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Vol. 48. TORONTO, MAY 20, 1904. No. 10.

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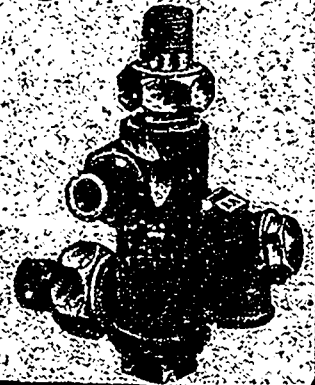
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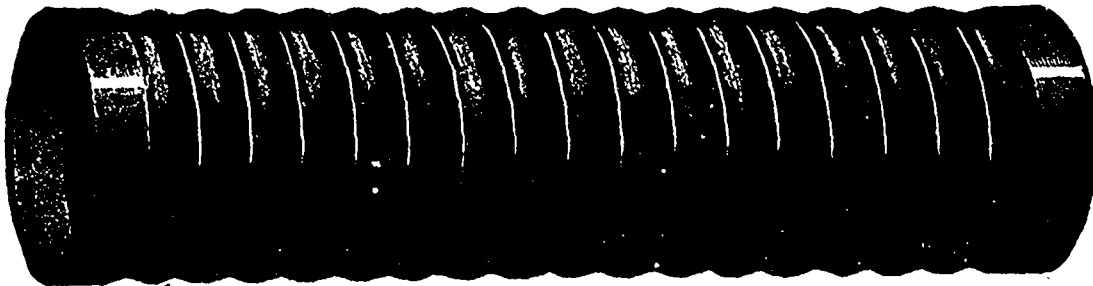


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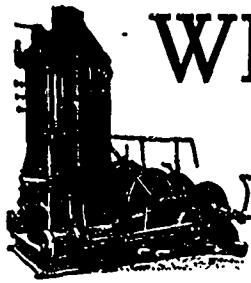
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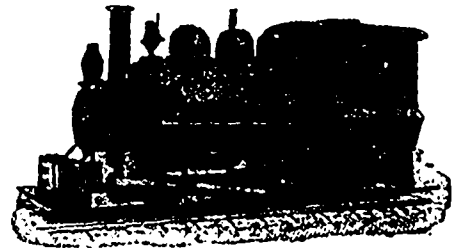
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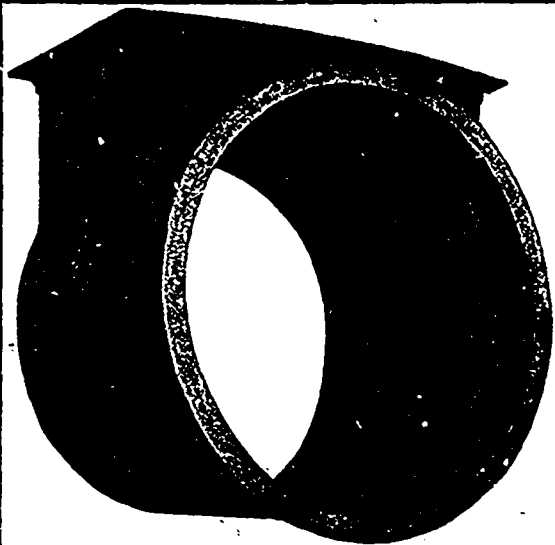
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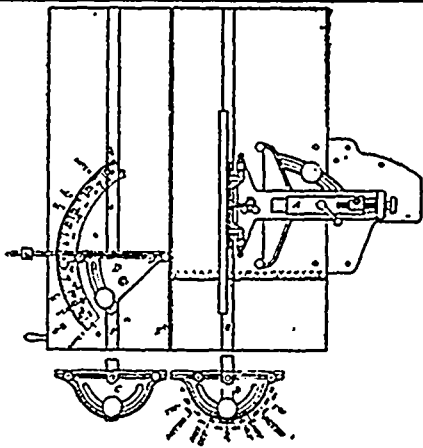
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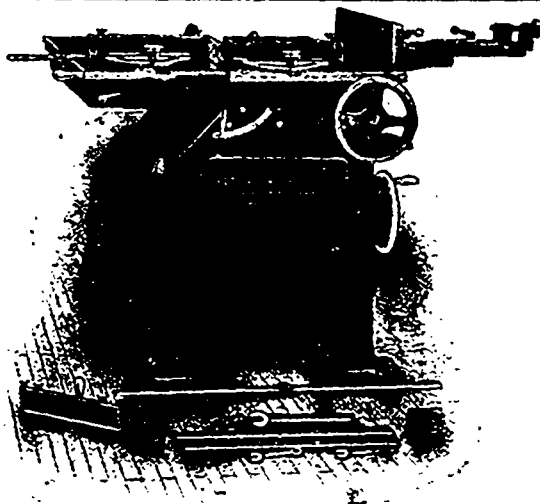
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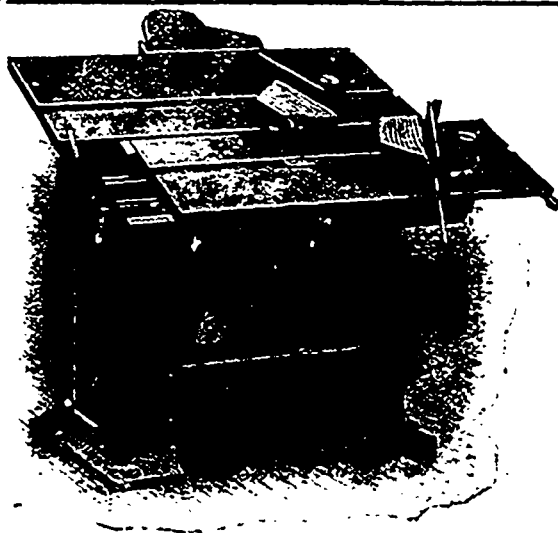
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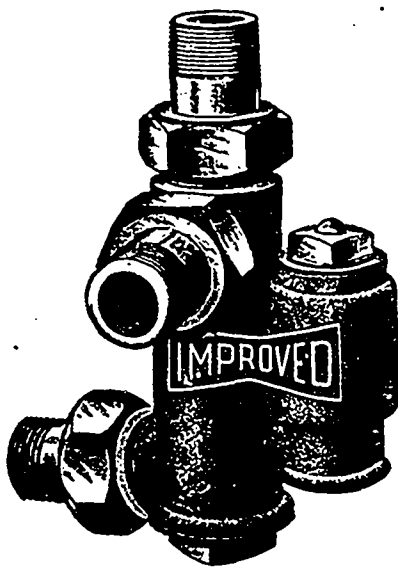
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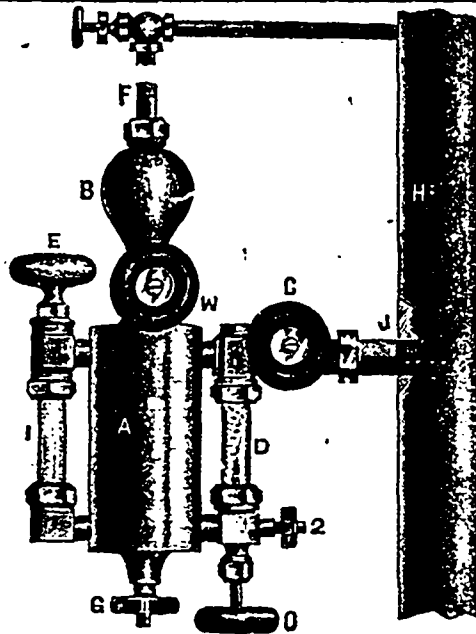
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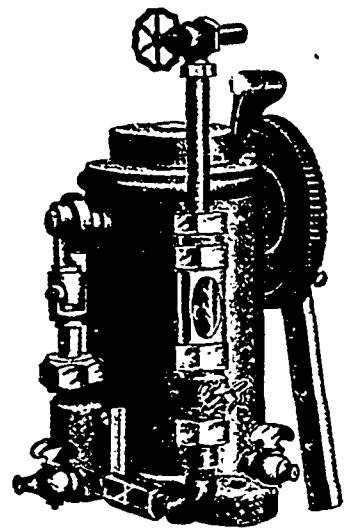
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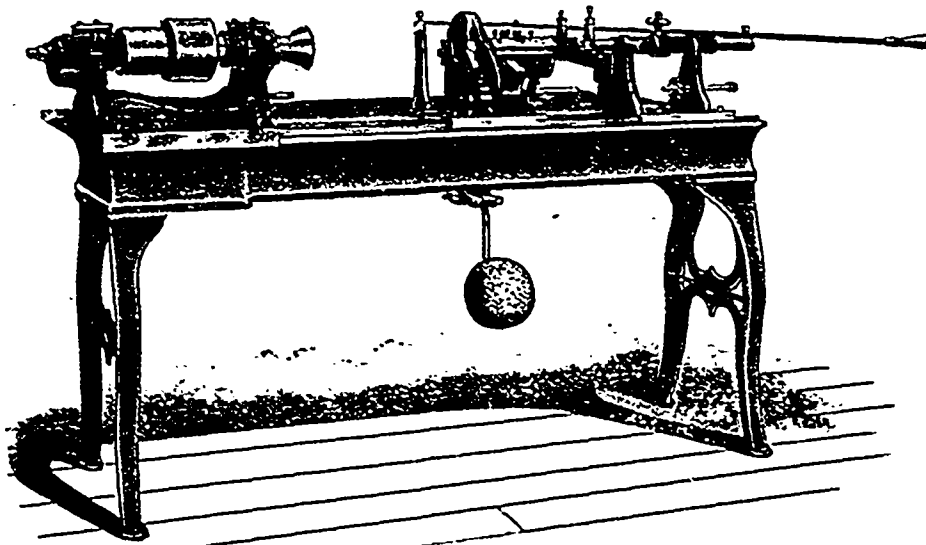
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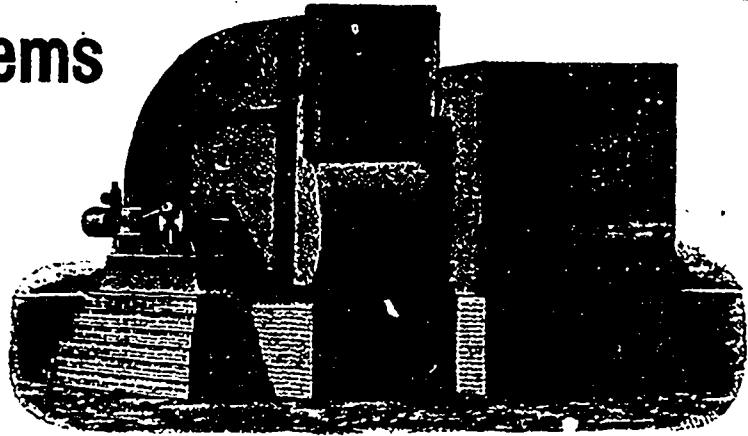
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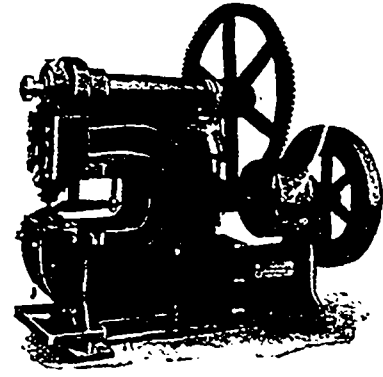
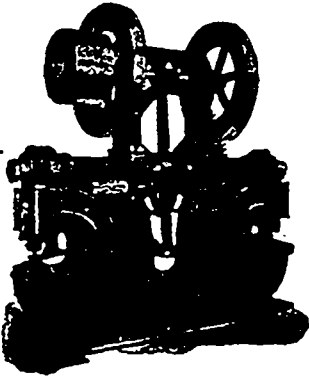
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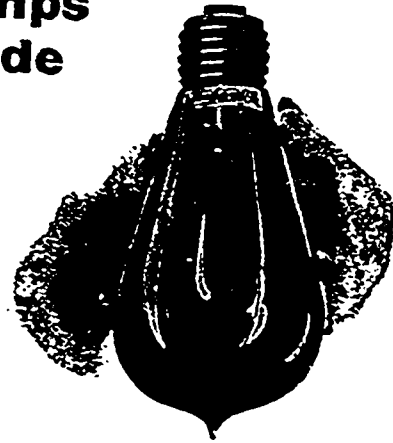
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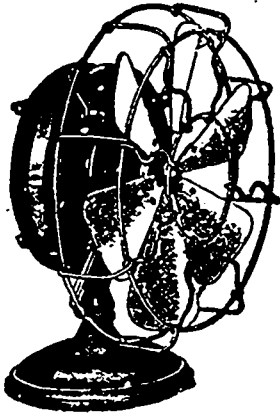
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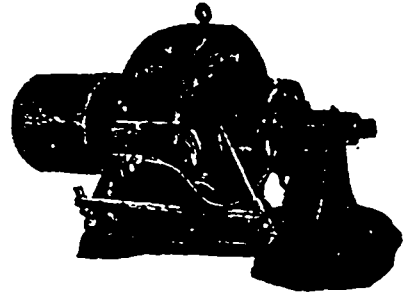
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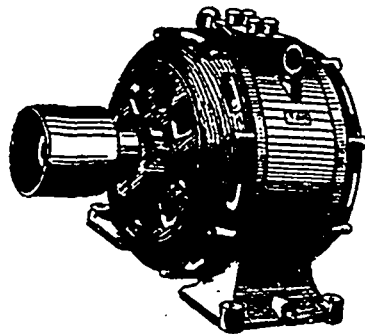
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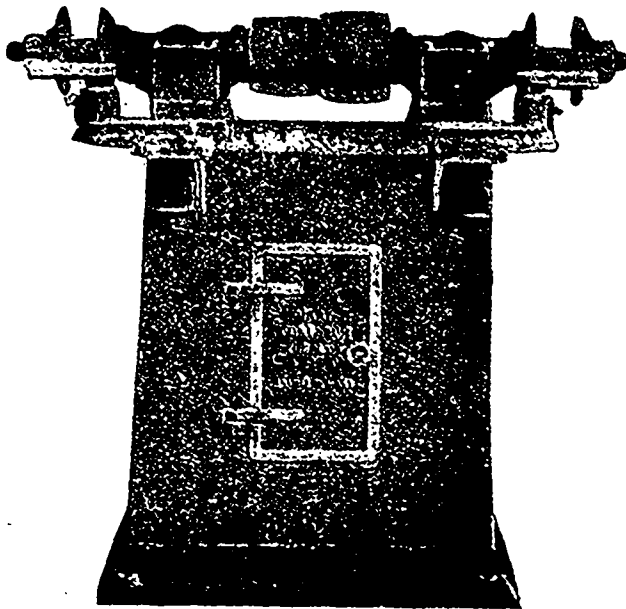
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**HOT AIR AND COLD FACTS.**

In the May 6 issue of this journal appeared an article entitled Commercial Intelligence in which it was shown that the Executive Council of the Canadian Manufacturers' Association had decided to appoint foreign agents, or corresponding members of the association in twenty-four trade centres of the world. The idea being that the great and increasing foreign trade of Canada, particularly in exports of manufactures, required such agencies in addition to those already maintained by the Dominion Government. Those association agents are required to report to the office of the association regularly once a month, the reports to be as regularly published in Industrial Canada for the benefit of the members, or those of them who may be interested in trade in the countries where the agents reside. It is not explained why the association see proper to appoint commercial agents in at least eight cities where the Dominion Government already maintain such officials, but such is the fact as regards Sydney, New South Wales, where Mr. J. S. Larke has been rendering efficient service for a number of years; Melbourne, where Mr. D. H. Ross is; Cape Town, where Mr. J. G. Jardine fills the bill; Mr. A. Poidron, in Paris; Mr. Alexander MacLean, at Yokohama; Mr. C. E. Sontum, at Christiania; Mr. Bruce Walker, at Glasgow, and Mr. Edward O'Kelley at Belfast. No complaint has been made regarding the efficiency of these agents appointed by the Dominion Government. We suppose, however, that it is the opinion of the association that if one agent in a city is a good thing, two would be better, particularly in view of the rapidly expanding export trade of members of the association.

The United States Government, evidently stirred into activity by the example of the Canadian Manufacturers' Association, have established consulates and commercial agencies in several parts of the world, some of them even in Canada, one of them being located at Orillia, Ont., a thriving town of about 6,000 inhabitants, some ninety miles from Toronto; and some of the members of the Manufacturers' Association reside in Orillia.

The following is an extract from the annual report of United States Consul Wakefield, of Orillia, Ont., for 1903, showing the amount and the character of American manufactures and products consumed in that district and the out-

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look for the increase of the same. The report will be printed in full in Commercial Relations for 1903.

"Imports from the United States at Orillia show a substantial increase each year, and this in the face of the fact that a new support of entry was established last year at North Bay, at which entries are now made for a section formerly comprising part of the territory connected with the port of Orillia. Imports for the year ended June 30, 1903, amounted to \$1,770,000. By far the greater part of these imports are free goods. The duties collected amounted to \$42,000, as against \$39,000 the previous year.

"More American commercial travelers are traversing this district than ever before and apparently with increasing sales. There are still quantities of imported articles that are cleared at Toronto, Hamilton and Montreal by the jobbing trade, so that it is impossible to get anything but a general idea of imports into this district.

"Two lines of men's boots and one of ladies' made by American firms are handled here, and the trade is increasing steadily.

"American harvesting machinery and agricultural implements give splendid satisfaction. Three or four of the largest American agricultural implement manufacturers have established branch plants in Canada.

"The Tudhope Carriage Company, whose output is 9,000 vehicles and 3,500 cutters annually, import the following articles entirely from the United States: Carriage cloth for tops, all joints, rails and tubulars, braids for tops, rolled-steel gear, braces and stops, shaft and pole irons, body loops, malleables, buggy shafts and dashers, paint brushes and varnishes, carriage machinery, thread, buttons, and nickle-plated specialties. In lumber they import hickory, ash, basswood, whitewood and poplar. These woods are all grown here except hickory, but have not the same qualities as wood grown in some of the North Central States. They import from American firms in constantly increasing quantities, being this year proportionately 25 per cent. in excess of previous years.

"Collars, cuffs and shirts from New York, imported last year for the first time, have given excellent satisfaction.

"Fancy biscuits imported this season have practically captured the market. This is partially, at least, attributable to the fact that these articles were sold by personal representatives and imported direct by the retailer.

"In the machinery line very little is imported except from the United States. From 30 to 50 per cent. of the tools and machinery used in this district are imported from the United States. Nearly all of the most expensive machinery used in the tanneries, pulp mills, and wood-specialty and veneer works are of American manufacture.

"American canned meats, soups, and table sauces are sold more extensively than all others combined.

"With the same conditions that now prevail, and careful



consideration of the local requirements, there is little danger of any falling off in the imports from the United States, excepting only in those articles which are being manufactured in Canada by branches of American firms. The present outlook is as favorable as that of the past two or three years, and the past rates of imports should readily be maintained. . . . There are no cities in the district, and, of course, no large stocks are carried. The merchants who buy new lines of goods will not make large orders. As a rule, they are very conservative. The increase in consumption of American-made goods should encourage American manufacturers to greater activity, especially now when, according to present indications, the next few years will be very prosperous ones in Canada."

Consul Wakefield gives a partial list of manufactures into the Orillia Customs district from the United States as follows:

Pianos, sewing machines, typewriters, cash registers, cash carriers, machinery for farm work, sawmills, pulp mills, manufacture of wooden ware, paper-making and carriage machinery, belting and oils; carpenter's and other tools, such as saws, axes, spirit levels, wrenches, screw drivers, spokeshaves, and similar tools; all planes, level glasses, glass-cutter's augers, bitstocks, tape measures, tool kits (small and large), steel squares, chisels and chisel handles, all kinds of trowels, game traps, rulers for surveying lumber, grindstones, machines for holding shoes to be polished, carpet sweepers, door and farm bells, door catches, corkcrews, castors, punches, pliers, window fasteners, saw-sets, locks, bolts, and hinges; cottons; various kinds of hard woods; files, saws, oil heaters, gasoline engines and launches, steam engines, hunting axes, automobiles, and printing presses; electrical apparatus, such as storage batteries, and storage-battery lamps; heaters, irons for laundry work, fancy shades, electrical watchmen's clocks and time detectors, watch movements, clocks, canes, umbrellas, coal and coke, compasses, bronzes, binder twines, scales, awls and awl hafts, tack pullers, can openers, picture nails, brass hooks and couplets, faucets, stair plates, wire-line snaps, horse bits, steel brackets, harness buckles, cabinet clamps, pulleys of all kinds and sizes, carpet stretchers, lumber pencils, cattle leaders, steel swivels, anti-rattlers for carriages, plumb bobs, cobbler's sets, wagon oils and greases, chalk, stove bolts, and fire clay; nickel goods, such as chafing dishes, teapots and coffeepots, crumb trays, and similar articles; coffee mills, oil tanks, scythes, stoves, spring balances, brushes of all kinds, brackets, burners, mirrors, and drinking glasses; putty, paper, shoe, and kitchen knives; curling tongs, clippers, collar buttons, scissors, key chains, spirit lamps, metal polish, dark lanterns, spoons of all kinds, razors, oil cups, cheaper grades of cutlery, small ware, fine carving sets, razor straps, harness snaps, rollers for doors, hayforks, knives and cutters, scoop shovels, post-hole augers, steam fitters, pencil and ink erasers, pencil sharpeners, brushes of all kinds, feather dusters, varnishes, floor stains and cleaners, cement, etc. In sporting goods: Rifles, shotguns, revolvers, all kinds of ammunition; fishing tackle (poles, lines, reels, fancy baits, baskets, etc.); golf sticks, balls, and golf bags; tennis racquets, nets, and balls; baseballs, mitts and bats.

