Canadian Office & School Furniture Co., Preston, Ont.
Meadows, Geo. B., Wire, Iron & Brass Works Co., Toronto.

Oils and Lubricants

Dixon, Jos. Crucible Co., Jersey City, N.J.
Fleming, W. A. & Co., Montreal.
Hart & Co., Chicago, Ill.
Imperial Oil Co., Petrolia, Ont.
Queen City Oil Co., Toronto.

Oil Cloth

Dominion Oil Cloth Co., Montreal.

Oil Cups

Penberthy Injector Co., Windsor, Ont.

Paints and Colors

Bellhouse, Dillon & Co., Montreal.
Fleming, W. A. & Co., Montreal.
Geigy, Aniline & Extract Co., New York City
Klipstein, A. & Co., New York City.
McArthur, Cornelio & Co., Montreal.

Paper Manufacturers

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

Patents

Budden, Hanbury, A., Montreal.
Case, Egerton R., Toronto.
Fetherstonhaugh & Co., Toronto.
Marion & Marion, Montreal.

Perforated Metals

Globe Machine & Stamping Co., Cleveland, Ohio.
Greening, B. Wire Co., Hamilton, Ont.
Stanyon Metallic Furniture Co., Toronto.

Personal Accident

Canadian Casualty & Boiler Insurance Co., Toronto

Phosphorizers

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

Pig Iron

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

Pipe (Riveted, Iron and Steel)

Babcock & Wilcox, Limited, Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Petroleum Iron Works Co., Washington, Pa.

Pipe Threading Machines

Armstrong Mfg. Co., Bridgeport, Conn.
Butterfield & Co., Rock Island, Que.
Petrie, H. W., Toronto.
Rice Lewis & Son, Toronto.

Pipes and Tubes

Abbott, William, Montreal.
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
Montreal Pipe Foundry Co., Montreal.
Rice Lewis & Son, Toronto.

Plaster

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

Plates

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

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CLASSIFIED INDEX.

(CONTINUED).

Plumbago

Hamilton Facing Mills Co., Hamilton, Ont.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.

Pneumatic Tools

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.

Pointer Rolls (For Rods and Wire)

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

Portland Cement

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

Power Plants—Equipments

Allis-Chalmers-Bullock, Limited, Montreal.
Babeock & Wilcox, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Cleveland Twist Drill Co., Cleveland, Ohio.
Corbett, R. B., Brooklyn, N.Y.
Darling Bros., Montreal.
Delano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Goldie & McCullough, Galt, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Kalsch, H. S., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Packard Electric Co., St. Catharines, Ont.
Perrin, William R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Phillips, Eugene F., Electrical Works, Montreal.
Pittsburgh Shafting Co., Detroit, Mich.
Robb Engineering Co., Amherst, N.S.
Sinclair, G. S. & Sons, Warton, Ont.
Sturtevant, B. F. Co., Boston, Mass.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Wilson, J. C. & Co., Glenora, Ont.

Presses (Tile, Sewer Pipe, Nozzles and Sleeves)

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

Pulleys

Darling Bros., Montreal.
Goldie & McCullough Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
McDougall, John, Caledonian Iron Works Co., Montreal.
McLaren, J. C., Belting Co., Montreal and Toronto.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Wilson, J. C. & Co., Glenora, Ont.

Pumps and Pumping Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Canada Foundry Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Darling Bros., Montreal.
Downie Pump Co., Downieville, Pa.
Goldie & McCullough Co., Galt, Ont.
Kerr Engine Co., Walkerville, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Ontario Wind Engine & Pump Co., Toronto.
Petrie, H. W., Toronto.

Punches and Shears

Globe Machine & Stamping Co., Cleveland, Ohio.
Petrie, H. W., Toronto.

Purifiers

Babeock & Wilcox, Limited, Montreal.
Goldie & McCullough Co., Galt, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

Purifying and Softening Systems (Water)

Babeock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.

Railroads

Chicago & North-Western Ry., Toronto & St. Paul, Minn.
Quebec Central Railway, Sherbrooke, Que.

