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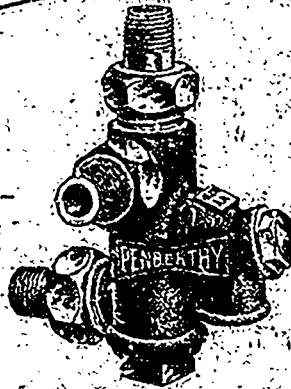
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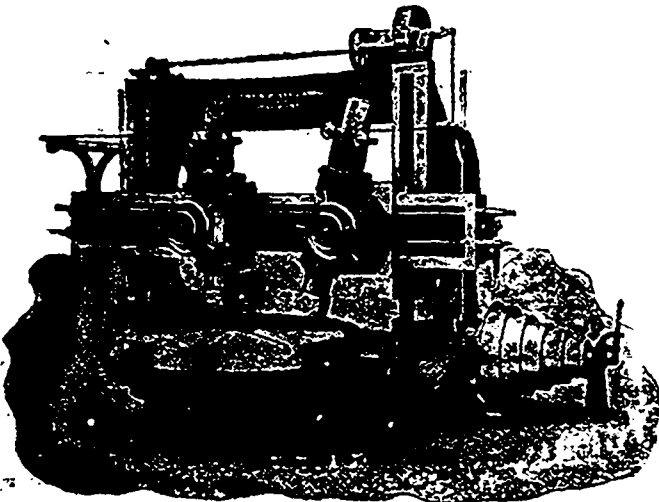
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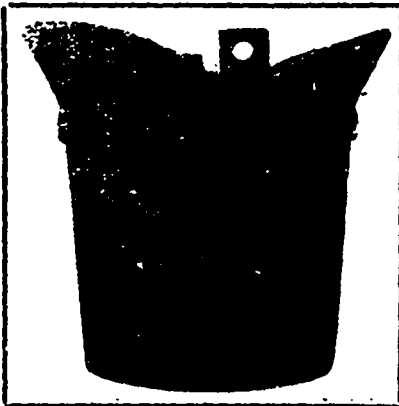
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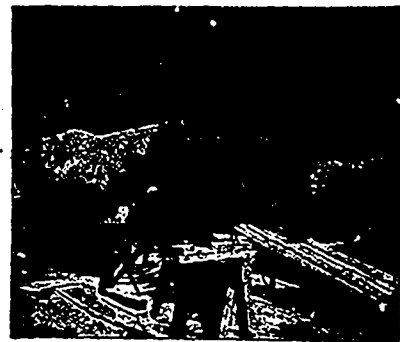
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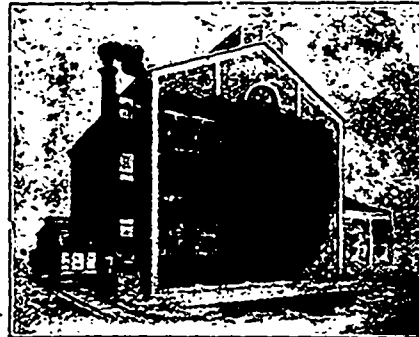