This astounding list of imports of American manufactures into the small town of Orillia is but a duplicate of the experience of every other small town, and large town, and city, and settlement in Canada; and if those Canadian manufacturers who are scattering money broadcast in reaching after trade in foreign countries can find the time to do so, we suggest that they seclude themselves in perusing the list of American goods imported into Orillia. There is not one single item included in the list the like of which is not made in Canada, or could be to good advantage. But outside of a comparatively few Canadian manufacturers who are liberal patrons of Canadian trade papers, those who make such goods succeed beautifully in hiding the fact from Canadian buyers, and spend much of their time in berating the Yankees.

### THE COAL DUTY.

Several of the Boards of Trade in important manufacturing centres in Ontario have passed resolutions advocating the removal of the duty imposed upon bituminous coal, some of them requesting the Canadian Manufacturers' Association to assist in the matter, to which answer is returned through Industrial Canada that "The people of Nova Scotia of both political parties believe that their prosperity depends upon the maintenance of the protection on coal, and they may rest assured that the Canadian Manufacturers' Association will not assail this important feature of our national policy." Ontario manufacturers cannot therefore hope for any assistance from the Association in ridding themselves of the payment of this duty upon their fuel, which amounts to about two million dollars a year.

The Association, through its organ, advances reasons why the duty on coal should not be removed, among them being that it would be an assault upon the national policy; that it would mean the loss to the revenue of the Government of \$2,000,000 a year; that this sum could be so applied by the Government as to give Ontario cheaper coal, and that \$2,000,000 annually would pay the interest on \$66,666,000 which might be expended in cheapening transportation between the Maritime Provinces and Ontario. In other words the Association, composed in large part of Ontario manufacturers, asks them to pay the interest on more than \$66,000,000 to assist the coal miners of Nova Scotia to sell their product in Ontario. It is a most generous proposition, and one which the manufacturers of Ontario will no doubt fully appreciate.

The Association cites the fact that the Intercolonial Railway from Montreal to St. John, N.B., and to Halifax, and Sydney, N.S., with branches to almost every important centre in those provinces, cost the country less than \$66,000,000, and that probably for half that amount it could be extended to Toronto, and other distributing centres in Ontario, and by steamship connection to Port Arthur, at the extreme west end of Lake Superior. The Association informs us that this being accomplished the Government could carry the farm products of Ontario and the North-West to St. John, Halifax and Sydney, for export, and bring back Nova Scotia coal at a rate low enough to give Ontario consumers cheaper fuel. Of course, all this is to be done at the expense of Ontario manufacturers who would be taxed not only to enable Nova Scotia coal miners to sell their product in Ontario, but also to help the farmers and others of Ontario and the North-West to carry their products to our Maritime shipping ports. The scheme is most beautiful in its conception and generous in the extreme to Ontario manufacturers who are to be depended upon to pay for carrying it out.

But why should the Association ask Ontario manufacturers to carry it out? The Association claims the fealty of the manufacturers on the ground that its aim and object is to look after their interests. It is perfectly proper for it to advocate the extension and improvement of transportation routes, but why should such important works be instituted at the expense of the manufacturers of Ontario only? Why not allow other interests to share in the burden? Why should the farm products of the North-West be facilitated in their transportation to the seaboard, and thence to the other side of the Atlantic at the expense of Ontario coal consumers?

The Association, through Industrial Canada, points out another way also in which the Government might enable Ontario consumers, at the expense of Ontario manufacturers of course, to get Nova Scotia coal at a low cost, viz., by applying a portion of the revenue derived from the coal duty

to bounties to ships carrying coal from Nova Scotia to Ontario lake ports. The revenue derived from Ontario manufacturers from the coal duties would, the Association tells us, be sufficient to pay interest on the cost of extending the Inter-colonial to Ontario as well as to provide bounties for water transportation on coal. In other words, Ontario manufacturers must contribute \$2,000,000 a year in the way of duty on their fuel with which to pay interest on \$66,666,000 to be expended by the Government in railway extension, improvements in waterways, and bounties to steamship freight carriers.

Ontario manufacturers will no doubt be delighted with the proposition.

#### DR. HAANEL'S REPORT.

In a recent issue of this journal allusion was made to the fact that Dr. Haanel and the Commission sent to Europe by the Dominion Government to investigate the manufacture of steel by electricity has returned to Canada and would report the result of their investigations to the Government. Dr. Haanel has handed his report to the Minister of the Interior, which has not yet been published, but some of the more important facts contained in it are known, from which we condense as follows:

By far the most important experiments witnessed by the commission were those made by Mr. Keller, of Keller, Leleux & Company of Livet France. Some 90 tons of iron ore were used to demonstrate the economic production of pig iron by the electric process. The furnaces employed for these experiments were the furnaces used in the regular work of the company of making by the electric process the various ferros, such as ferro-silicon, ferro-chrome and so forth. The company at the time of the visit of the commission were under contract to furnish ferro-silicon to the Russian Government, but generously interrupted their pressing regular work to undertake the making of experiments for the commission. The furnace employed is of the resistance type, and consists of two iron castings of square cross section, forming two shafts communicating with each other at their lower end by means of a lateral canal. The cases are lined with refractory material. The base of each shaft is formed by a carbon block. These blocks are in electric communication on the exterior of the furnace by means of copper bars. The carbon electrodes to which electric current is distributed pass two-thirds of their length into the shaft. The electrodes are prisms 72 centimetres in diameter and 135 centimetres long. Three sets of experiments were made as follows:—(1). Electric reduction of iron ore and obtaining different classes of pig grey, white and mottled. (2). Electric reduction of iron ore containing a definite amount of carbon in the charge, with a view of ascertaining the amount of electric energy absorbed in the production of one ton of pig iron. (3). The manufacture of ordinary steel of good quality from the pig manufactured in the preceding experiments.

The different classes of pig iron were obtained without difficulty, and the furnaces throughout the experiments worked quietly and without the slightest accident, the gas discharging on top in flickering flames, showing that the gas resulting from the reduction of the ore escaped at low pressure. The workman employed were ordinary Italian laborers without any special training. A number of castings, such as columns, pulleys, gear wheels, plates and so forth were made the metal drawn directly from the furnace. The castings showed sharp edges, a comparatively smooth surface, and were sound throughout. For the determination of the electric energy absorbed the volt metre and ammeter employed to measure the volts and amperes were calibrated in the laboratory of the director of the electrical department of the University of Grenoble, who also ascertained the power factor of the alternator furnishing the electric energy. The electric energy absorbed per ton of pig was found to be 226 horse power years.

The following are the figures which go to make up the approximate cost of producing a ton of pig iron:—(1). Ore (hematite) metallic iron 55 per cent., 1,842 tons at \$1.50 per ton, \$2.76. (2). Coke for reduction 33 tons at \$7 per ton, \$2.31.

(3). Consumption of electrodes at \$5 per 220 pounds, 77 cents. (4). Lime 30 cents. (5). Electric energy 226 horse power years at \$10 per e.h.y., \$2.26. (6). Labor at \$1.50 per day, 90 cents. (7). Different materials, 20 cents. (8). General expenses, 40 cents. (9). Repairs, maintenance, etc., 20 cents. (10). Amortization (machinery and building), 50 cents. Exclusive of royalty, \$10.60.

To satisfy the commission Mr. Keller made experiments to illustrate his process of making steel. The details of the operation and the figures relating to his experiments are in the hands of Prof. Harbord, the English metallurgist, who accompanied the commission.

In regard to other processes it was found that Mr. Harmet, of St Etienne, who published papers and obtained patents on the electric process for smelting iron and making of steel, and Mr. Gin, of Paris, who has obtained a patent for the production of steel from scrap, have as yet no plant in operation by which their methods might be tested. Photographs of the furnaces employed, except the Stessano furnace at Turin, have in each case been obtained, also detailed working drawings of the furnaces examined.

In his general conclusion Dr. Haanel says:—"It must be pointed out that the results obtained at Livet were the results of experiments in furnaces not specially adapted to the work required to be done. With the improved furnaces of which the commission has secured detailed drawings, permitting on account of higher column of charge a more effective use of the reducing power of the carbon monoxide evolved, and the employment of machinery for charging the furnace to reduce the cost of labor, a much better figure than the one given will result.

The processes of electric smelting must yet be regarded as in the experimental stage, no plant existing at present where iron ore is commercially reduced to pig by the electric process. The more remarkable therefore it appears that experiments made off-hand, so to say, in furnaces not at all designed to be used for the production of pig, should give a figure of cost which would enable an electric plant properly designed and managed to compete with the blast furnace. It is, moreover, reasonable to expect that as experience in electric smelting accumulates, the design of the electric furnace best suited to the conditions of the high temperatures with which the metallurgist has to deal will undergo changes which will reduce the absorption of electric energy to a minimum. The electric engineer will also be called upon by the new industry to design electric plants specially suited to the conditions of electric smelting. When it is considered that the electric process is applicable to the smelting of all other ores, such as copper, nickel, silver and so forth, that the furnaces are of simple construction and the regulation of the heat supply under perfect control, we may expect that the application of electric energy to the extraction of metals from their ores will not be long delayed, and that familiarity with handling large currents, and experience gained in electric smelting will result in displacing some of the costly and complicated methods by comparatively simple and economic processes. The immediate effect of a plant erected for the smelting of iron ores which will demonstrate the economic production of pig and the making of steel will arouse the faith of the industrial world in the new metallurgy, and other industries dependent upon electricity as the agent or to which electricity can be applied will follow as a consequence in the wake of this power plant.

At Gysang, Sweden, steel of superior quality is made by the smelting together of charcoal, pig and scrap in an electric furnace of the induction type, that is to say, a furnace without electrodes. This process corresponds to the crucible steel process, but it has certain advantages over the latter in that the melted materials at no time during the operation are exposed to gases, some of which when absorbed deleteriously affect the quality of the product. The furnace worked quietly and regularly, producing on the average four tons of steel in 24 hours. "Tapping" occurring every six hours, 116 electric horse power years were required per ton of product. The cost at the rate of \$10 per electric horse power a year would be \$1.16 per ton of product. At Korfors, Sweden, the Heroult process of making steel is in operation, but the furnace is at present employed in the making of ferro-silicon.

At Laprah, France, steel is also made from melted scrap. The process differs from that at Gysang in that it permits of

the purification of the materials employed, two slags being made for that purpose, and carburization is effected in the furnace by carbon briquettes. The furnace is of the tilting pattern, consisting of an iron casing lined with dolomite brick. The bottom of the furnace is filled on top of the lining with crushed dolomite, upon which the charge reposes. Two electrodes pass through water-cooled joints in the roof of the furnace. The electrodes are vertical and parallel, and are adjusted vertically either by hand or a specially constructed regulator. An alternating current of 4,000 amperes of 110 volts is distributed to the electrodes. Different classes of steel are made by the company at a cost per electric energy absorbed of \$1.54 per ton of ingot. The selling price of steel varies from 363 francs 60 centimes to 123 francs 60 centimes per ton, depending upon quality. Interesting experiments were made for the commission at this plant in the production of pig from the ore in a very simple furnace consisting of an iron box of rectangular cross sections, open on top and lined with refractory material. The bottom of the furnace in communication with the iron casing constituted one terminal of the electric circuit. A carbon electrode of square cross section and about three feet in length, placed vertically in the open top of the furnace, constituted the other terminal. By hand regulation this electrode could be lowered or raised within the furnace. Thirty charges of ore were made during the working, and thirteen taps of metal and slag taken.

Dr. Haanel's report being of such a satisfactory character we imagine that the Dominion Government will make a satisfactory allowance to give the system a thorough test in Canada; and if it proves as successful as is hoped for it, no doubt a liberal bounty will be paid upon the product of steel achieved from it. The simplest form of aid would be to confine the bounty to such products as are made entirely from Canadian ores.

#### NATURAL GAS.

Information comes from London that a representative of the owners of certain oil wells, and oil lands in and about Petrolea, Ont., is now in that city endeavoring to induce British manufacturers of tubes and tubing to exploit the Canadian market for that article. Millions of feet of such tubing has been consumed in oil and gas wells in Canada, not one foot of which was made in Canada, nor in any other country except the United States, American manufacturers always having had a monopoly of the Canadian market. The use of such tubing is not confined to oil well operations, and there is a strong and growing demand for it for piping gas wells, and in the West in boring for water; and no doubt that in that section where lignite is found, gas will also be found. Should such be the case, which fact geologists should determine, it would be indeed a great boon to the army of settlers now flowing into that region, to find all the heat, light and power they require so close at hand. It is to be hoped that the British manufacturers of tubing will awake to the fact that they could find a profitable market for their products in Canada, but judging from the trend of the trade in the past, unless the Dominion Government give sufficient tariff encouragement to the industry, the American manufacturers will continue masters of the situation.

According to recently published statistics, there is no country in the world which can compare with the United States in the production of natural gas; and if the article can be found in considerable quantities in Canada, and as widely distributed, it would be a blessing that few realize. The combined production of all other countries is not over 1½ per cent. of the quantity produced in the United States, which had in 1902 a value of \$30,867,668. A large portion of even the small outside production goes into the United States from Canada.

Mr. F. H. Oliphant's report on the production of natural

gas in 1902, which the United States Geological Survey has recently published as an extract from its annual volume of "Mineral Resources," is full of interesting details about the history, output, value and uses of this most satisfactory combustible.

The records of early investigators and missionaries show that natural gas has been known to exist in natural springs in western New York, western Pennsylvania, central West Virginia, northeastern Kentucky and southeastern Ohio for at least 250 years. In 1775 General Washington visited a burning natural gas spring on the northeast bank of the Great Kanawha river in West Virginia, a few miles east of the present city of Charleston. He was so impressed by the phenomenon that he preempted an acre of land surrounding the spring and dedicated it to the public forever.

The earliest economic use of natural gas in the United States was probably made in lighting the village of Fredonia, Chautauqua county, New York, in 1821. The existence and utilization of this gas at Fredonia became widely known, both at home and abroad, and excited the liveliest interest among scientific men. So little suspected, however, was the presence of the enormous volume of gas since developed, that, when it was further explored, it was pronounced "unparalleled on the face of the globe," and Humboldt is quoted as declaring it the eighth wonder of the world.

Its introduction into commercial use was slow, but after its value was fully demonstrated there was a rush of capital and a large amount of money was invested in gas territory, gas wells and pipe lines. Then followed a period of reckless consumption and appalling waste. Many of the original fields were rapidly depleted of their high pressure. Not until it was fully realized that a large proportion of the natural supply had been consumed and dissipated by the extravagant methods in use, were improved means adopted for holding back the gas in the original rock reservoirs. This was done by shutting off the wells, by cutting off all blow-off standpipes and escapes, by improving the joints of the pipe lines, and by the more economical consumption of the gas.

The economy came rather late, but enough of the original supply remains, stored principally in the deep and prolific sands of northern and southwestern Pennsylvania and western West Virginia, to furnish this ideal household fuel for many years to come. What may be done by deeper drilling and improved methods to prolong its use indefinitely is yet unknown.

The most profitable customers that the natural gas companies have are the householders. Natural gas is eminently fitted for domestic uses, as every woman who has cooked by its convenient flame has realized, if she has ever had occasion to abandon it for a wood or coal range. She does not wonder that the gods were jealous of the hero who brought fire down from heaven in a hollow reed and showed men how to warm and light their homes and how to cook their food. His was a god-like gift and meant to mankind the beginning of civilization. It is from such primitive uses of fire as Prometheus taught that the natural gas companies of to-day derive nearly all their revenue. They supplied natural gas to 509,695 domestic consumers in 1902, and blessed not less than 4,500,000 people with it as an illuminant.

The number of natural gas companies that supplied the 509,695 home bodies and the 8,103 establishments in 1902 was 2,147, which represented a gain of 602 companies over the enrollment of 1901.

One of the most effective uses to which natural gas has been

put is as motive power for engines. The natural gas engine came into favor about ten years ago, when its use was first employed in pumping wells. Afterward, in forms of magnitude ranging from 5 to 500 horse power, it was extensively introduced into manufacturing plants, where it has successfully demonstrated its economy and reliability. It has in many cases replaced the steam engine and boiler. Owing to the large number of points that are often widely separated and are difficult to supply with other fuel, it is particularly applicable to the pumping of oil wells and to driving pipe-line pumps.

In connection with a mantle of alkaline earth, natural gas has produced the cheapest and best illuminant known. All natural gas has not, however, the same illuminating value. In some districts it carries a small percentage of the heavier hydrocarbons, which add much to its illuminating properties.

Only one article is manufactured from natural gas; that is lampblack, for which a considerable quantity of the annual production of natural gas is employed.

#### GERMANY'S TRADE IN DYES AND CHEMICALS.

In recent years Germany has rapidly advanced to first place among the countries producing dyes and chemicals. Her success in the manipulation of coal tar reads like romance. Perkins, the English chemist, might discover that Germany alone has learned the art of exploiting. In 1892 the Empire exported 21,879,204 pounds of coal tar dyes, of which England took 4,146,872 pounds and the United States 5,153,448 pounds. In 1901, 51,060,792 pounds were exported—11,830,776 pounds to Great Britain and 10,461,924 pounds to the United States. German price lists put the price of these coal tar products at 57 cents per pound in 1892 and 37 cents in 1901.

One hundred and twenty companies, working under the limited-liability laws, with a paid up capital of \$83,931,914, paid out \$10,323,520 as interest to the stockholders in 1901—a 12.3 per cent. dividend. This is a trifle less than the one paid in 1900 and a little more than 1 per cent. less than in 1899, when the dividend was 13.52 per cent.

Nothing in the long list of modern discoveries, says the Textile Mercury, is more wonderful than Germany's investigations and success in the production of indigo. For a long time it had been the dream of dyers and chemists to find a substitute for India's natural product. They had driven French farmers to desperation when they destroyed the value of madder by substituting an artificial red won from coal-tar. They expected to do nearly as much with a substitute for natural indigo. In 1892 the Empire had to import 3,556,740 pounds of natural indigo, valued at \$4,450,600; in 1896, 4,026,756 pounds, worth \$4,926,600; in 1902, only 1,074,468 pounds, valued at \$833,000. India, the Dutch East Indies, and parts of Central America were the great producers. They, too, were watching the work going on in the Empire's laboratories, for they were very much interested. At last, in May, 1897, Bayer, a great chemist at Munich, made the long-looked-for and longed-for discovery. Since then the exports of the German Empire have gone on increasing, while the exports of natural indigo from other countries have been diminishing. In 1897 the exports were 1,036,116 pounds, in 1902, 10,779,972 pounds; expressed in values, \$1,142,400 and \$5,950,000; or, nearly 500 per cent.; and this notwithstanding the fact that the effect of the discovery of artificial indigo was to reduce the prices of this dye. Germany paid for natural indigo an average of \$2,787,000 in the years previous to 1896; since that time, less than \$238,000; last year, only \$166,600, while it exports millions of dollars' worth of the artificial, Great Britain taking 710,124 pounds last year and the United States 1,449,012 pounds. Even the East Indies are down for quite a large quantity in 1902—85,476 pounds. One company,

the aniline factory at Ludwigshafen on the Rhine, is reported to be producing more than 1,000,000 marks' worth of artificial indigo every twelve months. Once familiar with the Empire's methods of investigation and experimentation, all wonder at results vanishes.

That aniline company at Ludwigshafen has nearly 100 chemists constantly at work experimenting in all kinds of artificial products. If, as in the case of the artificial indigo, a discovery is made by somebody else in another laboratory, the Baden Aniline Company is ready and willing to pay liberally for the rights of production. Nowhere on earth are the essential elements of intelligent practice better joined to theory than in the laboratories of that company. That it pays is proven by the company's enormous growth and dividends.

#### MEETING OF THE SHAREHOLDERS OF THE CANADIAN MANUFACTURER PUBLISHING CO., Limited.

The Shareholders of the Canadian Manufacturer Publishing Co., Limited, are hereby notified that a General Meeting of the Company will be held on Monday, the 6th day of June, 1904, at the hour of 11 o'clock in the forenoon, at the Head Office of the Company, Room 408 McKinnon Building, corner Jordan and Melinda Streets, Toronto, for the purpose of receiving and considering a report from the Directors upon the affairs of the Company, to elect a Board of Directors for the ensuing year, and to consider, generally, such other business of importance to the Company, as may be presented.