Railway Supplies

Algoma Steel Co., Sault Ste. Marie, Ont.
Allis-Chalmers-Bullock, Limited, Montreal.
Carrshore, 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.
Cleveland Twist Drill Co., Cleveland, Ohio.

Rivets

Bourne-Fuller Co., Cleveland, Ohio

Rock and Ore Crushers

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

Roller Bearings

Pittsburg Shafting Co., Detroit, Mich.

Rolling Mill Engineers

Bourne-Fuller Co., Cleveland, Ohio.

Roofing

Bourne-Fuller Co., Cleveland, Ohio.
Metallic Roofing Co., Toronto.

Rubber Goods

Gutta Percha & Rubber Mfg. Co., Toronto.
Pittsburg Shafting Co., Detroit, Mich.

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.

Safes and Vaults

Goldie & McCullough Co., Galt, Ont.

Screws

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

Screw Plates

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

Sewer Pipe

Pittsburgh & Buffalo Co., Buffalo, N.Y.

Shafting

Allis-Chalmers-Bullock, Limited, Montreal.
Bourne-Fuller Co., Cleveland, Ohio.
Goldie & McCullough Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
McDougall, John, Caledonian Iron Works Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.

Shafting Coupler

Sinclair, G. S. & Sons, Warton, Ont.

Shapers and Carvers

Advance Machinery Co., Toledo, Ohio.

Shear Knives

Carlin's, Thomas Sons Co., Allegheny, Pa.
Hay, Peter Knife Co., Galt, Ont.

Sheets (Iron and Steel)

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

Sheet Metal Goods

Globe Machine & Stamping Co., Cleveland, Ohio.
Metallic Roofing Co., Toronto.
Stanyon Metallic Furniture Co., Toronto.

Sheet Metal Stamping

Globe Machine & Stamping Co., Cleveland, Ohio.
Metallic Roofing Co., Toronto.
Ryall Machine Screw Works, Montreal.
Stanyon Metallic Furniture Co., Toronto.

Ship Builders

Bertram Engine Works Co., Toronto.
Ramage, Edward, Toronto.

Smoke Stacks

Hamilton, Wm. Mfg. Co., Peterborough, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Petroleum Iron Works Co., Washington, Pa.

Solder

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

Special Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Globe Machine & Stamping Co., Cleveland, Ohio.
Stanyon Metallic Furniture Co., Toronto.

Speed Recorders

Bristol Co., Waterbury, Conn.

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J. J. CASSIDEX, Manager.

PUBLISHED TWICE A MONTH.

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CLASSIFIED INDEX.

(CONTINUED).

Springs—Flat and Spiral
Bailey-Underwood Co., New Glasgow N. S.

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

Stamps and Stencils
Globe Machine & Stamping Co., Cleveland, Ohio.
Hamilton Stamp & Stencil Works, Hamilton, Ont.
Stanyon Metallic Furniture Co., Toronto.

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

Steam Separators
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McEachren Heating & Ventilating Co., Galt, Ont.

Steam Specialties
Darling Bros., Montreal.
McEachren Heating & Ventilating Co., Galt, Ont.
Penberthy Injector Co., Windsor, Ont.
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.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

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

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

Steel Shafting
Darling Bros., Montreal.
Goldie & McCullough Co., Galt, Ont.
Greycy, Wm. & J. G., Toronto.
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.
Pittsburg Shafting Co., Detroit, Mich.
Wilson, J. C. & Co., Glenora, Ont.

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

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

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

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

Tanks (Oil and Water)
Canada Foundry Co., Toronto.
Corbett, R. B., Brooklyn, N.Y.
Goldie & McCullough Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

Ontario Wind Engine & Pump Co., Toronto.
Petroleum Iron Works Co., Washington, Pa.

Taps and Dies
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Globe Machine & Stamping Co., Cleveland, Ohio.
Hamilton Stamp & Stencil Works, Hamilton, Ont.