ARTA CASSIDY,

Secretary.

Dated at Toronto, this 6th day of May, A.D., 1904.

#### EDITORIAL NOTES.

Adam Shortt, professor of political economy at Queen's University, Kingston, Ont., in a recent pamphlet on Canada's interest in and attitude toward the Chamberlain proposition for preferential trade within the empire, states very convincingly the reasons which will prevent the Dominion from accepting the fundamental conditions on which the Chamberlainites purpose to offer it special advantages in the markets of the home country. Though he considers the proposition in many varying aspects, the gist of his criticism is that Canada is a nation and will develop along national lines, taking advantage of all her natural resources and utilizing them to their fullest. She will never surrender, even partially, her right to install and extend manufactures of her own raw materials nor to circumscribe her industries. She will not sacrifice the fulness and variety of her civilization nor doom herself to remain a granary, with all its implications of narrowed and lowered intellectual and commercial growth. In short, her people feel the impulse of destiny as an entity. She has no disposition to become a specialized department in a vast organism. With growing consciousness of her own natural riches, she must and will expand naturally and symmetrically, increasing simultaneously her agricultural population and the industries to supply it with necessities and luxuries. Her opportunities and her disposition are such that she will never consent to handicap her own internal development in order to make a preserve for British manufactures. Imperial sentiment is an excellent thing in its proper sphere, but to traffic in it is to degrade and destroy it. Prof. Shortt is inclined to poke fun at the Chamberlain programme, which he says includes the promise of a stationery provision market to the British workman, through the readiness of the foreigner to pay the tax, together with an increased price to Canada for her grain, and in conjunction an increased market for the products of his labor, in conjunction with a higher price to Canada for her grain. He confesses his inability to see how all these promises are to be simultaneously kept; but bases his opposition to the scheme less on the improbability of the predicted results from such an arrangement than on the impossibility of inducing the Dominion to deliberately tie her own hands with regard to the utilization of the riches which nature has lavished upon her.

### THE WESTINGHOUSE-PARSONS STEAM TURBINE.

The accompanying illustration is of a 600 h.p. Westinghouse-Parsons steam turbine engine built by the Westinghouse Machine Co., East Pittsburg, Pa.

This company acquired the right to manufacture the Parsons turbine in the United States and Canada in 1895. The Westinghouse-Parsons turbine was first put upon the market in 1898. It embodies the original Parsons principles but has in addition an important individuality developed by long-continued and exhaustive experiments.

One of the first installations made by the company was at the plant of The Westinghouse Air Brake Co. at Wilmerding, Pa., where three 400-kilowatt turbo-alternator units were put into

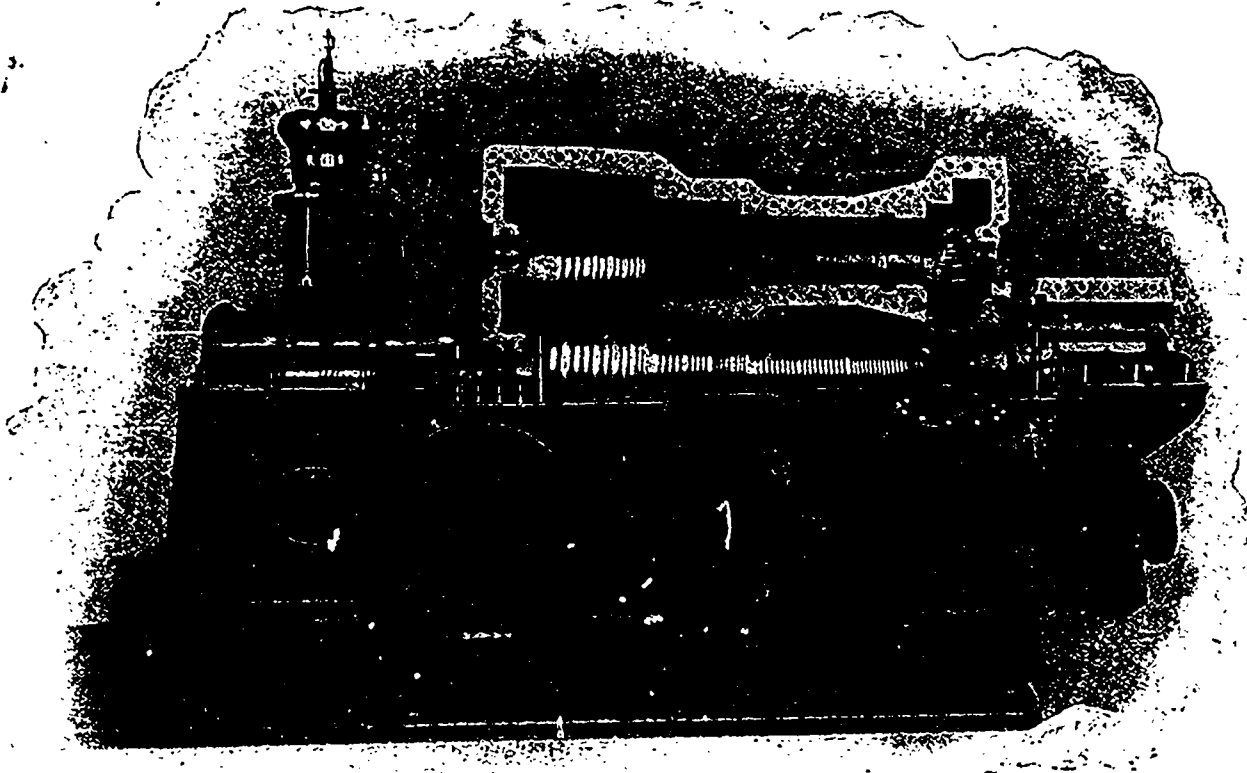
the same energy whether it issues from a suitable orifice or expands against a receding piston.

Two transformations of energy take place in the steam turbine: first, a conversion from thermal to kinetic energy; second, a conversion from kinetic energy to useful work. The latter alone presents an analogy to the hydraulic turbine. The radical difference between the two turbines lies in the low density of steam as compared with water and the wide variation of its volume under varying temperatures and pressures.

A cubic foot of water under 100 pounds initial pressure and discharging into a 28-inch vacuum would attain a theoretical velocity of 130.2 feet a second, and would exert 16,900 foot-pounds of energy. A cubic foot of steam under like conditions would attain a theoretical velocity of

impinges upon a ring of moving blades. The moving blades receive a double effect. The first is from impact, the second from reaction due to the difference in pressure on either side of the ring blades. This series of actions is repeated throughout the turbine, the pressure of the steam alternately increasing and decreasing with the passage through the alternating rings of blades, and gradually lowering to that of the vacuum.

Tests of a 400-kilowatt turbine-electric unit at the works of the Yale & Towne Mfg. Co., Stamford, Conn., made by Frederick A. Waldron, M. E., and reported by him in a paper read before the American Society of Mechanical Engineers at the Saratoga meeting in August, 1903, give some results which appeal at once to the practical man. Measuring the power as delivered



600 Horse Power Turbine open for inspection.

operation in 1899. A fourth unit was added later, and direct steam operation was entirely displaced in the air brake works in 1900. Comparative tests made about that time showed a saving of 40,000 pounds of coal a day as a result of the use of the turbines and the electrical distribution of power.

In 1901, the largest steel turbine unit in commercial use in the United States was installed at the plant of the Hartford Electric Light Co., Hartford, Conn. This turbine is practically of 2,000 kilowatts or 2,700 h.p. capacity, although it was sold as of 1,500 kilowatts capacity. The plant is now being augmented by two turbine units of 1,000 kilowatts each to supplant reciprocating engines.

Steam expanding through a definite range of temperature and pressure exerts

3,860 feet a second and would exert 59,900 foot-pounds of energy. Such steam velocities would require in a turbine an ideal peripheral speed of 2,000 feet a second to utilize their power value. This would mean 38,100 turns a minute for a wheel one foot in diameter.

The Westinghouse-Parsons turbine utilizes the full steam energy and does this at rotative speeds well within commercial requirements. These speeds do not exceed 3,600 turns a minute for the 400-kilowatt unit. For the larger units the number of turns is less. The steam is also robbed of all power of erosion by having its velocity gradually reduced as it passes through the turbine.

Steam enters the working part of the turbine through a ring of stationary guide blades which give it direction. Expanding beyond these blades, the steam

at the pulley of the motor, Mr. Waldron found that 2½ pounds of coal produced a horse power upon the brakes on an evaporation of 8,707 pounds of water to a pound of coal and allowing 5 per cent. for banking fires. Under like conditions it took three times as much coal or 7½ pounds to give the same power at the engine fly-wheel when non-condensing piston engines scattered about the shops were used.

In his paper Mr. Waldron says: The strongest appeal that the turbo-generator makes to the business man or the engineer is its inherent commercial efficiency. By this I mean that its efficiency is unchanged week in and week out, year in and year out. Leaky pistons or valves, lack of alignment of slides and bearings, keying up, and above all, lubrication, all of which exist in the reciprocating engine,



are eliminated in the turbine. After a year's service, the bearings were carefully measured and no differences in diameter could be discovered.

The Westinghouse-Parsons turbine consists of only two elementary parts, the stator and rotor. Its adjustments are permanent. Every working part is opened for inspection by raising the upper part of the casing or cylinder.

There is nothing to wear out. The bearings are the only rubbing parts. These are preserved by copious libations of oil. The thrust bearing has no thrust to bear. The balance pistons rotate freely in an atmosphere of steam and the low steam velocity protects the blades from erosion. Turbines which have been worked continuously through a period equal to the ordinary life of steam engines are still in perfect condition.

**A NEW SMOKE HOOD.**

The Stevens Smoke Hood and Exhaust System for locomotive roundhouses recently patented by Alfred J. Stevens, Toronto, consists of a system for removing smoke and gases from locomotives when housed, and is designed to replace the Wigwam Jack now in common use, and to fulfil other economical and desirable ends.

The system consists essentially of a Horizontal Main Smoke Pipe, suspended to the roof and reaching over all the stalls in the house to be served and provided with swinging, adjustable hoods which fit closely to the stacks of the locomotives. The main pipe is connected to an exhaust fan or chimney, and the smoke is delivered through a single stack at any desired elevation above the engine house or surrounding property.

Railroad Corporations and Municipalities will find this system removes all objections to the location of engine houses near residential property where a factory chimney is permissible. The better draft in the fire box of the locomotive will cause less smoke, and what is made can be delivered at a high elevation. (The smoky Wigwam Jack will be superseded by new and up-to-date equipment.) There are many advantages to railroad companies, cities, towns and employes in keeping the work of the employer and the homes of the employed near each other.

**THE CANADIAN CASUALTY AND BOILER INSURANCE CO.**

One of the most modern and up-to-date concerns in business in Canada is the Canadian Casualty & Boiler Insurance Co. with head offices in Toronto. In addition to the special line of business for which it was originally organized, it was empowered at the recent session of the Ontario Legislature to issue policies for insurance against sickness, and in this particular branch of their business the company is meeting with much success. This, however, interferes in no manner with their original business. The inspection and insurance of boilers, in which connection they offer the services of their staff of experts in making specifications for power plants, etc.

**SAVING CYLINDER OIL.**

The Burt Mfg. Co., Akron, Ohio, have for some years been making what they call their "Style B. Oil Filter." This filter will take the condensation from the oil separators and exhaust heads, and automatically separate the oil from the water, and purify the oil at the same time, the absolutely pure oil going into the pure oil reservoir, and the water running from the drip into the sewer.

This filter is made in several sizes, from three to 500 gallons capacity per day. It is used by prominent concerns, such as the National Cash Register Co., United States Steel Corporation, Westinghouse Air Brake Co., Allegheny County Light Co., Edison Electric Light Co., and scores of others.

The modern engineering practice has made a device of this kind almost a

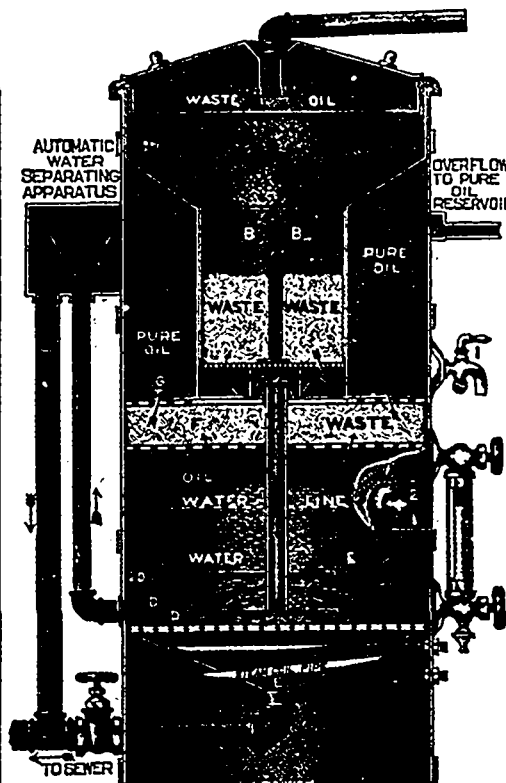
the direction shown by the arrows, into tube C, and from here on to filter plate D, where the increased weight of the water has a tendency to keep the oil back in tube C. However, the pressure of oil in chamber B forces it down and spreads it out over plate D in a very thin film, which constantly changes surface, and grows thinner as it travels from the center to the circumference of plate D, thus exposing every particle of waste oil to the action of the water. It then flows upon plate D1 and D2, going through the same process in each case. When the oil leaves the filter plate D2 it is in a finely divided state of separation, and thoroughly mixed with water, which washes it out, and from which it separates by gravity all the remaining impurities which settle in chamber E, and can be removed by opening the gate valve at bottom of filter, which drains off all the water and dirt. From plate D2 the oil again filters through the stratum of filtering material F, and from there it rises to the pure oil chamber, and then flows to the oil reservoir.

The water is automatically separated after it passes down the tube C and reaches the bottom plate, as the oil being lighter than water, just as soon as it reaches the bottom of the filter, it immediately rises, and the surplus water passes into the tube which leads to the automatic water separating device (see cut).

Before the introduction of the Style B oil filter, all cylinder oil went to waste, and as cylinder oil is the most expensive oil used around a plant, the saving effected by the Style B filter is a large one as the reclaimed oil can be used to lubricate pumps and other machinery, thus cutting down oil bills very materially.

Any concern now using the ordinary oil filter can use the Style B in addition, to very profitable advantage.

The Burt Mfg. Co. have their filters adopted by nine foreign governments, and in use by nearly every power plant of any prominence in the country. Their method of shipping the filter on 30 days trial, before paying for same, proves the purchase of their Cross oil filter to be a profitable one.



Style B. Oil Filter.

necessity in every power plant, not only from a standpoint of economy, but as a part of every well-regulated engineering system.

The reputation of the Burt Mfg. Co. is thoroughly upheld in this class of filter, being one of the most complete devices of its kind on the market. It works automatically, without care or trouble, when once installed, and pays for itself many times over in the saving of oil.

The following description shows every operation of a perfect filtration of oil from waste exhaust, as shown by the accompanying cut.

The oil and water is poured in the top of filter (see cut), and then passes into chamber B, through the layer of waste, which collects all the heavier impurities of the oil. From thence through the perforated bottom of chamber B, down in

proves the purchase of their Cross oil filter to be a profitable one.

**THE COAL TRADE.**

The exportation of Canadian coal to the United States for the nine months ending March 31, 1904, was 1,046,388 tons as against 1,470,854 tons for the corresponding period of 1903. Canadian imports of anthracite coal from the United States for the nine months ending March 31, 1904, aggregated 1,235,361 tons, a gain of 533,426 tons over the corresponding period of 1903. During the same time Canada imported from the United States 3,275,475 tons of bituminous coal, a gain of 680,347 tons over the nine months of the previous year.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

## CAPTAINS OF INDUSTRY.

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

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

The starting of any such concern means a demand for some sort of machines, machinery, or supplies, such as steam engines and boilers, shafting, pulleys, belt- ing, 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 American Cereal Co., Peterboro, Ont., will build a million bushel wheat elevator at Port Arthur, Ont.

R. Anderson, machinist, Toronto, has a contract for building a number of envelope machines for Messrs. Brown Bros. and other firms burned out by the recent fire.

The Brantford Produce & Cereal Co., Brantford, Ont., have been incorporated with a capital of \$40,000, to manufacture cereal coffee and foods, leather dressings, etc. The provisional directors include A. E. James, W. H. Hammond, and H. V. Hutton, Brantford.

The S. M. Knechtel Chair Co., Southampton, Ont., have been incorporated with a capital of \$75,000, to manufacture furniture, bed springs, etc. The provisional directors include S. M. Knechtel, D. McF. Ferguson, Southampton, and J. H. McKnight, Toronto.

The Toronto Casket Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture caskets, coffins, hearses, etc. The provisional directors include J. A. McCracken, R. A. McCracken and H. Cooper, Toronto.

The Montreal and Boston Consolidated Mining & Smelting Co., Toronto, have been incorporated with a capital of \$7,500,000, to carry on a mining and smelting business, and to manufacture iron, stone, manganese, etc. The provisional directors include H. J. Wright, J. A. Thompson, and John Payne, Toronto.

Warwick Bros. & Rutter, Limited, Toronto, have been incorporated with a capital of \$250,000, to acquire the business of Warwick Bros. & Rutter, to manufacture paper goods, etc., and carry on a printing and book-binding business. The provisional directors include G. R. Warwick, A. F. Rutter, and C. E. Warwick, Toronto.

The 2 Macs, Limited, Ottawa, Ont., have been incorporated with a capital of \$100,000, to manufacture clothing, etc., and to acquire the business of the 2 Macs Tailoring Co. The provisional directors include S. McClenaghan, L. Whitney, and Wm. Hasley, Ottawa.

The Canadian Gold Mining Concession Co., Ottawa, Ont., have been incorporated with a capital of \$300,000, to carry on a gold mining business, etc.

The provisional directors include J. A. Ritchie, J. N. Rattey, and R. A. Sauriol, Ottawa.

The Youngs Lake Mining Co., a United States incorporation, have been licensed to manufacture ores, etc., in Ontario, with a capital of \$50,000. J. A. McPhail, Sault Ste. Marie, Ont., is their attorney.

The Empire Machine & Metal Stamping Co., Toronto, have changed their name to the Stanyon Metallic Furniture Co., Limited.

The East Grey Telephone Co., Markdale, Ont., have been incorporated with a capital of \$7,000, to operate a telephone business in the county of Grey. The provisional directors include C. Knott, J. W. Ford, Euphrasia, Ont., and W. Turner, Markdale, Ont.

O'Brien's, Limited, Toronto, have been incorporated with a capital of \$60,000, to manufacture clothing, etc. The provisional directors include D. O'Brien, G. Grant, and S. Gordon, Toronto.

The British American Development Co., Toronto, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and development business. The provisional directors include J. E. Haines, Brampton, Ont., A. T. Haines, Chellenham, Ont., and A. Linton, Guelph, Ont.

The Simcoe Tanning & Fur Dressing Co., Simcoe, Ont., have been incorporated with a capital of \$40,000, to manufacture leathers, furs, etc. The provisional directors include A. Shaver, Delhi, Ont., J. Jago and W. P. Innes, Simcoe, Ont.

The Woodstock Varnish Co., Toronto, have been incorporated with a capital of \$60,000, to manufacture varnish, oils, paints, etc. The provisional directors include G. E. Bradshaw, J. W. Curry, and J. T. Eastwood, Toronto.

The Kamloops Lumber Co., Toronto, have been incorporated with a capital of \$500,000, to manufacture timber, etc. The provisional directors include Wm. Irwin, Peterborough, Ont., Geo. McCormick, Orillia, Ont., and Hon. Geo. E. Foster, Toronto.

The Canadian Lines, Limited, Toronto, have been incorporated with a capital of \$1,000,000, to build and operate steamships for commercial purposes. The

provisional directors include J. S. Lovell, Wm. Bain and M. Lash, Toronto.

The Skinner Co's. harness and carriage factory at Gananoque, Ont., was destroyed by fire May 11. Loss about \$75,000.

The Canadian Pacific Railway Co's grain elevator "B" at Fort William, Ont., was destroyed by fire May 12. Loss about \$250,000.

F. Marr, Barrie, Ont., is inviting tenders for steam heating in a Barrie Public school building.

J. Wrigley, Ayr, Ont., is inviting tenders for the building of a bridge, 400 feet in length, across the Grand River, three miles below Galt, Ont.

Thos. M. Cullon, town clerk, Huntsville, Ont., is inviting tenders for the erection of a Public school building there.

G. H. Smith's lumber, stave and shingle mill at Uthoff, Ont., was destroyed by fire May 13. Loss about \$8,000.

The W. J. Bolus Co., Limited, Toronto, have been incorporated with a capital of \$50,000, to acquire the business of the W. J. Bolus Co., and to manufacture wall-papers, mouldings, etc. The provisional directors include W. J. Bolus, Wm. Lawrence, and G. S. Redford, Toronto.

Messrs. A. Klipstein & Co., New York City, have been licensed to manufacture dyestuffs, chemicals, oils, etc., in Ontario, with a capital of \$40,000. F. Dallyn, Hamilton, Ont., is their attorney.

The Syndicate Mining Co., Toronto, have been incorporated with a capital of \$50,000 to carry on a mining, milling and reduction business. The provisional directors include S. P. Kineon, L. E. Ziegler, and Geo. Kinsey, Cincinnati, Ohio.

The Cornwall Beef Co., a United States incorporation, has been licensed to carry on a packing house business in Ontario, with a capital of \$25,000. A. G. Browning, North Bay, Ont., is their attorney.

Messrs. Sanderson & Rossiter's brush factory at Toronto, was destroyed by fire May 6. Loss about \$15,000.

The Dominion Government will purchase the Canada Eastern Railway in New Brunswick for \$800,000.

The Telfer Mfg. Co's. paper box factory, Toronto, was partially destroyed by fire May 12. Loss about \$7,000.

Messrs. J. & J. Kerr's planing mill at Petrolia, Ont., was destroyed by fire May 13. They will erect a new mill at once.

Messrs. Semmens & Evel's factory at Hamilton, Ont., was partially destroyed by fire May 9. Loss about \$10,000.

The Isolation Hospital at Ottawa will be enlarged at a cost of \$6,000.

At the Cabinet meeting a few days ago at Ottawa, a vote was passed for placing an ice-breaker on the St. Lawrence, so that navigation can be kept open longer each season. A powerful steamship of special design will be built for this purpose. It is expected that the new vessel will be ready for use this fall.

The Grand Trunk Railway Co. will install their own water supply system in their shops at Stratford, Ont.

The Stratford Gas Co., Stratford, Ont., will lay three miles of mains at a cost of \$10,000.

Geo. Fitzgerald's carriage works at Peterborough, Ont., were partially destroyed by fire May 9. Loss about \$3,000.

The McClary Mfg. Co., London, Ont., will erect a new warehouse in that city.

A new Collegiate Institute will be erected at Peterboro', Ont., at a cost of \$50,000.

The Militia Department, Ottawa, Ont., are preparing plans for the erection of new barracks at Toronto, at a cost of about \$175,000.

The Canadian Otis Elevator Co., Hamilton, Ont., will establish a branch factory in Winnipeg, Man.

Messrs. Sproatt & Rolph, architects, Toronto, are preparing plans for the elaborate decorations of the new City Hall of Cape Town, Cape Colony, South Africa, which is to be built at a cost of \$1,500,000.

W. H. Kennedy's saw and shingle mill at Omemece, Ont., was destroyed by fire May 5. Loss about \$4,500.

J. W. Crawford's sawmill and sash and door factory at Durham, Ont., were destroyed by fire May 5. Loss about \$12,000.

The Dominion Fish Co.'s new passenger steamer, the Cariboo, constructed by Wm. Marlon, of Goderich, Ont., was launched from the shipyards a few days ago. She is 150 feet long by 25 feet beam. The boiler was built at the Polson Iron Works, Toronto, and the fore-and-aft compound engine is being installed by the Goderich Engine Co., Goderich.

The Ottawa City Council will purchase a 1,000 gallon steam fire engine at a cost of \$6,000.

The brewery of the Superior Brewing & Malting Co., at Port Arthur, Ont., was destroyed by fire May 13. Loss about \$5,000.

The B. Greening Wire Co., Hamilton, Ont., will enlarge their works at a cost of \$4,500.

The new Administration Building being erected at the Toronto Exhibition grounds, will contain a large public room for the officers of the Exhibition Association. It will be constructed so as to afford every facility to exhibitors and prize takers. The building will cost \$24,000.

The ironwork department in the Stratford Manual Training School, Stratford, Ont., has been opened. The equipment consists of three forges, three anvils, two lathes, and other machinery.

John McCosh, mayor, Orillia, Ont., will receive tenders for constructing and boring a tunnel through granite rock at their power plant at the Severn River. The tunnel will be 12x12, and about 1,500 feet long.

The mayor of Oshawa, Ont., is inviting tenders for the construction of a system of sewers.

The Board of Water Commissioners at Oshawa, Ont., are inviting tenders for the construction of a system of water-works in that town.

Tenders are now being received by J. A. Ellis, architect, Manning Chambers, Toronto, for the new factory of the Pease Furnace Co. Mr. Ellis has also prepared plans for a new factory for Matthew's Bros., Toronto, and Cleland Bros., Meaford, Ont.

Contracts for interior work at the new School of Practical Science building, Toronto, have been awarded by the Minister of Public Works, as follows:— For heating and ventilating to Messrs Purdy, Mansell & Co., Toronto; plumbing and electric wiring, W. J. McGuire & Co., Toronto; boilers, the Toronto Furnace Co., and for five generators, switch-boards and engines, the Electrical Construction Co., London, Ont. The cost of this work will aggregate \$55,000. Contracts to the amount of \$235,000 have now been let for the building.

The Elliott-Millman Co., London, Ont., have been incorporated with a capital of \$40,000, to manufacture dry goods, etc. The provisional directors include J. R. Elliott, Lansing, Mich., P. McK. Millman, and G. McNaughton, London, Ont.

The Ottawa Citizen Co. have just completed a new six-story fireproof building, which is one of the finest newspaper buildings in Canada. The building is very handsome and imposing, and is a credit to the Canadian Capital. The Citizen Co. have also installed a new three-deck Hoe press, with a capacity of 24,000 papers per hour.

The Montreal, Ottawa & Georgian Bay Canal Co., which proposes to render navigable for vessels of 20 feet draught the Ottawa river from Montreal to Mattawa, from that point to canalize the Mattawa river, to cut a canal from the headwaters of that river over the height of land to Lake Nipissing, and thence via the French river to Georgian Bay, have applied to the Dominion Parliament for an extension of time for the construction of the works. The company, which is backed by British capital, have made a survey of the route, and the estimated cost of the work is \$70,000,000.

G. D. Ellis, Toronto, has been appointed manager of the Turbine Steamship Co., and the following have been appointed officers of the steamer which was launched at Hepburn-on-Tyne, England, last week, and is expected at Hamilton, Ont., to take up the run to Toronto May 24. Captain Crawford, master, Captain Maddocks, chief officer, C. Arthur, purser.

The Cormack Mfg. Co. are about to be incorporated, and will take over the patented device of Mr. John Cormack for his air cooler, refrigerator and ice making machine. The construction of this machine is very simple. The complete machine in operation can be seen at 111 Victoria street, Toronto. Mr. J. A. MacMurtry is Mr. Cormack's representative, and he reports that subscription for the stock is being taken up quite satisfactorily, and that from present prospects

it is probable the company's stock will be fully subscribed and the company in operation at an early day.

The Anticosti, a sister lightship to the Lurcher, recently launched from the yard of the Polson Iron Works, Toronto, for the Dominion Government, will be completed, and it is expected that she will be placed on her station off Anticosti island, Gulf of St. Lawrence, in June. The keel plates for the new fisheries protection cruiser for the great lakes are all ready to be laid on the blocks from which the Anticosti was launched.

Among recent shipments of Little Giant water wheels, manufactured by J. C. Wilson & Co., Glenora, Ont., have been the following to England: one 8-inch, four 14-inch, one 16-inch, three 18-inch, one 24-inch, and one 28-inch, all of the vertical type.

P. E. Ryan, secretary-treasurer, Temiskaming & Northern Ontario Railway Commission, is inviting tenders for the construction of an extension of their railway from New Liskeard, Ont., to a point on the River Abitibi about 100 miles distant.

Mr. P. Dierlamm, Stratford, Ont., has invented a cement building block, consisting of three longitudinal walls, forming double air spaces. He has also invented a machine to make the block.

J. C. Wilson & Co., Glenora, Ont., recently received an order from E. M. Berry, Clementsvale, N.S., for a deep bucket 24-inch Little Giant water wheel, gearing, shafting, bearings, etc., for the new sawmill which he is erecting at that place.

Messrs. Church & Bros.' heading mill, hoop mill and dry kiln at Sand Point, Ont., were destroyed by fire May 10. Loss about \$25,000.

The B. Greening Wire Co., Hamilton, Ont., report that there is a steady growing demand for the wire barrel hoop in place of the old-fashioned elm hoop. Coopers find such a difficulty now-a-days in getting material suitable for the wooden hoop, that not only has the price advanced to an enormous extent, but it is practically impossible to get enough stock of suitable quality to supply the demand. The consequence is that in trying to use inferior stock there is a very serious loss of time and annoyance both to the cooper and to the shipper. The wire barrel hoop consists of a piece of No. 9, 10, 11, or 12 gauge steel wire with the ends twisted together; and The Greening Wire Co. claim their hoops are made in a perfect circle, thus enabling them to slip down over the barrel into their place without binding at any particular point. The price is as low or lower than the wooden hoop. These wire hoops are now successfully used on flour, sugar, salt and apple barrels, and are coming into use in barrels for general merchandise. Any of our readers interested in this who have not already tried the wire hoop might communicate with The B. Greening Wire Co.

A. Pritchard, Kazubazua, Que., is installing in his flour mill a 21-inch Little Giant turbine, which, with the necessary gearing, shafting, etc., for transmit-



ting the power, was supplied by J. C. Wilson & Co., Glenora, Ont.

Sir Frederick Borden, Minister of Militia, states that the Dominion Government had adopted the principle of purchasing as far as possible from Canadian manufacturers, instead of, as hitherto, from the War Office or British manufacturers, equipment for the Canadian militia. In pursuance of this policy artillery harness has been purchased from H. Lamontagne & Co., Montreal. The Ottawa Car Co., in accordance with an understanding with the Government, have equipped the works at considerable expense for the purpose and are now prepared not only to make repairs to artillery equipment, but also to build new wagons, limbers and similar work. The Dominion Arsenal at Quebec has also been equipped for the same class of work.

The Canadian Pacific Railway Co. recently placed the following orders for equipment: 10 simple consolidation locomotives with the Canadian Locomotive Co., Kingston, Ont., and 11 similar locomotives with the Locomotive & Machine Co., Montreal; 6 switching locomotives at their Delorimier Avenue shops, Montreal; 16 baggage cars and 11 mail and express cars at their Hochelaga shops, Montreal; 25 30-ton box cars and 42 30-ton flat cars at their Perth, Ont., shops; and 3 vans at their Farnham, Que., shops.

J. C. Wilson & Co., Glenora, Ont., report a constantly increasing demand for their machine dressed gearing, numerous shipments having been made lately to large manufacturing concerns.

The Canada Screw Co., Hamilton, Ont., are considering extending their works.

The Hamilton Bridge Works Co., Hamilton, Ont., are making extensive alterations to their works. A new addition will be built of concrete and steel and also a new storage warehouse.

About 200 cottages will be built this summer at Balmy and Kew Beaches, Toronto.

Recent shipments of Walsh-improved double-acting water wheel governors have been made by J. C. Wilson & Co., Glenora, Ont., to The Pingston Creek Lumber Co., Revelstoke, B.C., and to D. H. Brand, Mildmay, Ont.

The American Cereal Co., Peterboro, Ont., have purchased the plant of the Peterboro Radial Railway Co., which has been inoperative for some time, and will have new rails and ties laid. W. Learmouth, of the Cereal Co., is inviting tenders for the work.

Messrs. Hugh Walker & Son, fruit dealers, Guelph, Ont., will erect a three-story building 106x50 feet to cost \$10,000.

Robt. Noble, Norval, Ont., who is remodelling his flour mill, has placed an order with J. C. Wilson & Co., Glenora, Ont., for two 33-inch Little Giant water wheels.

J. Murphy, Fort William, Ont., has awarded the contract for the erection of a three-story building at a cost of \$20,000.

The Hamilton Bridge Works Co., Hamilton, Ont., have been awarded the

contract for the superstructure of the new bridges at Winterbourne and Conestogo, Ont., at a cost of about \$25,000.

The Rathbun Co., Deseronto, Ont., have closed a contract with the Berlin and Waterloo Railway for 14,000 railway ties to be laid this summer along the line.

The Percival Plow & Stove Co., Merrickville, Ont., have recently installed a standard 18-inch and a deep bucket 28-inch Little Giant turbine, supplied by J. C. Wilson & Co., Glenora, Ont.

The Canadian Locomotive Co., Kingston, Ont., have placed an order for the installation of a hydraulic rivetting and flanging plant in their shops. The riveter will be a 125-ton machine complete with necessary hydraulic crane, accumulator, pumps, etc. This will increase the capacity of the boiler shop from 6 to 15 locomotives per month.

The Toronto & Scarboro Electric Railway Co. are applying for leave to extend their line from the Half-Way House to Highland Creek, along the Kingston Road.

The ratepayers of Port Colborne, Ont., will grant a loan of \$10,000 to the Dominion Valve & Brass Co. to locate at that town. The company is a Canadian incorporation of an American firm manufacturing the Huxley valve, and Messrs. Cullen & Johnson, brass manufacturers, Toronto, are interested.

The Arena Co. of Toronto has been organized for the erection of an arena to cost about \$50,000 at Toronto Junction. Mr. A. R. Westervelt, Toronto, is interested.

The Stratford Mill Building Co., Stratford, Ont., have placed an order with J. C. Wilson & Co., Glenora, Ont., for two 33-inch deep bucket Little Giant turbines, their contract calling for this particular type of water wheel.

Messrs. Puddy Bros., Toronto, have purchased the plants of the Pakenham Pork Packing Co., at Stouffville, Ont.

A storage battery system will be installed at the power house of the Street Railway Co. of Guelph, Ont.

The McAllister Milling Co. have completed a new sawmill at Hawksville, Ont. The building is 50 feet square. The engine, 50 h.p., and the boiler, 60 h.p., with 52 flues, were supplied by E. Leonard & Sons, London, Ont., and the sawmill equipment proper by the Waterous Co., Brantford, Ont.

The Copeland-Chatterson Co., Toronto, are considering the establishment of a factory at St. Catharines, Ont.

A new town hall will be erected at Port Dover, Ont., at a cost of \$3,000.

G. M. Miller & Co., architects, Toronto, are inviting tenders for the erection of Euclid Avenue Methodist Church.

The Stratford, Ont., City Council have voted \$1,000 for site and a ten years exemption from taxes to Messrs. Crowe & Nichols, Superior, Wis., who are to build a chair factory there at a cost of about \$25,000.

The Polson Iron Works Co., Toronto, are building a new cruiser for the Do-

minion Government Fisheries Protection Service. She will be of the twin-screw type, 176 feet long, 22 feet beam, and 8-foot draught, and will be equipped with triple expansion engines and two Scotch "water-back" boilers, carrying 200 pounds steam pressure. Her speed will be eighteen miles per hour, and she will be armed with quick-firing guns.

The Dominion Government will enlarge the Customs Bonding Warehouse at Toronto at a cost of about \$30,000.

Building permits for residences issued in Toronto during the past few days aggregate more than \$80,000.

Practically the whole Toronto coal-carrying fleet—nine vessels in all—reported at the Harbormaster's office on May 18, arriving from Oswego and Fairhaven, N.Y. The united cargoes represent a total of over 6,500 tons of hard and soft coal, the latter predominating. The names of the vessels, with the companies to whom the coal is being shipped, are as follows: Steamer Van-Allen, from Fairhaven, for the Electric Light Co.; steamer St. Joseph, from Oswego, for Dickson & Eddy; schooners Keewatin and St. Louis, from Oswego, for the Elias Rogers Co.; schooner Danforth and her consort, the steamer Erin, from Oswego, also for the Rogers Co.; schooners Van Straubenzie and Dundee, from Fairhaven, for P. Burris & Co.; and the schooner L. W. Dunn, from Fairhaven, for the Conger Coal Co.

Messrs. J. C. Wilson & Co., Glenora, Ont., are increasing their capacity by building an extension to their machine shop for the accommodation of new and heavier machine tools.

The Electric Purifying Co., Montreal, are making estimates on a new water system for Westmount, that city.

The Canada Malting Co. will install a grain elevator with a capacity of 372,000 bushels at St. Henri, Que.

A fire at Grand Bay, Que., near Chicoutimi, Que., on May 14, destroyed Price Bros. & Co.'s sawmill and the saw and flour mills owned by Mr. Petit, M.P.P.

The Montreal Harbor Commissioners will construct a powerful fire tug to protect their water front property.

Thos. Sonnes' tent, awning and sail factory at Montreal, was partially destroyed by fire May 3. Loss out \$15,000.

Messrs. Peter Lyall & Sons and the Dominion Bridge Co., Montreal, will build the fourteen new steel freight sheds along the harbor front, that city. There will be about \$1,000,000 worth of steel needed for all the sheds and this will be put in by the Dominion Bridge Co. Work on the first few sheds is to start on June 15.

About 200 new residences will be built this season at Maisonneuve, Que., at a cost of about \$200,000.

Commodore Spain, of the Department of Marine & Fisheries, has stated that the Dominion Government will place two ice-breaking steamers on the St. Lawrence route between Quebec and Montreal. There will be one large steamer, which will keep the channel at Cape Rouge clear of ice during the entire

winter, and a small steamer, which will be used between Sorel and Montreal.

The Imperial Coal & Coke Co., recently organized in Montreal with a capital of \$4,500,000, have been granted an extra provincial charter authorizing them to transact business in British Columbia. The company have secured some 60,000 acres of coal lands on Fording River, north of Michel, B.C., which they will develop on a large scale, commencing the work in the course of a few weeks. The operations contemplated include mines and coke ovens. W. H. Evans, Montreal, is president of the corporation.

The St. Lawrence Waterproof Clothing Co., Montreal, have been incorporated with a capital of \$25,000, to manufacture clothing, cloths, etc. The provisional directors include P. D. La Riviere, A. M. Joncas and L. La Riviere, Montreal.

The Quebec Steam Whaling Co., Montreal, have been incorporated with a capital of \$295,000, to do a whaling business. The provisional directors include B. Sawyer and P. McKenzie, Westmount, Que., and W. D. B. Scott, Montreal.

The Oswego Coal Co., Montreal, have been incorporated with a capital of \$20,000, to manufacture charcoal, artificial ice, etc. The provisional directors include A. E. Brunet, A. Duclos and R. J. Demers, Montreal.

The Canadian Economic Lubricant Co., Montreal, have been incorporated with a capital of \$50,000, to manufacture lubricating and other oils, etc. The provisional directors include W. B. Converse, J. Marsden and O. C. Pangman, Montreal.

The Canada Land & Power Co., Montreal, have been incorporated with a capital of \$1,000,000, to construct buildings, bridges, and to develop water powers, etc. The provisional directors include R. A. E. Greenshields, R. T. Heneker and Wm. J. Henderson, Montreal.

The Imperial Light, Heat & Power Co., Montreal, have been incorporated with a capital of \$3,000,000, to manufacture coke and peat, and to carry on the business of engineers, iron foundries, miners, etc. The provisional directors include J. W. Harris, F. D. Monk and W. B. Powell, Quebec City.

The warehouse of Messrs. Waldron Drouin Co., furriers, Montreal, was destroyed by fire May 5. Loss about \$175,000.

Mr. O. Chalifour's last factory at Quebec City was destroyed by fire May 6. Loss about \$25,000.

The Locomotive & Machine Co., Montreal, recently purchased by the American Locomotive Co., have been reorganized and the following officers elected: S. R. Calloway, president; A. J. Pitkin, vice-president; K. W. Blackwell, D. W. Morrow and Roger Miller, directors; Leigh Best, secretary; C. B. Denny, treasurer, and Roger Miller, manager. The company have contracts on hand to build ten passenger engines for the Grand Trunk, eleven consolidated engines for the Canadian Pacific Railway, three for

the Toronto, Hamilton & Belleville Railway, two for the Brockville, Westport & North-Western, two for the Dominion Coal Co., one for the Cumberland Railway & Coal Co., and one for the British Columbia Mills, Timber & Trading Co.

The Montreal Light, Heat & Power Co., Montreal, have been awarded the contract for the street lighting at Outremont, Que.

The cattle sheds at the Eastern Abattoir, Montreal, which were destroyed by fire a few days ago, will be rebuilt at a cost of \$14,000.

The Grand Trunk Railway Co. will erect a new station at Coaticook, Que.

The Caledonia Springs Co., Montreal, have been incorporated with a capital of \$200,000, to acquire the business of the Grand Hotel Co., of Caledonia Springs, and to manufacture mineral and aerated waters, chemicals, etc. The provisional directors include H. L. Peiler, F. A. Jones and W. G. Mitchell, Montreal.

The business of the Linotype Mfg. Co., Montreal, has been taken over by the Toronto Type Foundry Co. The present factory in Montreal will be continued, but the Toronto firm will not manufacture the Oliver typewriter. That business will still be carried on by the old firm.

C. A. Jaques, Montreal, manager of the Montreal-Toledo line of steamers, states that the company are considering plans for two new steamers for the route.