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
Greycy, Wm. & J. G., Toronto.
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 Steel
Abbott, William, Montreal.
Bourne-Fuller Co., Cleveland, Ohio.
Hopkins, F. H. & Co., Montreal.
Leslie, A. C. & Co., Montreal.

Trucks
Corbett, R. B., Brooklyn, N.Y.
Greycy, Wm. & J. G., Toronto.
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.
Greycy, Wm. & J. G., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Wilson, J. C. & Co., Glenora, Ont.

Typewriters and Supplies
Unitex 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.
Petrie, H. W., Toronto.
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 Woodwork
Hore, F. W. & Son, Hamilton, Ont.

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

Water Purifying Chemicals
Lord, Geo. W. Co., Philadelphia, Pa.
Sleeth, D., Montreal.

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.
Pittsburg Shafting Co., Detroit, Mich.
Wire & Cable Co., Montreal.

Wire Rope Fittings
Dominion Wire Rope Co., Montreal.

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

Wire Specialties
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Stanyon Metallic Furniture Co., Toronto.

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Advance Machinery Co., Toledo, Ohio.
Cowan & Co., Galt, Ont.
Cowdroy, C. H., Machine Works, Fitchburg, Mass.
Goldie & McCullough Co., Galt, Ont.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.
Sheldon & Sheldon, Galt, Ont.
Stentoo, John Shaper Co., Cincinnati, Ohio.
Williams, A. R. Machinery Co., Toronto.

Yachts
Bertram Engine Works Co., Toronto.

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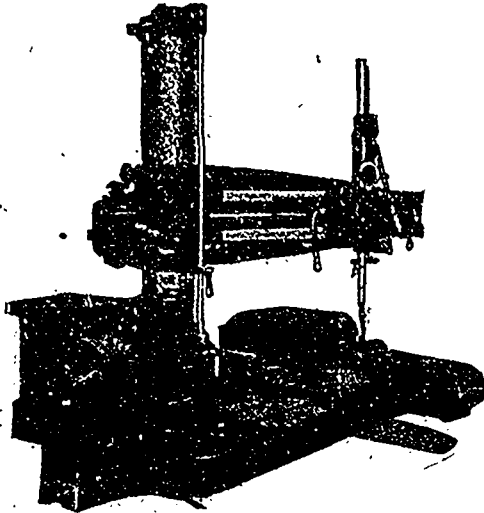
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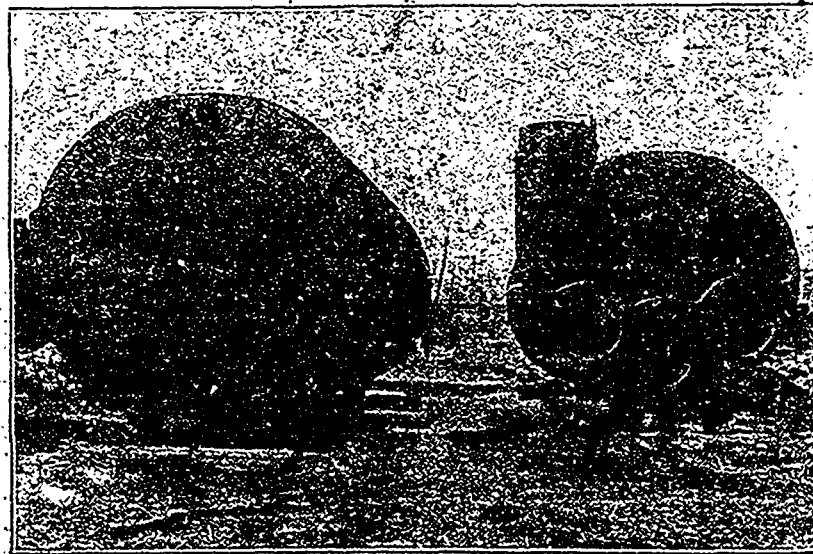
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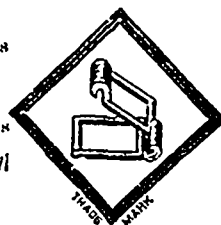
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