At a recent meeting of the shareholders of the newly-formed Imperial Coal & Coke Co. at Montreal, the following directors were elected:—W. H. Evans, Jas. W. Pyke, F. Thompson and C. W. Spencer, Montreal; R. Macdonald, Toronto; O. G. Labree and A. Laidlaw, Spokane. At a subsequent meeting of the board Mr. W. H. Evans was elected president and Mr. Jas. W. Pyke vice-president.

The Montreal & Boston Copper Co., The Dominion Copper Co., The Morrison Mines, The Athelstan & Jack Pot Gold Mining Co., and three-fourths of the Emma Mine, have been amalgamated into a new corporation to be called The Montreal & Boston Consolidated Mining & Smelting Co., Montreal, with a capital of \$7,500,000. They will erect a fourth blast furnace and a converter with a daily capacity of 1,500 tons at Boundary Falls, B.C., and will secure a coal property and erect their own coking ovens.

A company is being organized at Sydney, N.S., with a capital of \$35,000, to manufacture boots and shoes. They propose erecting a three story brick building. The provisional directors include W. H. Morley, A. M. Crofton and J. E. Burchell, Sydney.

The Newcastle Collieries Co., Port Morien, N.S., are installing new machinery, which includes a Rand air compressor of 3,109 cubic feet per minute from the Canadian Rand Drill Co., and two 500 h.p. Babcock & Wilcox boilers.

Rhodes, Curry & Co., Amherst, N.S., have received orders for 50 box cars, 60,000 pounds capacity, from the Quebec

Lake St. John Railway; for 15 flat cars, 40,000 pounds capacity, from the Dominion Coal Co., and for 250 coal cars, 30,000 pounds capacity, and seven baggage cars from the Intercolonial Railway.

The Londonderry Iron & Mining Co. have now one of their two stacks in operation, turning out foundry pig; the second stack will not be remodelled at present. The bulk of the output is used by the Eastern branch of the Montreal Pipe Foundry Co., whose new plant at Londonderry, N.S., has just been completed.

The Nova Scotia & Mexican Mining Co. are having a civil engineer examine the water power of the Northwest Arm Brook between Sherbrooke and Golden-ville, N.S., and they have made some surveys for the purpose of establishing an electric plant for supplying power at their works at Goldenville, N.S.

The Mic-Mac Gold Mining Co., at Millisigate, N.S., have been putting in new machinery, and a new boiler and air compressor. They have bought a water power at Port Medway River, N.S., and they will run the plant by electricity. The shaft is single compartment and is four hundred feet deep, a 16-stamp mill on the ground is used for crushing the ore and five stamps more will be added.

Tenders are invited by the town council of Sydney Mines, N.S., for the installation of a waterworks system at a cost of about \$75,000.

The Aberdeen hospital at New Glasgow, N.S., will be enlarged at a cost of \$25,000.

The crop of coal at Dominion No. 5, the new mine at Big Glace Bay, N.S., has been definitely located. It was found in the last test pit nine feet from the surface. The works will now be located and rushed along to completion, and the Dominion Coal Co. are making arrangements with the Government to have the Sydney and Louisburg Railway extended from Morief Junction to Glace Bay.

General Manager Plummer, of the Dominion Iron & Steel Co., at Sydney, N.S., says that his company will be manufacturing steel rails next autumn. These will be open-hearth steel rails.

The mines of Nova Scotia exhibit a constantly increasing output, which will probably soon pass 5,000,000 tons per annum. The abundance of coal in this Province and the facilities for mining it are placing Nova Scotia in strong competition with England, whose mines have passed their maximum productiveness.

A discovery has been reported of nickeliferous copper in large quantities in Cape Breton, N.S. The ore body is reported to be between 270 and 280 feet wide, carries gold and silver, and contains high values in copper and gold.

The output of the Dominion Coal Co.'s properties for April aggregated 242,625 tons, as against 236,290 for March. The output for the four months to April 30 has been 864,136 tons.

James Rogers, Montreal, has been appointed receiver of the Canada Coal & Railway Co., which owns coal mines at

Joggins, N.S., and a railroad connecting with them, and arrangements are being made to resume operations at the mines.

The first shipment of material manufactured by the small billet mill of the Dominion Iron & Steel Co., Sydney, N.S., was made to Montreal, and the first carloads of wire rods was forwarded by Intercolonial Railway to Brantford.

The Shediac Boot & Shoe Mfg. Co.'s factory at Shediac, N.B., was destroyed by fire May 11. Loss about \$50,000.

Operations have begun on the erection of the new car repair shop for the Intercolonial Railway at Sydney, N.S. The shop will be 175 feet long by 45 wide. Mr. F. L. Dixon, of that city, has the contract for the work. The building will cost in the vicinity of \$20,000, and it is expected that it will be completed about the first of August next.

The Borden Clothes Reel Mfg. Co., Campbellton, N.B., have been incorporated with a capital of \$5,000, to manufacture clothes reels, etc. The provisional directors include W. W. Borden, D. R. McEae and J. E. Miller, Campbellton.

The Central Telephone Co., St. John, N.B., will increase their capital from \$10,000, to \$209,000.

A steamer named the Granville has been launched at Shelburne, N.S., for the Valley Steamship Co. The engines are to be installed at Yarmouth, N.S.

The Newfoundland government have made a contract with Montreal and Western capitalists for the establishment of an extensive cold storage enterprise in the colony. The company agrees to erect between St. John's and Port au Basque a central cold storage warehouse, containing boilers, machinery and engines with a capacity of freezing 50 tons of ice per day; also a packing house with machinery for the reduction of fish offal and oil bearing fish material, with a capacity for freezing 30 tons of fish or fish offal per day; also a warehouse to handle and ship 100 tons of fresh fish per day, at a cost of \$250,000, and they will also erect storage bait houses at least five and not more than thirteen at the option of the Government.

The Bowring Bros., St. John's, Newfoundland, will build two steamers for coast service, 200 feet long and 31 feet deep, with a speed of 12 knots, especially designed for winter navigation.

A new drill shed will be erected at Fredericton, N.B.

H. E. Gates, architect, Halifax, N.S., has prepared plans for a new banking building for the Union Bank at Dartmouth, N.S.

Messrs. Miller & Richard, typesetters, Toronto, will erect a five-story building in Winnipeg, Man.

About 2,000,000 trees are being sent out from the experimental farm at Brandon, Man., and Indian Head, N.W.T., to be planted by farmers in the West. A. P. Stevenson, inspector of forestry in Manitoba, is at present in Brandon superintending the work of shipping out the trees. In an interview he told of the

popularity that the tree planting movement had attained in the West. In 1901, the first year of free distribution, applications were received for only 50,000. In 1902 half a million were sent out; in 1903 this number was increased to 1,000,000 and this year as has been stated, the number has reached the 2,000,000 mark. Maple, cottonwood, ash and elm are the varieties sent out.

The Kempsey House at La Riviere, Man., was destroyed by fire May 5. Loss about \$12,000.

An examination of the anthracite bed discovered on the boundaries of the Canadian National Park, near Baufr N.W.T., discloses a solid 10-foot seam of the very best anthracite. The seam runs 10 miles in a southwesterly direction and varies from 6 to 10 feet in thickness. Analysis show it to contain from 75 to 80 per cent. of carbon, and extensive development work is now under way.

The assessment rolls for Winnipeg, Man., have been completed for the year. The assessment in round numbers is placed at \$48,000,000, and the population at 67,000. Last year the figures were \$36,231,920, and 56,603.

Messrs. Deeks & Deeks, Winnipeg, Man., have been awarded the contract for the construction of a tunnel in that city for the Canadian Pacific Railway Co. The tunnel will have five concrete arches, reinforced by steel work, and eight tracks, the cost will be about \$115,000.

The J. H. Ashdown Hardware Co., Winnipeg, Man., have been licensed to do a hardware manufacturing business in British Columbia with a capital of \$1,000,000. H. G. Goodeve, Nelson, B.C., is their attorney.

A floating drydock will be constructed at Vancouver, B.C., at a cost of about \$1,000,000.

The Pacific Coast Steamship Co., have chartered two vessels to carry coal from Ladysmith, on Vancouver Island, to Nome, Alaska; the intention is to carry from 15,000 to 20,000 tons during the season.

The Consolidated Cariboo Hydraulic Mining Co., have been much hampered and delayed for several seasons by lack of water, although their fine systems of reservoirs and ditches are very extensive. They will undertake this season to dam another lake and make its waters tributary to the old system by the construction of another ditch some 15 miles in length. The construction cost of obtaining this additional supply is estimated at \$250,000.

The British Columbia Electric Railway Co., will build, during the current year, at their Vancouver shops 10 convertible city cars, 20 feet long; one double truck interurban car 30 feet long; three interurban cars 50 feet long, and one flat car.

The White Bear Concentrator is now being constructed at Rossland, B.C.

The A. J. Burton Saw Co., recently organized at Vancouver, B.C., with a capital of \$75,000, have purchased the site for their works and commenced building operations.

The plan of the Canadian Pacific Railway Co. for extensive irrigation in the west has become an assured fact, and tenders will be called in Vancouver, Chicago, Montreal, Winnipeg, and Calgary for the main canal excavations. The project will be started near Calgary, and if it proves as successful as the company's engineers have every faith that it will, over 3,000,000 acres of land will be reclaimed and rendered cultivable. The land is now lying waste, owing to the lack of moisture, that region being subject to cycles of extreme drought. It is believed that the irrigation plan will render fully 1,500,000 acres fit for growing cereals of all kinds, while the remainder will be devoted to grass cultivation and grazing purposes. At present the company will irrigate 300,000 acres, and after colonizing that will extend the works until the entire area is covered. Mr. Tighe, assistant engineer of the company, states that tenders for the canal work would be invited at once, though the actual operations will not be commenced before spring. Mr. J. S. Dent is the engineer in charge of the work at Calgary. There will be two canals used to irrigate the tract, a main canal 35 miles long with a width at bottom of 60 feet and carrying 10 feet depth of water. This will be built first and will be used to carry water to the secondary canal, which, when completed, will be 115 miles long. To make the main canal, 250,000,000 cubic feet of earth will be removed. The work will be done by steam shovels etc. The project is the largest of the kind ever attempted on the continent.

The harbor at Vancouver, B. C., will soon be equipped with much better docking facilities than at present. The Victoria Machinery Depot Co. are about to install a marine railway and dry dock of large size. The plans for this structure have been prepared by the H. I. Crandall & Son Co., Boston, Mass. They show a dock which will be 65 ft. wide and have a length of 264 ft. on the keel blocks, and carrying capacity of 3,000 tons. Very solid construction has been employed throughout, all the under framing being heavy structural steel, and the dock floor and sides of heavy timber work. Messrs. Crandall & Son are sparing no expense to make this a model of its kind, and have placed the inspection of the work in the hands of the De Lano-Osborn Engineering Co., Toronto. The steel has been ordered from the mills and the work will be finished as rapidly as possible so that the dock may be in service by the middle of the navigation season or perhaps even sooner. When completed, this will prove a very welcome addition to the port's equipment for handling large vessels.

The Consolidated Mining & Smelting Co., have been incorporated at Victoria, B. C., with a capital of \$2,500,000, to carry on a mining, smelting and refining business.

The Dominion Government will erect a new drill shed at Rossland, B. C.

The Jackson Bushing Spring Co., Jackson Mich. are preparing to erect a plant in Canada.

The Glen Falls Portland Cement Co., Glen Falls, N. Y. have registered in Quebec and opened sales offices at 224 Board of Trade Building, Montreal, in charge of W. A. Cook. The company manufacture the "Iron Clad" "Invicta" and "Adircndack" brands of cement well known to the trade.

The mines of the Crow's Nest Pass Coal Co., Crows Nest Pass, B. C., are operating steadily and turning out a good tonnage. While as a general thing the output of these mines increases about 50 per cent, a year, one of the officials of the company is quoted as saying that the prospects are favorable for a 100 per cent, increase during the present year.

The Manitoba Lumber Co., have been incorporated at Victoria, B. C. with a capital of \$100,000, to construct and operate shingle and sawmills, etc.

The New Monashee Mines, Ltd., have been incorporated at Victoria, B. C. with a capital of \$1,000,000, to carry on a mining, milling and smelting business.

The Washington Mine, Ltd., have been incorporated at Victoria, B. C. with a capital of \$200,000, to carry on a mining and reduction business.

The Kryslin Mfg. Co., Limited, Victoria, B.C., have been incorporated with a capital of \$7,000, to acquire the business of the Kryslin Mfg. Co., and to manufacture Kryslin and extracts.

A land slide occurred at the Silver Cup Mine at Ferguson, B.C., April 15, which destroyed 1,600 feet of tramway, ore sheds and the machine shop. Loss about \$75,000.

The Rocky Mountain Oil Co. have struck an oil flow of 550 barrels per day in their 1,300-foot well, recently bored near the Flat Head Reserve, on the eastern slope of the Rockies.

The Dominion Government have purchased the German antarctic exploration steamer Gauss, to be used as a survey and patrol vessel in Hudson's bay and other points on the Arctic ocean.

Many millers, even some old in the business, are often puzzled to know why the sale of their flour, under their brands on the market for years, is not larger. The fault lies in the neglect of the firm to come before the public prominently. The grocer's clerk may be an independent factor in helping the miller to dispose of his flour, but the brand—its peculiarity of coloring, its general design and the value of the flour—must be fixed in the consumer's mind regardless of the efforts put forth by the retailer. This can be done by careful advertising. A good standing advertisement that is not only attractive but highly valuable is the transfer window sign, such as the Meyercord Co., of Chicago, Ill., makes. This company's reproductions of mill brands, bags and barrels, are used to a considerable extent by millers because of their trade-pulling powers. Samples and quotations will be gladly furnished by the Meyercord Co.

The Rothesay Lumber Co., have been incorporated at Victoria, B. C. with a capital of \$10,000, to manufacture lumber, etc.

## PERSONALS.

Mr. Alexander MacLean, Canadian Trade Commissioner to Japan, who is now in Canada, but expects to sail from Vancouver about May 23, for Yokohama, where he will make his headquarters: while in Toronto a few days ago mentioned a number of lines of manufactures in which he considered a very considerable trade might be worked up between Canada and Japan. The principal of these were flour, cured meats, such as ham and bacon, dried fish, paper and pulp, cottons, woollens, rubber goods, sewing machines, plated ware, nails, wire, hand tools, lumber, house-boxed furniture, organs, pianos, hides and leather. A great social and economic change is going on in Japan, remarked Mr. MacLean. At one time they used no furniture at all, they required neither chairs, tables nor beds. Now, however, they are getting western ideas and are using western manufactures. There is a population there of between 45 and 46 million people, and a very slight change in their methods of living would mean a great deal in the way of purchasing power. If the war with Russia lasts for any considerable length of time, it will probably lead to a large increase of trade between that country and this. Certainly Japan will require large commissariat supplies which Canada is in a position to furnish, such as flour, meats and fish. These supplies would not be considered contraband of war, because there is no war in Japan. We should be able to largely increase our exports of flour to Japan. The millers of the United States have that trade very largely in their hands, but our Northwest flour is better than the American flour, and, while it may cost a little more, there should be a good demand for it.

At the annual meeting of the Canada Club, held in Toronto April 25, the following officers were elected for the ensuing year: President, George A. Howell; first vice-president, Mark H. Irish; second vice-president, C. W. I. Woodland; secretary, A. E. Heustis; literary correspondent, J. H. Bone; treasurer, C. Herbert Wood. Committee, Rev. H. J. Cody, Harold Van der Linde, A. L. Crossin, S. P. Gundy, Jos. A. Thompson, Dr. Harold Clarke, W. R. P. Parker (ex-officio).

Alfred J. Stevens, Toronto, Consulting and Mechanical engineer who represents a number of leading manufacturers, has opened new offices at 49 Canada Permanent Building.

Merwin Armstrong has opened a machine shop at 18 Shepherd St., Toronto, and installed a number of improved machine tools. He will conduct a general machinist business.

The Consolidated Electric Co., Toronto, have removed to 710 Yonge St.

E. Von der Osten & Co., Toronto, have designed a new brick machine for William Beith, Toronto. The machine is being built by the Weddell Bridge & Engine Works, Trenton, Ont. Among the other special machinery being designed by E. Von der Osten & Co. may be mentioned

a new rotary engine for J. A. Leask which is being built by the Dominion Motor & Machine Co., Toronto, also a number of other engines and machines for inventors for which patents are now pending. The company make a specialty of clear and accurate drawings of all kinds. Mr. H. Etches, the well-known Toronto consulting engineer has recently become associated with the company.

Mr. C. C. Hoyt who has been connected with the Canadian Rand Drill Co. for some time is now in charge of the Toronto office of the company, 1103 Temple Building.

Mr. J. H. Duthie, Toronto, and until recently, president of the Chicago-LaSalle Coal Co., Chicago, Ill., has accepted the position of Canadian sales agent for Jules G. Hoffman, a prominent miner and shipper, whose general offices are at Detroit, Mich. Mr. Duthie is now visiting the Canadian trade.

The Canadian Rand Drill Co., have removed their Montreal offices to the new Imperial Bank Building, St. James and McGill Streets.

Mr. L. H. Beard, representing a line of English tool steel has opened offices at 369 St. James St., Montreal.

The Hall Engineering Co., Montreal have filled up a modern machine shop at 14 Cole St., and will engage in a general machine and engineering business.

Mr. C. D. Teneyck has succeeded Mr. H. P. Hubbard as Canadian manager for E. C. Atkins Co., Indianapolis, Ind. Mr. Hubbard has been appointed general sales manager with headquarters at Indianapolis.

The Shipway Bell & Wire Co., 33 Richmond Street East, Toronto, will remove to 62 Richmond Street East where they have secured larger quarters.

Mr. A. C. Leslie of the firm of A. C. Leslie & Co., Montreal, was in Toronto and other Ontario manufacturing towns the past week in the interest of his company.

Mr. F. B. Leslie, western representative of A. C. Leslie & Co., Montreal, has resigned that position and is now a member of the newly organized Stanyon Metallic Furniture Co., who have absorbed the Empire Machine & Metal Stamping Co., and the Toronto Iron & Brass Bedstead Co.

Mr. George B. Frank, connected with the Syracuse Smelting Co., Montreal, is writing a series of interesting articles relating to "Metals, their Origin and Nature," his last article being upon Gold, Silver and Mercury.

The Kay Electric Dynamo & Motor Co., Toronto, have removed their plant to Johnston Lane and opened up offices at 22 Toronto Arcade.

Mr. F. B. Polson and Mr. J. B. Miller of the Polson Iron Works, Toronto, have been in Great Britain looking over the ship yards for new ideas. Mr. Polson expresses the hope that in the future Canada will build her own turbines.

Mr. J. C. McQuiston, until recently secretary, has been appointed superintendent of the Westinghouse Co's. pub-

lishing department, having charge of matters relating to the publicity of the products of the various Westinghouse interests in the United States and Canada.

Chas. G. Shepard, Ellicott Square, Buffalo, N.Y., has been shipping considerable pig iron and coke into Canada. He carries a line of Mahoning valley northern iron from lake ores, different brands of Tennessee and Alabama foundry iron, and the "Globe" brand used as an auxiliary iron. This iron is an absolute softener fluidizer, and is made from Jackson County, Ohio, ores. Mr. Shepard also handles genuine 72 hour Connellsville foundry coke, and is well equipped to handle orders at short notice.

Mr. C. Harrison, Seattle, Wash., will erect a five story hotel in Vancouver, B.C., at a cost of \$75,000.

Mr. E. R. Frost, secretary of the National Machinery Co., Tiffin, Ohio, was in Toronto last week in connection with his company which is represented in Canada by the A. R. Williams Machinery Co., Toronto.

The Geigy Aniline & Extract Co., whose New York office has heretofore been located at numbers 104 to 196 Murray St., announce their removal to new quarters at 69 Barclay Street, between West Broadway and Greenwich St., New York.

Mr. H. H. Wotherspoon, jr., compressed and manufactured fuel expert, 150 Nassau St., New York, has contributed an interesting article on preparing peat for fuel purposes by the briquetting system. Mr. Wotherspoon has made a close study of this subject for some years and parties interested in Canadian peat-fields will do well to communicate with him.

Mr. J. B. Palmer general sales agent of the Dunbar Fire Brick Co., Pittsburg, Pa., was in Toronto last week in the interest of his firm which have a considerable Canadian trade.

The name of the American Machinery Co., Grand Rapids, Mich., manufacturers of high grade wood-working machinery has been changed to "Oliver Machinery Co." This change is solely as to name, and the production of Oliver wood-working and pattern shop equipment will still conform to the previous standard which has made the products of this concern so well known throughout the United States, Canada and Great Britain.

#### ALLIS-CHALMERS-BULLOCK CO.

An important industrial deal was recently completed at Cincinnati, O., when the papers were signed which gave the Allis-Chalmers Co. control of the Bullock Electric Manufacturing Co., of that city. As a result of the deal the Bullock electrical plant will be enlarged so that there will ultimately be employed from 2,000 to 3,000 hands.

By the terms of the contract there will be a new company formed, with a paid-up capital of \$500,000. George Bullock, president of Bullock Electric Co., is to be president of the new company, and Joseph S. Neave will be the vice-presi-

dent. These two men, with three representatives from the Allis-Chalmers Co., will form the board of directors.

The new company will be known as the Allis-Chalmers-Bullock Co. The Canadian headquarters are located in the Coristine building, Montreal with branches in Toronto and other Canadian cities.

#### NEW RAILWAY COMMITTEE.

The Ontario Government have taken advantage of the act passed in 1902, and appointed Hon. F. R. Latchford, Hon. R. Harcourt and Hon. John Dryden as the Railway Committee of the Executive Council. Mr. W. B. Wilkinson, Assistant Law Clerk of the Assembly, will be Secretary of the committee.

Owing to the large number of electric railways that were being projected, it was felt when the act was passed, two years ago, that the many important questions frequently arising affecting municipalities should be referred to some regularly constituted body for adjustment. Until recently, however, it was not found necessary to take advantage of the provision.

The committee have jurisdiction over all railways, electric railways and street railways, subject to the Legislature, and may exercise the powers conferred on the Lieut.-Governor in Council and the Commission of Public Works by the railway act of Ontario or any special act respecting railways. It is authorized to superintend agreements between railways for running rights, crossings, etc., and to settle disputes between railway companies and municipalities with respect to service, rates and speed of cars. It has the same powers as the High Court in regard to the summoning of witnesses, and may hold its sittings at any place in Ontario.

Under the same act, electric and street railways are given power to connect with the lines of any other companies or obtain running rights, provided that "no such agreement shall be acted upon in any municipality affected thereby until the assent of the municipality or until an order has been made by the Railway Committee, pursuant to the provisions of the act after due notice to the municipality."

#### INDUSTRIAL 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.)

"The Comparative Efficiency of Internally-fired and Externally-fired Boilers," is the subject of a paper by Mr. D. W. Robb, of the Robb Engineering Co., Amherst, N. S., published in the Engineering Magazine for April. The article is illustrated with diagrams of boilers fired both externally and internally, and shows the conclusions arrived at by Mr. Robb in his most thorough and exhaustive study. The Editor of the Engineering Magazine makes the following

comments upon Mr. Robb's paper: It is generally admitted that theoretically the internally-fired boiler should have a lower efficiency than any form which gives better space for combustion, and less close proximity of the fire to the cooling surfaces. It is not often that the two types of setting have been accurately and impartially compared, and hence data and results of trials, made by independent authorities upon boilers of nearly the same capacity, with practically the same coal, and under closely similar conditions, demand unbiased presentation. It must be clearly understood that Mr. Robb's article is not a comparison between two different makes of boilers, but between two different types of furnaces, types which are open to the entire engineering profession, for use both on land and at sea, the whole forming a valuable contribution to practical steam engineering.

The Goldie & McCulloch Co., Galt, Ont., have issued a catalogue on "Ideal High-art Engines," which is a very artistic production, and sets forth clearly the advantages of these engines.

Under the title of "Friends," Sheldon & Sheldon, Galt, Ont., have issued a booklet containing a list of Canadian firms now using their heating, ventilating and drying systems, mill exhausters, dust collectors, mechanical draft fans, portable forges, etc.

"Noark" fuse and service boxes are mentioned in a new folder by the Canadian General Electric Co., Toronto.

"Worthington Centrifugal Pumps" are described and illustrated in a new catalogue just issued. Considerable historical information on the development of pumps is also given. Copies will be mailed on application to the John McDougall Caledonian Iron Works Co., Montreal.

The Peterboro Canoe Co., Peterboro, Ont., have issued a very fine catalogue of their well-known line of canoes and other small water craft. The various lines of canoes are finely illustrated; complete description and prices are also given.

The Black Diamond Steamship Co., owned and operated by the Dominion Coal Co., Glace Bay, N. S., have issued a new folder giving the sailings of their vessels for the season.

"Thermit," a new welding material, is the title of a treatise issued by William Abbott, Montreal, Canadian agent for the new material.

The Milner-Petrolia Wagon Co., Petrolia, Ont., have issued a handsome catalogue on farm and freight wagons. Manufacturers and others will be interested to know that this company builds a full line of heavy freight wagons, trucks, etc., especially adapted to factory purposes.

The London Machine Tool Co., London, Ont., have issued a catalogue on "Planers and Shapers." Details of construction of these machine tools are given, and the catalogue is finely illustrated. Mention is also made of lathes, drills, hammers, punches and shears, and other tools manufactured by them.



The Canadian Rand Drill Co., Sherbrooke, Que., have issued an attractive colored folder on their Imperial pneumatic riveters and hammers.

We have received the new "Wood-working Machinery" catalogue of Messrs. Clark & Demill, Galt, Ont., one of the finest of its kind we have seen for some time. It is printed on the finest paper and contains nearly fifty illustrations of the different machines manufactured by the company. Aside from the complete description and specifications of the different machines, the catalogue gives rules for calculating the speed of drums or pulleys, and full instructions for ordering any machine or part. Parties interested should write for this catalogue.

"Wire Rope Lubrication," by the Jos. Dixon Crucible Co., Jersey City, N. J., treats of the advantages of Dixon graphite for this use.

The Indicator Instruction Co., Scranton, Pa., have issued a booklet on their correspondence system of learning engine indicating.

A. J. Stevens, Toronto, Canadian agent for the Trussed Concrete Steel Co., of Detroit, Mich., is mailing printed matter on this system.

"The Coal Trade Annual, for 1904," by Frederick E. Seward, editor of the Coal Trade Journal, New York, is a handbook of interest to every coal operator in the Dominion as well as to the hundreds of coal dealers, and thousands of Canadian manufacturers, who are large coal and coke users. This is the thirty-first year of publication of "The Coal Trade Annual"—a compendium of coal production, prices, transportation, etc., in every way up-to-date.

"The Iron Age Directory for 1904," just issued, contains a complete classified list of goods advertised in that journal.

The Seaforth Engine & Machine Works, Seaforth, Ont., have issued a new catalogue on the new "Bell" automatic engine.

C. W. Bongard & Co., Toronto, agents for Hart Mfg. Co., Hartford, Conn., have issued folders on Diamond "H" switches and other electrical supplies.

The Jeffrey Mfg. Co., Columbus, O., have issued a supplement to their recent "Century" rubber belt conveyor catalogue. The latest booklet is devoted to sectional conveyors.

The John Steptoe Shaper Co., Cincinnati, Ohio, have issued a folder illustrating the Steptoe geared and crank shapers. The A. R. Williams Machinery Co., Toronto, are Canadian agents for this well known line of machine tools.

#### HARBOR IMPROVEMENTS AT PORT COLBORNE, ONTARIO.

In an article describing improvement work in the harbor of Port Colborne, Mr. Emile Low, who is connected with the United States government engineer office at Buffalo, says that the Dominion of Canada has expended on the original construction and the enlargement of its several canals the vast sum of \$84,000,000, and a further sum of \$19,000,000 has

When writing to

been expended on their repair, maintenance and operation; making a total of \$103,000,000, a sum greater than it is contemplated to spend in the enlargement of the Erie canal. Continuing, Mr. Low says:

Since the opening of navigation in the spring of 1900, by means of the enlarged Canadian canal system and the intermediate waterways, passage to vessels, drawing 14 feet of water, from Lake Superior to the head of the ocean navigation at Montreal has been afforded. The through route between Montreal and Port Arthur, at the head of Lake Superior, includes 73 miles of canal and 965 miles of river and lake waters, or a total of 1,038 miles. To Duluth the total distance is 1,162 miles.

The enormous tonnage of the great lakes is well known. It is impossible to convey within a reasonable space an adequate idea of its extraordinary extent. The grain receipts of Buffalo alone are in the neighborhood of 200,000,000 bushels annually. The Canadian government is making strenuous efforts to get a share of this enormous traffic by the expenditure of large sums of money in the further improvement of its waterways. In furtherance of this expectation, extensive harbor improvements are being made at Montreal, and also at Port Colborne. With this end in view, and concurrent with the canal improvement work at the entrance of the Welland canal, the Department of Public Works of Canada has awarded a contract for the construction at Port Colborne of a breakwater 5,700 feet in length, extending from Sugar Loaf Point into deep water, having for its object the formation of a sheltered enclosure of over 400 acres in extent, with (after the necessary dredging shall have been performed) 22 feet of water at the lowest stage, thereby permitting the largest vessels now operating on the lakes to seek the shelter of the Canadian shore and be under the lee of this breakwater in perfect safety, under any wind from any quarter. Inside of that protected area the shipping will find, when the plans are carried into effect, the necessary pier and elevator accommodations for loading, unloading, and transshipment. These Port Colborne improvements comprise the deepening of the approaches to the canal to 22 feet, and the construction of two docks, with piers 200 feet wide, upon which grain elevators will be erected to transfer grain to the 14-foot draught canal boats when required. The completion of these improvements with the magnificent breakwater nearly finished, will provide one of the finest artificial breakwaters in the lakes. Without any flourishing of trumpets, but in a quiet, unostentatious way, the Canadian government is spending over \$2,000,000 for these works.

The existing harbor works consist of a timber pier jutting out into the lake a little over one-third of a mile, at the outer end of which the present lighthouse is situated. This structure, known as the west pier, affords shelter to the actual entrance of the Welland canal, and also serves as a guide to vessels in making the

entrance from the lake. The trend of the shore west of Port Colborne is to the south, terminating in what is known as Sugar Loaf Point. The new breakwater extends from this point lakeward about 5,700 feet, its direction being a little south of east, its eastern extremity about on a line with the west pier extended. Viewed from the lake, the breakwater was an imposing structure last fall. It rose about 12 feet above water level, its outer face of water-washed timber sheeting glistening in the sunlight like polished steel, with the water breaking in ripples over the stone riprap which showed itself in spots here and there above the lake surface. The breakwater is built of submerged timber cribs, resting upon rock bottom, with the tops of the cribs level with the water and filled with rubble stone. On top of the cribs rises the superstructure, also built of timber. Part of the breakwater, where it is subjected to the greater force of the waves, is 50 feet wide, and is constructed of two lines of cribs. The inner line of cribs above water level is covered with a sloping deck of concrete. A lighthouse has been also in course of construction during the last season at the lake or outer end of the new breakwater or pierhead which forms its termination. The depth of water at the outer end of the breakwater is 22 feet, which rapidly decreases to the shore. Three powerful drill boats have been at work excavating a large area to a sufficient depth to float the largest lake carriers. Perhaps the most interesting feature of the improvement is the dock at the southern end of the west pier. There are to be two parallel piers, each 200 feet wide and 700 feet long. Between these piers is a slip or basin 200 feet wide and 600 feet long, having a depth of water of 22 feet. There will also be sufficient depth of water for vessels to lie alongside the outside of the piers, thus giving the berthage at one time for four of the largest lake carriers afloat. It is intended to erect modern types of grain elevators on these piers for the transference of grain.

The proposed plan is to make Port Colborne a point of transshipment, the same as Buffalo. The monster carriers with their cargoes of grain will unload here, the grain being then reloaded into vessels of canal size and taken seaward by means of the enlarged Canadian canal system and intermediate waterways, which now afford a minimum depth of 14 feet of water from Port Colborne to the head of ocean navigation at Montreal, and which will accommodate vessels 255 feet long and 44 feet beam. As an index to the carrying power of the new canal boat, it may be observed that a typical vessel, the Aragon, whose length is 247 feet and width 42.6 feet, has passed through the Welland canal carrying 2,212 tons of corn.

The piers are being constructed in the most substantial manner. The substructure, or part under water, is built of timber cribs, filled with stone and resting upon the solid rock. Above water the piers are formed of concrete walls, resting upon huge concrete blocks, founded on top of the cribs. It was first intended to

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fill in the space between the concrete walls with rubble stone, but this filling was afterward held in abeyance, pending the decision as to the proper form of foundation for the elevators. Other improvements in progress or already finished include the deepening of the entrance to the Welland canal basin and the construction of substantial concrete wharves along both sides of the latter, which banks, beside serving a utilitarian purpose, also form beautiful esplanades in the heart of the town. The miter sills of the entrance or guard lock at Port Colborne have also been lowered, so that there is now 17 feet of water over them. The long level between Port Colborne and Thorold has also been deepened, so as to allow plenty of water for all stages. The large expenditures of money in the development of the Canadian all-water route to the seaboard are already bearing fruit. A fleet of ten vessels was in commission last summer, carrying large quantities of grain, with the result that for the month of August alone there was a shortage of 3,000,000 bushels in the receipts at Buffalo.

#### TELEPHONES IN NOVA SCOTIA.

A new long distance-distance telephone system, with 292 miles of copper wire, furnished by the Wire & Cable Co., Montreal, has been opened between Halifax and Sydney, the offices being equipped with the standard relay-energy system, including the latest improvements. The reports of the company show that in Nova Scotia there is one telephone in use for every 88 inhabitants. In the city of Halifax there is one to every 27 persons, while in other towns the proportion is between 20 and 30.

The report of the general manager of the Nova Scotia Telephone Co., shows 790 miles of poles for their long-distance lines, and 2,246 miles of copper wire. The total mileage of telephone wires in the province is 7,136, and the total miles of posts is 791. The number of telephones in the province is 3,260, of which 1,801 are in the city of Halifax.

Last year the company transmitted 14,000,000 messages. The long-distance line unites Truro, Amherst, Bridgewater, New Glasgow, Windsor and Sydney.

The average number of calls per day, per telephone, in Halifax is 11, compared

with 7½ under the old system. Halifax answers daily 18,000 calls; the average per telephone being only 10, although some instruments go as high as 150 calls a day. The rates for conversations of three minutes between Halifax and points in Cape Breton are each \$1.25 in the daytime and 65 cents at night between 6 p.m. and 8 a.m.

#### \$50 TO CALIFORNIA AND RETURN.

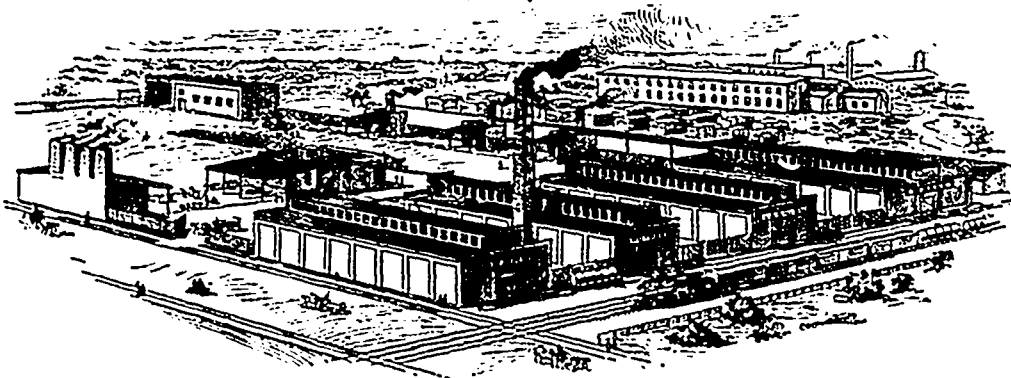
Via The Chicago, Union Pacific & North-Western Line, from Chicago, April 23 to May 1. Choice of routes going and returning. Correspondingly low rates from all points. Two trains a day from Chicago through without change. Daily and personally conducted tourist car excursions. Write for itinerary and full particulars regarding special train leaving Chicago, April 26. B. H. Bennett, 2 East King St., Toronto.

#### EFFICIENT FIRE ESCAPES.

In recent issues of this journal we have pointed out a number of the more important features of modern fireproof con-

## CORUNDUM WHEELS, EMERY WHEELS and GRINDING MACHINERY

CANADIAN CORUNDUM  
WHEEL CO.  
HAMILTON, - ONT.



## It is nearly Half a Century

since we commenced to make Varnish. During this period we have acquired a knowledge not only of Varnish, but of the varied needs of varnish consumers that nothing but time can impart, and have also learned how to cater successfully to every varnish want.

Our experience belongs to those who use and sell Berry Brothers' Varnishes. Safest goods to handle, surest and most reliable goods to use.

WRITE FOR CATALOGUE.

**BERRY BROTHERS, Limited, - Walkerville, Ont.**



struction, and of appliances for preventing and controlling fire in office, factory and warehouse buildings; and in another page will be found further information in this connection. A matter which has been pointed out to us is the defective laws on the regulation of fire escapes on public buildings, and the need of a thorough revision of the Acts on this subject.

The fire escapes on many of the industrial buildings in Toronto, Montreal, and other Canadian cities are the merest pretences, to which few men would trust their lives. Hundreds of girls are employed in many of the factories, and in times of fire a panic is almost certain to result and many lives probably lost in attempts to escape by such fire escape appliances.

A leading Canadian manufacturer and an expert in such matters has lately made some observations on this point and says that an efficient appliance is in use in Buffalo, similar to that which he has for some years advocated here. By this method the exposed sides of the fire escape are inclosed by woven wire or wire lattice work, which make it impossible for anyone to fall while leaving

a building by the fire escape. The idea is worked out in an attractive manner, so that no objection can be raised to its adoption so far as appearance is concerned, and the cost of such work is a bagatelle as compared with the lives which may be saved in cases where a large number of employees have to use this method of exit in time of fire.

**STEAM TURBINE POWER PLANT.**

An interesting departure in engineering practice by the authorities of the United States Navy, Department of Yards and Docks, is marked by the introduction of Westinghouse-Parsons steam turbines for furnishing power for lighting the buildings and yards, and power for operating dry dock pumps and miscellaneous machinery.

The initial installment of this character is in process of construction at the Charlestown Navy Yard, Boston, Mass., and for the present, one Westinghouse-Parsons turbine generating unit of 750 K.W. capacity will be placed in service. This turbine is now under construction at Pittsburg. A Worthington surface condenser will be employed, using salt water for circulation. The condensers will be located

between the foundations, which consist of concrete piers. A running vacuum of 28 inches will be secured through the aid of a dry air pump. Steam will be furnished at 150 pound pressure by Babcock & Wilcox boilers in units of 350 horse power, equipped with Roney mechanical stokers. Coil superheaters in the boiler settings will furnish to the turbine a superheat of about 100 deg. F. The boiler house will be equipped with a complete outfit of coal and ash handling machinery.

The turbine plant will supply 3-phase alternating current at 2,300 volts, this voltage being used for general distribution and for direct use in larger motors, while for lighting, lower voltage will be provided by transformation. The turbine generator will be served by a 37½ K. W. Westinghouse compound exciter unit.

The engineering work is under joint execution by the Department of Yards and Docks and the constructing engineers, Westinghouse, Church, Kerr & Co., who are installing the plant.

**A TRAVELLING MACHINE SHOP.**

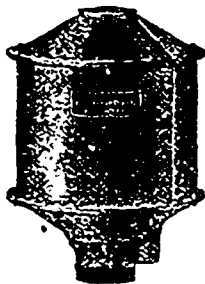
The success of the repair ship Vulcan, of the United States Navy in the Spanish-American war, suggested to the engineers

Intelligent Crucible making should be met by careful Crucible handling—warm, dry storage away from damp ground—a gradual warming up on a low fire the first time used. A trial order will be convincing.

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**B. F. STURTEVANT CO.**  
BOSTON, MASSACHUSETTS

New York Philadelphia Chicago London 331



of Morgan Construction Co., Worcester, Mass., the use of a freight car properly equipped for a portable machine shop. In the erection of rolling mill plants it has frequently been found necessary to have on the ground several machine tools with some means for operation on which to do the small jobs of fitting and operation which cause so much delay if the parts have to be sent to a machine shop. The expense of installing tools and the depreciation on account of exposure was very excessive, and the machine shop car has proved to be a great success. It is sent to a plant whenever the erection is to begin and remains there on a siding ready for immediate use until the work has been finished when it is despatched to the next field of operations. The car itself is an 80,000-lb. capacity box car with standard inside dimensions of 8 feet 6 inches by 36 feet, fitted up entirely by Morgan Construction Co.

The windows are somewhat embedded in the sides of the car. This was done in order that the wooden sections removed might be replaced over the windows as

protection for the glass while the car is in transit or not in use. The motive power is obtained from an 8 h.p. Walrath gasoline engine. One of the difficulties of using a gasoline engine in such a small place where a forge and combustible material would often be used, was to locate the gasoline supply tank where there would be no danger of explosion. This was overcome by bolting the gasoline supply tank underneath the car. This tank has a capacity of 74 gallons. For cooling the engine cylinder, a 300-gallon water tank was placed inside the car. The exhaust muffler is bolted underneath the car. The engine is connected to the shaft by means of a belt running on a clutch pulley so that the power may be shut off at any time without stopping the engine. The main line of shafting is 1 1/2-16 inch diameter and 15 feet 3 inches long.

The car is equipped with a 20-inch Reed lathe, an 18-inch stroke Stockbridge shaper, a Norton emery wheel grinder, a Champion Blower Co's. forge, an anvil and a good-sized work bench. It also

has all the necessary auxiliary tools for these machines. There is wiring for lighting by electricity, the current being taken from the nearest point where electricity is available, and acetylene lamps are provided for use when electricity is not to be had. Steam pipes for heating purposes are run along the side of the car, the steam also being taken from the nearest convenient supply.

The end of the car has a section reserved as an office for the superintendent of erection. In this office are a roll top desk and chair and a cabinet where blue prints and drawings are filed. A sink and toilet case with mirror complete the equipment. There is at this end of the car, a rack where tools, bolts and supplies are kept. The car is entirely complete with all necessary tools, lubricants, supplies and, in fact, all ordinary items that a machine shop is likely to require. It has been found of much practical value in field work, saving the superintendent of erection much time, trouble and traveling when machine work is required without delay.



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Glens Falls Portland Cem. Co.,	Glens Falls, N.Y.	Alma Cement Co.,	Wellston, Ohio
Cryers Lake Cement Co.,	Ithaca, N. Y.	Acton Portland Cement Co.,	Penton, Mich.
National Portland Cement Co.,	Durham, Ont.	Penn-Allen Portland Cement Co.,	Allenstown, Pa.
Sandusky Portland Cement Co.,	Syracuse, Ind.	Martins Creek Portland Cement Co.,	Martins Creek, N. J.
Newaygo Portland Cement Co.,	Newaygo, Mich.	Wolverine Portland Cement Co.,	Coldwater, Mich.
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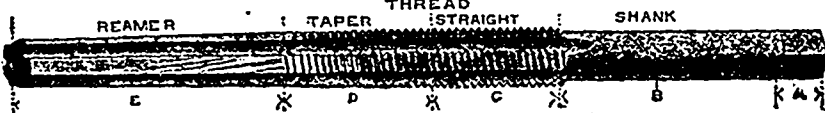


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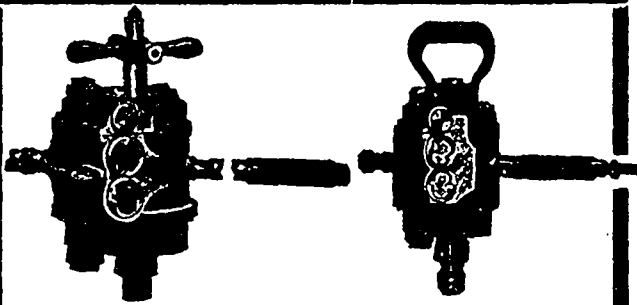
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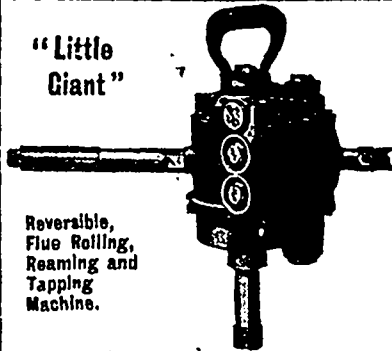
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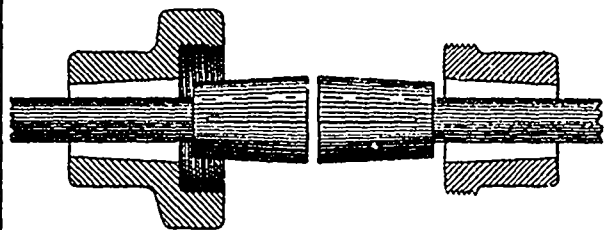
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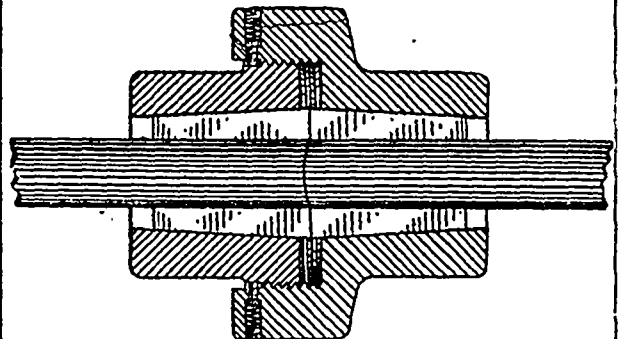
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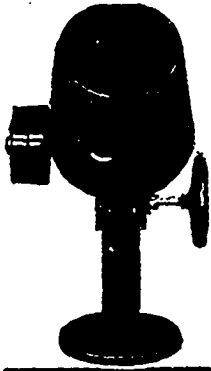


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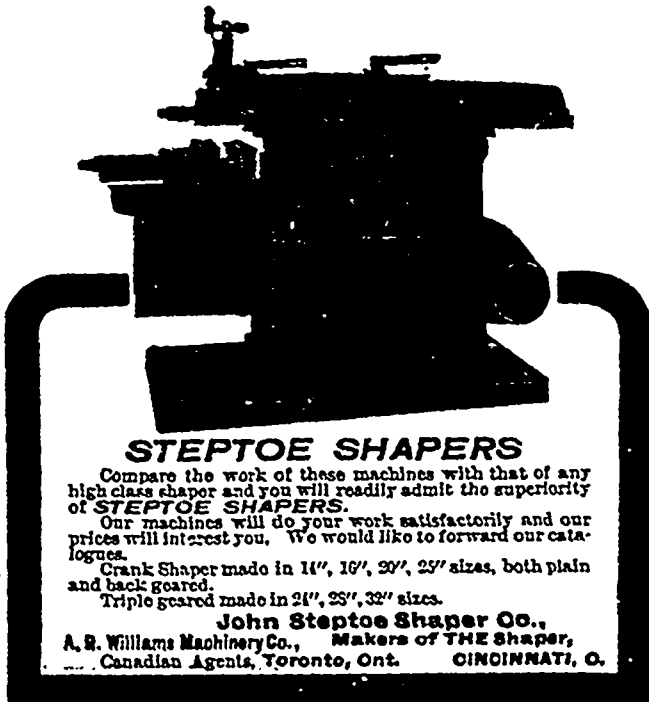
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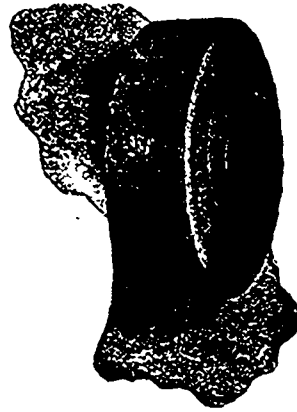
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Our machines will do your work satisfactorily and our prices will interest you. We would like to forward our catalogues.

Crank Shaper made in 14", 16", 20", 25" sizes, both plain and back geared.

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Ordinary Steam Pumps will strike the heads, but the **BURNHAM** will not injure from load to no load without change of throttle.

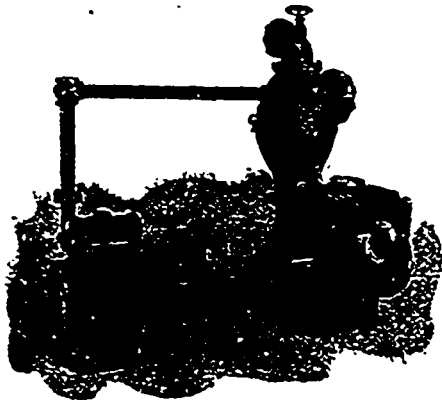
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**Burnham Boiler Feed Pump.**



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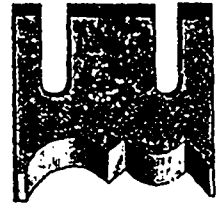
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Cottonades, Tickings, Denims,  
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Zephyrs, Skirtings,  
Dress Goods, Lawns,  
Cotton Blankets,  
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- 2—Cameron Sinking Pumps, No. 9.
- 2—" " " No. 11.

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Paisley, Ont.



**TENDERS FOR COAL, 1904**

SEALED tenders, addressed to the Provincial Secretary, Parliament Buildings, Toronto, marked "Tenders for Coal," will be received up to noon on Monday, May 23rd, for the delivery of such quantities and qualities of coal in the sheds of the following provincial institutions on or before the 15th of July next, viz:—Toronto, London, Kingston, Hamilton, Mimico, Brockville, Cobourg, Orillia and Penetang Asylums; also the Central Prison, Mercer Reformatory, Deaf and Dumb Institute, Belleville; Blind Institute, Brantford.

Specifications of the qualities and quantities of coal required and forms of application may be obtained on application to the Department, or from the Bursars of the respective institutions.

Tenders are to specify the mine of origin and the quality of respective kinds of coal, and furnish evidence on delivery that the coal is of origin specified, fresh mined and up to standard of trade grades.

Delivery subject to satisfaction of officers of Department of the Provincial Secretary, who may require additional deliveries, not exceeding 20 per cent., up to 15th of July, 1904.

Tenders will be received for the whole quantity specified, or for the quantities required in each institution. An accepted check for \$500, payable to the order of the Honorable the Provincial Secretary, must be furnished by each tenderer, and two sufficient sureties will be required for the due fulfilment of each contract. The lowest or any tender not necessarily accepted.

**J. R. STRATTON,** Provincial Secretary,  
Parliament buildings, Toronto.

May 13th, 1904.

**WORK AND PRICES RIGHT GALVANIZING ONT WIND ENGINE & PUMP CO. TORONTO, ONT.**



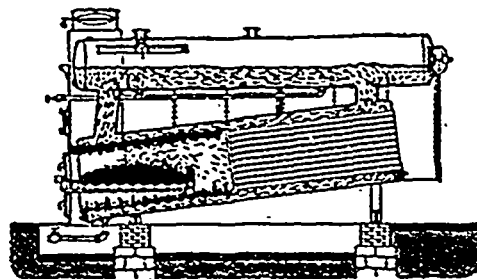
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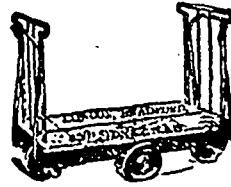
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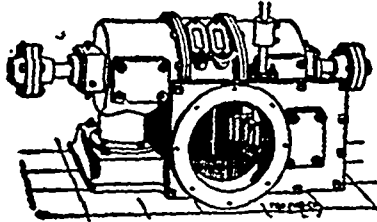
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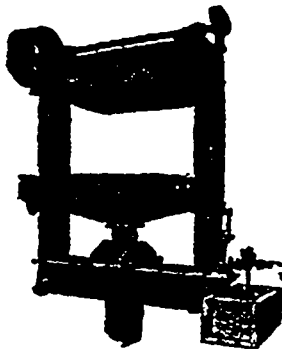
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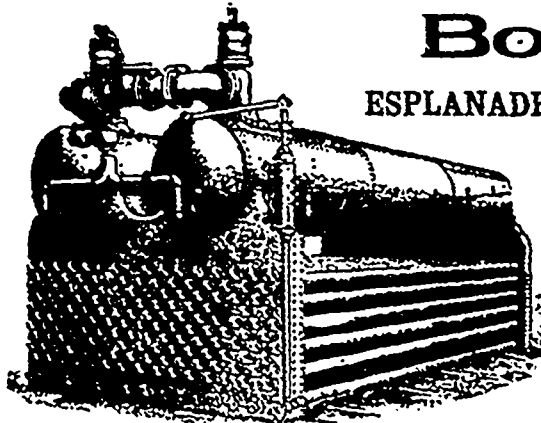
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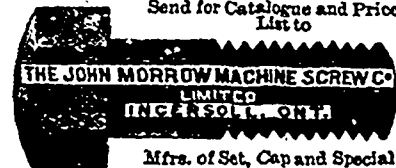
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MONTREAL - CANADA.

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HAMILTON, ONT.

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Write for prices. TORONTO, Canada.



## CLASSIFIED INDEX.

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

### Air Compressors

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Canada Foundry Co., Toronto.  
Canadian Rand Drill Co., Sherbrooke, Que.  
Chicago Pneumatic Tool Co., Chicago, Ill.  
Corbett, R. B., Brooklyn, N. Y.  
Darling Bros., Montreal.  
Shaw, Willis, Chicago, Ill.

### Aluminum

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

### Angles, Beams and Girders

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Canada Foundry Co., Toronto.  
Cooper, Estate late James, Montreal.  
Nova Scotia Steel & Coal Co., New Glasgow, N.S.  
Slingsby, H. C., Montreal.

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Benson, W. T. & Co., Montreal.  
Brunner, Mond & Co., Northwich, England.  
Cassella 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.

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

### Antimony

Syracuse Smelting Works, Montreal.

### Anvils and Vises

Cooper, Estate late James, Montreal.  
Leslie, A. C. & Co., Montreal.  
Rice Lewis & Son, Toronto.

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

### Assayers.

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

### Axles

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Nova Scotia Steel & Coal Co., New Glasgow, N.S.

### Babbitt Metal

Petrie, H. W., Toronto.  
Pittsburgh Shafting Co., Detroit, Mich.  
Syracuse Smelting Works, Montreal.

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Bank of Hamilton, Hamilton, Ont.

### Bar Iron and Steel

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Cooper, Estate late James, Montreal.  
Leslie, A. C. & Co., Montreal.  
Rice Lewis & Son, Toronto.

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Petrie, H. W., Toronto.  
Rossendale Belting Co., Toronto.  
Williams, A. R., Machinery Co., Toronto.

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

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McLaren, D. K., Montreal and Toronto.  
McLaren, J. C. Belting Co., Montreal and Toronto.  
Petrie, H. W., Toronto.  
Pittsburgh Shafting Co., Detroit, Mich.  
Rossendale Belting Co., Toronto.  
Wilby, P. H., Toronto, Ont.

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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.  
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McLaren, D. K., Montreal and Toronto.  
Petrie, H. W., Toronto.  
Pittsburgh Shafting Co., Detroit, Mich.

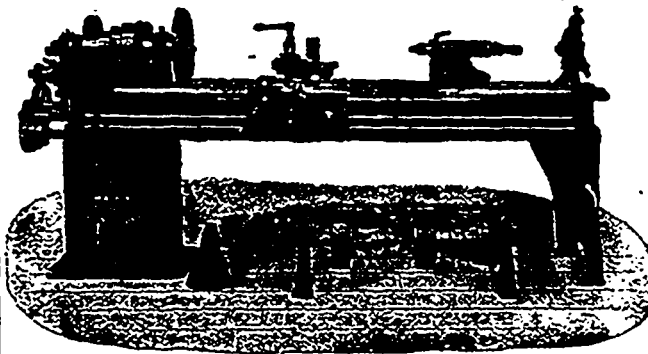
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restores neglected belts to full efficiency or breaks in a new one. It has been doing this for 27 years. Shall we send you Booklet 33E?

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Advertise in  
**The Canadian Manufacturer**

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(CONTINUED).

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Flaming, W. A. & Co., Montreal.  
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.  
Roe Lewis & Son, Toronto.  
Rossendale Belting Co., Toronto.  
Wilby, P. H., Toronto.  
Williams, A. R. Machinery Co., Toronto.

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Morgan Construction Co., Worcester, Mass.

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Wilson Bros. Bobbin Co., Liverpool, England.

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Expanded Metal & Fireproofing Co., Toronto.

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Canada Foundry Co., Toronto.  
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Cooper, Estate late James, Montreal.  
Dodge Mfg. Co., Toronto.  
Expanded Metal & Fireproofing Co., Toronto.  
Gartshore, John J., Toronto.  
Meadows, Geo. B., Wire, Iron & Brass Works, Toronto.  
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Owen Sound Portland Cement Co., Owen Sound, Ont.  
Pittsburgh Shafting Co., Detroit, Mich.  
Roe Lewis & Son, Toronto.  
Sheidon & Sheldon, Galt, Ont.

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Dominion Wire Rope Co., Montreal.  
Wire & Cable Co., Montreal.

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Slingsby, H. C., Montreal.  
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Canada Iron Furnace Co., Montreal.  
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Hoffman, Jules G., Detroit, Mich.  
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Shawmut Coal & Coke Co., St. Marys, Pa.  
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Shipman, O. W. Co., Detroit, Mich.  
Wick, H. K. & Co., Buffalo, N.Y.

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Jeffrey Mfg. Co., Columbus, Ohio.

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Jeffrey Mfg. Co., Columbus, Ohio.

**Coil Chains.**  
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Leslie, A. C. & Co., Montreal.

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McDougall, John, Caledonian Iron Works Co., Montreal.  
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McCullough-Dalzell Crucible Co., Pittsburg, Pa.  
Pittsburg Crucible Works, Pittsburg, Pa.  
Syracuse Smelting Works, Montreal.

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

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London Machine Tool Co., London, Ont.  
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Pittsburgh Shafting Co., Detroit, Mich.  
Shaw, Willis, Chicago, Ill.

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# CLASSIFIED INDEX.

(CONTINUED).

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 Canadian Rand Drill Co., Sherbrooke, Que.  
 Chicago Pneumatic Tool Co., Chicago, Ill.  
 Jeffrey Mfg. Co., Columbus, Ohio.

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 Pittsburg Shafing Co., Detroit, Mich.

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

**Drop Forging Dies**  
 Globe Machine & Stamping Co., Cleveland, Ohio.

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

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

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 Bellhouse, Dillon & Co., Montreal.  
 Benson, W. T. & Co., Montreal.  
 Brunner, Mond & Co., Northwich, England.  
 Cassella Color Co., New York City.  
 Geigy Aniline & Extract Co., New York City.  
 Kliebsain, A. & Co., New York City.  
 McArthur, Cornelius & Co., Montreal.  
 Winn & Holland, Montreal.

**DYNAMOS (See Motors and Dynamos)**

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 Paokard Electric Co., St. Catharines, Ont.

**Electric Mine Locomotives**  
 Canadian General Electric Co., Toronto.  
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.  
 Jeffrey Mfg. Co., Columbus, Ohio.  
 Shaw, Willis, Chicago, Ill.

**Electrical Repairs**  
 Volta Electric Repair Works, Toronto.

**Electrical Supplies**  
 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.  
 Paokard Electric Co., St. Catharines, Ont.  
 Phillips, Eugene F., Electrical Works, Montreal.  
 Toronto & Hamilton Electric Co., Hamilton, Ont.  
 United Electric Co., Toronto.  
 Worth & Martin, Toronto.

**Elevators and Conveyors**  
 Buhl Malleable Co., Detroit, Mich.  
 Canadian Otis Elevator Co., 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.  
 Hart Corundum Wheel Co., Hamilton, Ont.  
 Petrie, H. W., Toronto.

**Engineers (Cement).**  
 Wentz, R. F. Engineering Co., Toronto.

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

**Engineers (Civil)**  
 DeLano-Osborn Engineering Co., Toronto.  
 Kelsch, R. S., Montreal.  
 Parko, R. J., Toronto.  
 Vogel, C. H., Ottawa.

**Engineers (Consulting)**  
 DeLano-Osborn Engineering Co., Toronto.  
 Electrical Construction Co., London, Ont.  
 Hunt, Robert W. & Co., Chicago, Ill.  
 Kelsch, R. S., Montreal.  
 Marion & Marion, Montreal.  
 Morgan Construction Co., Worcester, Mass.  
 Parko, R. J., Toronto.  
 Perrin, William R. & Company, Limited, Toronto.  
 Simpson, T. T. Deschences, Que.  
 Vogel, C. H., Ottawa.  
 Volta Electric Repair Works, Toronto.  
 Von der Osten, E. & Co., Toronto.  
 Wentz, R. F. Engineering 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)**  
 Canadian General Electric Co., Toronto.  
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.  
 DeLano-Osborn Engineering Co., Toronto.  
 Electrical Construction Co., London, Ont.  
 Electric Engineering & Supply Co., Montreal.  
 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)**  
 Babcock & Wilcox, Limited, Montreal.  
 Buhl Malleable Co., Detroit, Mich.  
 Darling Bros., Montreal.  
 DeLano-Osborn Engineering Co., Toronto.  
 Electrical Construction Co., London, Ont.  
 McDougall, John, Caledonian Iron Works Co., Montreal.  
 Hunt, Robert W. & Co., Chicago, Ill.  
 Kelsch, R. S., Montreal.  
 Kerr Engine Co., Walkerville, Ont.  
 Marion & Marion, Montreal.  
 Morgan Construction Co., Worcester, Mass.  
 Robb Engineering Co., Amherst, N.S.  
 Sheldon & Sheldon, Galt, Ont.  
 Wentz, R. F. Engineering Co., Toronto.

**Engineers (Mill and Hydraulic)**  
 Buhl Malleable Co., Detroit, Mich.  
 DeLano-Osborn Engineering Co., Toronto.  
 Vogel, C. H., Ottawa.

**Engineers (Mining.)**  
 Buhl Malleable Co., Detroit, Mich.  
 Heys, Thos. & Son, Toronto.  
 Mills, S. D., Toronto.

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

**Engineers and Contractors.**  
 Buhl Malleable Co., Detroit, Mich.  
 Jeffrey Mfg. Co., Columbus, Ohio.

**Engines and Boilers**  
 Babcock & Wilcox, Limited, Montreal.  
 Bertram Engine Works Co., Toronto.  
 Canada Foundry Co., Toronto.  
 Canadian Heat Safety Boiler Co., Toronto.  
 Cooper, Estate into James, Montreal.  
 Corbett, R. B., Brooklyn, N.Y.  
 Goldie & McGulloch Co., Galt, Ont.  
 Hamilton, Wm. Mfg. Co., Peterborough, Ont.  
 Hyde Bros. & Co., Pittsburg, Pa.  
 Leonard, E. & Sons, London, Ont.  
 McDougall, John, Caledonian Iron Works Co., Montreal.  
 Petrie, H. W., Toronto.  
 Petroloum Iron Works Co., Washington, Pa.  
 Pittsburg Shafing Co., Detroit, Mich.  
 Robb Engineering Co., Amherst, N.S.  
 Shaw, Willis, Chicago, Ill.  
 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.  
 Petroloum Iron Works Co., Washington, Pa.

**Files**  
 Spenco, R. & Co., Hamilton, Ont.

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

**Filters (Oil)**  
 Babcock & Wilcox, Limited, Montreal.  
 Burt Mfg. Co., Akron, Ohio.  
 Darling Bros., Montreal.  
 McDougall, John, Caledonian Iron Works Co., Montreal.  
 Poirin, William R. & Company, 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.  
 Pennsylvania Fire Brick Co., Lock Haven, Pa.  
 Seloto Fire Brick Co., Selctoville, Ohio.  
 Wynn, W. H. & Co., West Decatur, Pa.

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

**Forges and Blowers**  
 Canada Foundry Co., Toronto.  
 Sheldon & Sheldon, Galt, Ont.  
 Sturtevant, B. F. Co., Boston, Mass.

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## CLASSIFIED INDEX.

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### Founders

Canada Foundry Co., Toronto.  
Cowan & Co., Galt, Ont.  
Gartshore-Thomson Pipe & Foundry Co., Hamil-  
ton, Ont.  
Goldie & McCulloch Co., Galt, Ont.  
Hamilton, Wm. Mfg. Co., Peterborough, Ont.  
Kareh, H. W., Hespeler, 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.

### 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)

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

### Gas and Gasoline Engines

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

### Gas Producers.

Morgan Construction Co., Worcester, Mass.

### 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

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

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

### Government Notices

Factory Inspectors.  
Minister of Agriculture.

### Graphite

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

### Grease Cups

Penberthy Injector Co., Windsor, Ont.

### Grinding Machinery

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

### Grinding Pans

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

### Hand Travelling Cranes

Morgan Construction Co., Worcester, Mass.

### Hardware

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

### Heating and Ventilating Apparatus

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

### Hoists (Chain and Pneumatic)

Canadian Rand Drill Co., Sherbrooke, Que.  
Chicago Pneumatic Tool Co., Chicago, Ill.  
Cooper, Estate late Jamaica, Montreal.

### Hose (Fire and Pneumatic)

Chicago Pneumatic Tool Co., Chicago, Ill.  
Gutta Percha & Rubber Mfg. Co., Toronto.  
McLaron, J. C. Bolting Co., Montreal and Toronto.  
Slingsby, H. C., Montreal.

### Hydrants

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

### Hydraulic Accumulators

Morgan Construction Co., Worcester, Mass.  
McDougall, John, Caledonian Iron Works Co.,  
Montreal.

### Hydraulic Cranes

Morgan Construction Co., Worcester, Mass.

### Hydraulic Machinery

Canada Foundry Co., Toronto.  
Darling Bros., Montreal.  
Hamilton, Wm. Mfg. Co., Peterborough, Ont.  
Morgan Construction Co., Worcester, Mass.  
McDougall, John, Caledonian Iron Works Co.,  
Montreal.  
Parin, William R. & Company, Limited, Toronto.  
Petrie, H. W., Toronto.  
Wilson, J. C. & Co., Glouora, Ont.

### Industrial Plants

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

### Insulated Wires and Cables

Wire & Cable Co., Montreal.

### Iron and Steel Specialties

Abbott, William, Montreal.  
Armstrong Mfg. Co., Bridgeport, Conn.  
Bourne-Fuller Co., Cleveland, Ohio.  
Brown & Co., Paris, Ont.  
Buhl Malleable Co., Detroit, Mich.  
Canada Foundry Co., Toronto.  
Cleveland Twist Drill Co., Cleveland, Ohio.  
Dodge Mfg. Co., Toronto.  
Kareh, H. W., Hespeler, Ont.  
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

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

### Lathes

Bertram, John, & Sons Co., Dundas, Ont.  
Cowdroy, C. H., Machine Works, Fitchburg, Mass.  
London Machine Tool Co., London, Ont.  
Petrie, H. W., Toronto.  
Williams, A. R. & Co., Toronto.

### Lathes (Wood-Working)

American Machinery Co., Grand Rapids, Mich.  
Cowan & Co., Galt, Ont.  
Goldie & McCulloch Co., Galt, Ont.  
Petrie, H. W., Toronto.  
Williams, A. R. Machinery Co., Toronto.

### Lubricators

Penberthy Injector Co., Windsor, Ont.

### Machinists.

Bertram Engine Works Co., Toronto.  
Buhl Malleable Co., Detroit, Mich.  
Goldie & McCulloch Co., Galt, Ont.  
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.  
Cooper, James, Montreal.  
Dodge Mfg. Co., Toronto.  
Goldie & McCulloch Co., Galt, Ont.  
Gutta Percha & Rubber Mfg. Co., Toronto.  
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.  
Ryall Machine Screw Co., Montreal.  
Sinclair, G. S. & Sons, Warton, Ont.  
Worth & Martin, Toronto.



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## Machine Tools

Abbott, William, Montreal.  
Bertram, John, & Sons Co., Dundas, Ont.  
Cleveland Twist Drill Co., Cleveland, Ohio.  
Darling Bros., Montreal.  
London Machine Tool Co., London, Ont.  
Petrie, H. W., 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.

## Mechanical Draft

Babeock & Wilcox, Limited, Montreal.  
Sheldon & Sheldon, Galt, Ont.  
Surtovant, B. F. Co., Boston, Mass.

## Metal Gates

Page Wire Fence Co., Walkerville, Ont.

## Metal Shears

Morgan Construction Co., Worcester, Mass.

## Metal Stamping

Empire Machine & Metal Stamping Co., Toronto.  
Globe Machine & Stamping Co., Cleveland, Ohio.

## Metallurgists.

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

## Mill Machinery and Supplies

American Machinery Co., Grand Rapids, Mich.  
Armstrong Mfg. Co., Bridgeport, Conn.  
Buhl Malleable Co., Detroit, Mich.  
Cleveland Twist Drill Co., Cleveland, Ohio.  
Cooper, Estate into James, Montreal.  
Cowan & Co., Galt, Ont.  
Darling Bros., Montreal.  
Dodge Mfg. Co., Toronto.  
Flaming, W. A. & Co., Montreal.  
Gartshore, John J., Toronto.  
Goldie & McCulloch Co., Galt, Ont.  
Gutta Percha & Rubber Mfg. Co., Toronto.  
Hamilton Brass Mfg. Co., Hamilton, Ont.  
Hamilton, Wm. Mfg. Co., Peterborough, Ont.  
Hay, Peter Kullo Co., Galt, Ont.  
Jeffrey Mfg. Co., Columbus, Ohio.  
Karch, H. W., Hespeler, Ont.  
Leonard, E. & Sons, London, Ont.  
London Machine Tool Co., London, Ont.  
Morrow, John, Machine Screw Co., Ingersoll, Ont.  
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.  
Ryall Machine Screw Co., Montreal.  
Sinclair, G. S. & Sons, Winton, Ont.  
Spence, R. & Co., Hamilton, Ont.  
Wilson, J. C. & Co., Glenora, Ont.

## Mining Machinery

Buhl Malleable Co., Detroit, Mich.  
Canadian Rand Drill Co., Sherbrooke, Que.  
Chicago Pneumatic Tool Co., Chicago, Ill.  
Cleveland Twist Drill Co., Cleveland, Ohio.  
Cooper, Estate into James, Montreal.  
Corbett, R. B., Brooklyn, N.Y.  
Gartshore, John J., Toronto.  
Hamilton, Wm. Mfg. Co., Peterborough, Ont.  
Jeffrey Mfg. Co., Columbus, Ohio.  
McDougall, John, Caledonian Iron Works Co., Montreal.  
Perrin, William R. & Company, Limited, Toronto.  
Petrie, H. W., Toronto.  
Shaw, Willis, Chicago, Ill.  
Williams, A. R. Machinery Co., Toronto.

## Motors and Dynamos

Canadian General Electric Co., Toronto.  
Canadian Westinghouse Co., Ltd., Hamilton, Ont.  
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

Chicago Pneumatic Tool Co., Chicago, Ill.  
Dixon, Jos., Crucible Co., Jersey City, N.J.  
Flaming, 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.  
Flaming, W. A. & Co., Montreal.  
Geigy Aniline & Extract Co., New York City.  
Klipstein, A. & Co., New York City.  
McArthur, Cornelio & Co., Montreal.

## Paper Manufacturers

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

## Patents

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

**Pattern Makers' Machinery and Supplies**  
American Machinery Co., Grand Rapids, Mich.

## Pattern Shop Equipments

American Machinery Co., Grand Rapids, Mich.

## Perforated Metals

Greening, B. Wro Co., Hamilton, Ont.

## 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.  
Shopard, Charles G., Buffalo, N.Y.  
Syracuse Smelting Works, Montreal.

## Pipe (Riveted, Iron and Steel)

Babeock & 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-Tomson Pipe & Foundry Co., Hamilton, Ont.  
Montreal Pipe Foundry Co., Montreal.  
Rice Lewis & Son, Toronto.

## Plaster

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

## Plates

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

## Plumbago

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

## Pneumatic Tools

Canadian Rand Drill Co., Sherbrooke, Que.  
Chicago Pneumatic Tool Co., Chicago, Ill.

## Pointer Rolls (For Rops and Wire.)

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

## Portland Cement

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

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Central Ontario Power Co., Peterboro, Ont.

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### Power Plants—Equipments

Babcock & 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.  
Dodge Mfg. Co., Toronto.  
Electrical Construction Co., London, Ont.  
Goldie & McCulloch, Galt, Ont.  
Gutta Percha & Rubber Mfg. Co., Toronto.  
Hamilton, Wm. Mfg. Co., Peterborough, Ont.  
Jeffrey Mfg. Co., Columbus, Ohio.  
Jones & Moore Electric Co., Toronto.  
Kelsch, R. S., Montreal.  
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Darling Bros., Montreal.  
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Corbett, R. B., Brooklyn, N.Y.  
Darling Bros., Montreal.  
Downie Pump Co., Downieville, Pa.  
Goldie & McCulloch 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

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

### Purifying and Softening Systems (Water)

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

### Railroads

Chicago & North-Western Ry., Toronto & St. Paul, Minn.  
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Algoma Steel Co., Sault Ste. Marie, Ont.  
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Gartshore, John J., Toronto.  
Greening, B. Wire Co., Hamilton, Ont.  
Gutta Percha & Rubber Mfg. Co., Toronto.  
Nova Scotia Steel & Coal Co., New Glasgow, N.S.  
Phillips, Eugene F., Electrical Works, Montreal.  
Slingsby, H. C., Montreal.

### Reamers

Butterfield & Co., Rock Island, Que.  
Chicago Pneumatic Tool Co., Chicago, Ill.  
Cleveland Twist Drill Co., Cleveland, Ohio.

### Rivets

Bourne-Fuller Co., Cleveland, Ohio.

### Roll Lathes

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### Roller Bearings

Pittsburg Shafting Co., Detroit, Mich.

### Rolling Mills

Morgan Construction Co., Worcester, Mass.

### Rolling Mill Engineers

Bourne-Fuller Co., Cleveland, Ohio.  
Morgan Construction Co., Worcester, Mass.

### 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, Cuyahoga Falls, Ohio

### Rural Mail Boxes

Globe Machine & Stamping Co., Cleveland, Ohio.

### Saves and Vaults

Goldie & McCulloch Co., Galt, Ont.

### Saws (Band)

American Machinery Co., Grand Rapids, Mich.

### 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.

### Shafting

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Goldie & McCulloch Co., Galt, Ont.  
Jeffrey Mfg. Co., Columbus, Ohio.  
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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.

### 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

Empire Machine & Metal Stamping Co., Toronto.  
Globe Machine & Stamping Co., Cleveland, Ohio.  
Metallic Roofing Co., Toronto.

### Sheet Metal Stamping

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

### Ship Builders

Bertram Engine Works Co., Toronto.  
Clyde Steel Works, Toronto.

### Smoke Stacks

Hamilton, Wm., Mfg. Co., Peterborough, Ont.  
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### Special Machinery

Empire Machine & Metal Stamping Co., Toronto.  
Globe Machine & Stamping Co., Cleveland, Ohio

### Speed Recorders

Bristol Co., Waterbury, Conn.  
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### Sprinkler Insurance

Canadian Casualty & Boiler Insurance Co., Toronto.

### Stamps & Stencils

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

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Darling Bros., Montreal.  
Goldie & McCulloch Co., Galt, Ont.  
Leonard, E. & Sons, London, Ont.  
McDougall, John, Caledonian Iron Works Co., Montreal.  
Petrie, H. W., Toronto.  
Pittsburgh Shafting Co., Detroit, Mich.  
Shaw, Willis, Chicago, Ill.  
Williams, A. R., Machinery Co., Toronto.

### Steam Separators

Babcock & Wilcox, Limited, Montreal.  
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### Steam Specialties

Darling Bros., Montreal.  
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Petrie, H. W., Toronto.  
Williams, A. R., Machinery Co., Toronto.

## Steel Plants

Morgan Construction Co., Worcester, Mass.

## Steel Rails

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Gartshore, John J., Toronto.

## Steel Shafting

Darling Bros., Montreal.  
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Rice Lewis & Son, Toronto.  
Worth & Martin, Toronto.

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## Suspension Furnaces

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Petroleum Iron Works Co., Washington, Pa.

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## Tees

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## Textile Manufacturers

Canadian Colored Cotton Mills Co., Montreal.  
Dominion Oil Cloth Co., Montreal.  
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Morris, D. Sons & Co., Montreal.  
Smith Mfg. Co., Toronto.  
Storey, W. H. & Sons, Acton, Ont.

## Textile Supplies

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## Thermometers (Recording)

Bristol Co., Waterbury, Conn.

## Tin

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Syracuse Smelting Works, Montreal.

## Tool Steel

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Cooper, Estate late James, Montreal.  
Leslie, A. C. & Co., Montreal.

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Cooper, Estate late James, Montreal.  
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McDougall, John, Caledonian Iron Works Co., Montreal.  
Sheldon & Sheldon, Galt, Ont.  
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## Trucks (Railway)

Canada Foundry Co., Toronto.

## Trucks (Wire Mill Supplies)

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

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

## Tumbling Barrels

Globe Machine & Stamping Co., Cleveland, Ohio.

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Canada Foundry Co., Toronto.  
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## Typewriters and Supplies

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## Valves

American Steam Pump Co., Battle Creek, Mich.  
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Gutta Percha & Rubber Mfg. Co., Toronto.

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Darling Bros., Montreal.  
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## Windmills

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

## Wire and Wire Rope

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Greening, B. Wire Co., Hamilton, Ont.  
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Wire & Cable Co., Montreal.

## Wire Rope Fittings

Dominion Wire Rope Co., Montreal.

## Wire Cloth

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

## Wire Drawing Machinery

Morgan Construction Co., Worcester, Mass.  
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## Wire Fencing and Netting

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## Wire Rod Reels

Morgan Construction Co., Worcester, Mass.

## Wire Specialties

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Meadows, Geo. B. Wire, Iron & Brass Works Co., Toronto.  
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## Zinc

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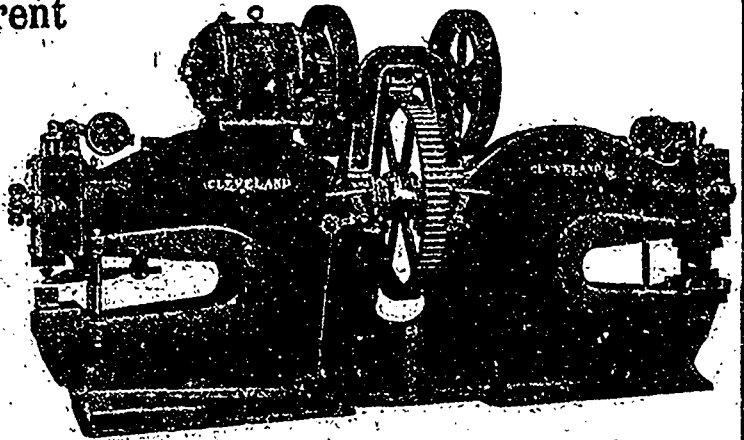
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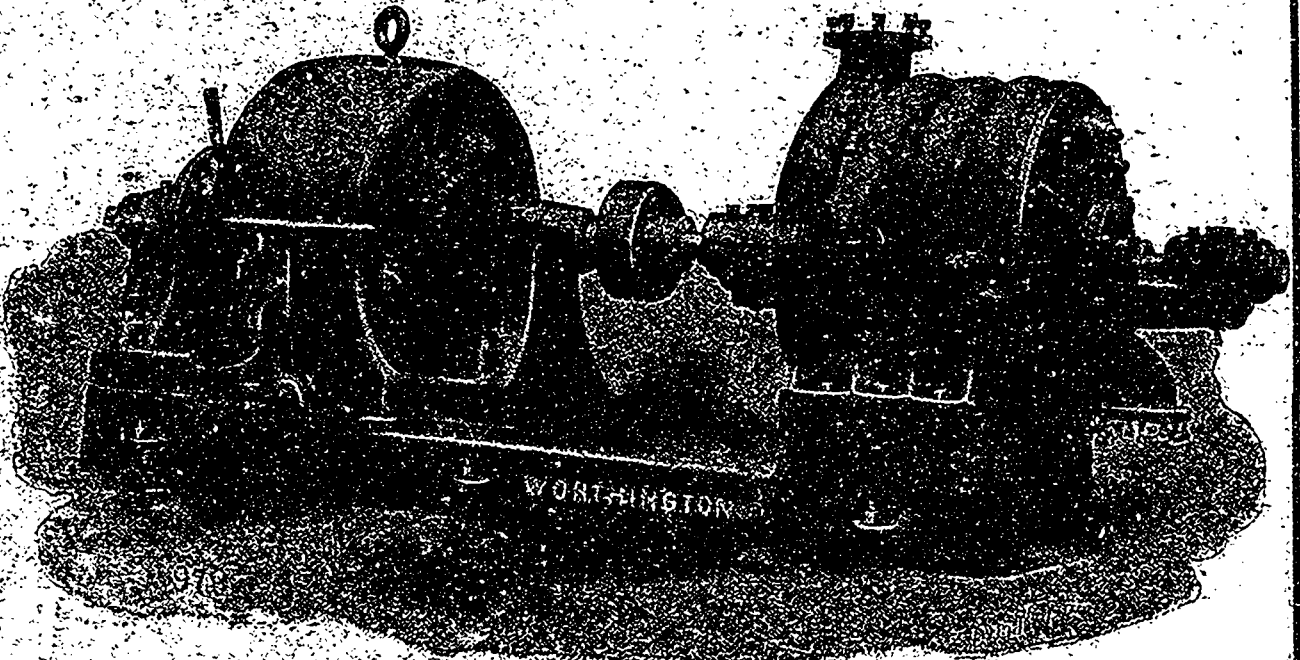
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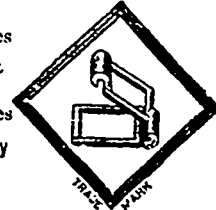
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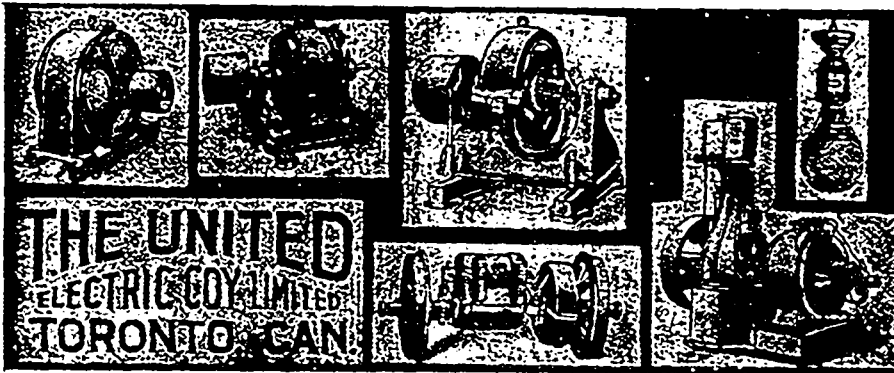
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