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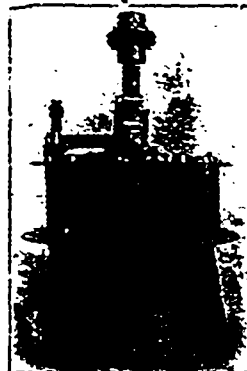
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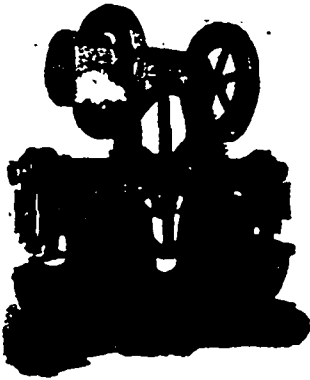
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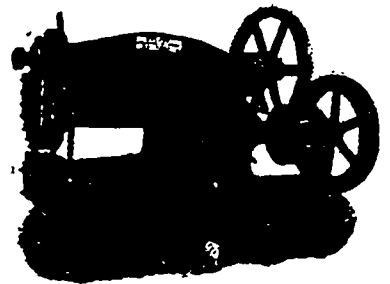
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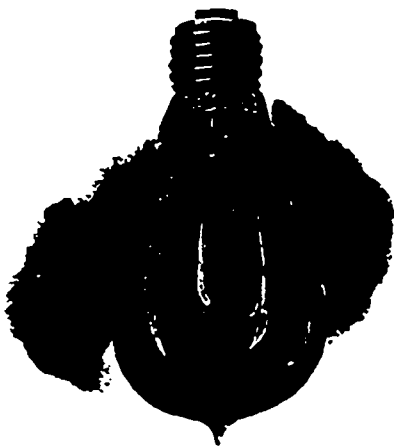
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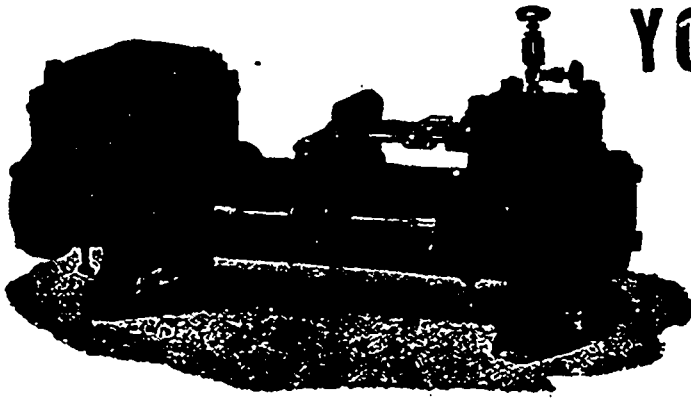
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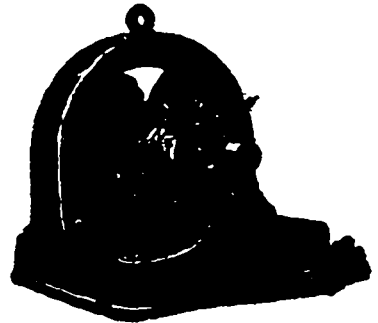
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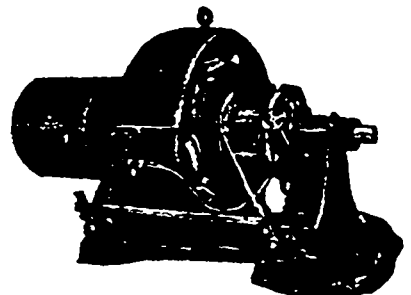
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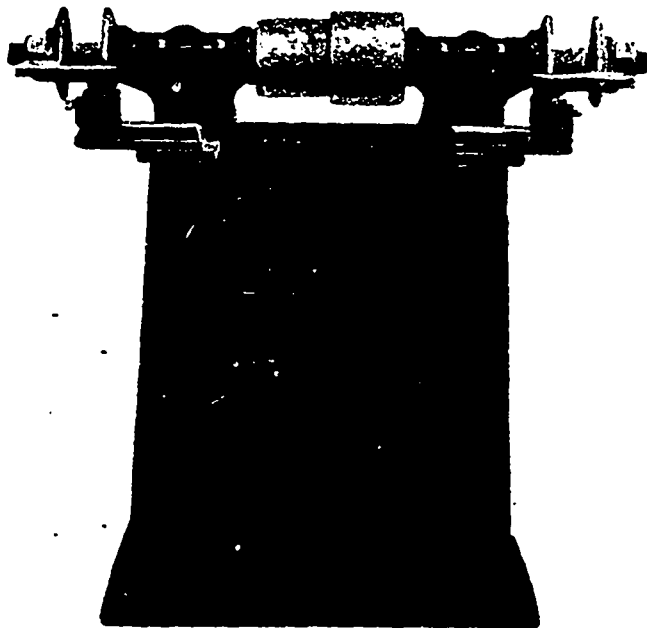
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J. J. CASSIDY, - - - Editor and Manager.

Classified IndexPage 39
Index to AdvertisersPage 46**THE CANADIAN MANUFACTURER**

Reaches all the Blast Furnaces, Iron and Steel Works, Rolling Mills, Manufacturers of Iron and Wood-Working Machinery, Steam Engines and Boilers, Pumping and Mining Machinery, Electric Machinery, Textile, Pulp and Paper Mill Machinery, Water Power Plants, Cement, Sewer Pipe and Terra Cotta Works, Dealers in Steam Fitters' and Plumbers' Supplies, and all Hardware Merchants in Canada.

WHEN THE TARIFF IS REVISED.

The Dominion Parliament has been summoned to assemble at Ottawa on February 10 instant for dispatch of business, and much interest is centred in the question as to whether the tariff should then undergo the revision which is claimed to be so urgently required. If such revision is then made, or whenever it is made, it should include the following features:

1. The tariff should be of a dual character—a minimum tariff to apply to imports from commercially friendly countries, such as Great Britain—and a maximum tariff to apply to imports from commercially unfriendly countries, such as Germany.

2. The duty imposed upon imports should be (a) specific only and always where possible; or, (b) compound, i.e. both specific and ad valorem; to be ad valorem only when neither specific or compound is practicable.

3. Tariff rates, under all circumstances, should be sufficiently high to afford adequate protection to every Canadian manufacturing and industrial interest.

4. Every possible safeguard should be thrown around the administration of the tariff laws to prevent undervaluation and other frauds upon the Customs.

5. There should be no special preferential provisions in the tariff such as now exist, as such features would be included in the minimum tariff, and applicable not only to British imports but also imports from any other country which treats Canada with equal commercial favor.

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

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

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

Is the duty on imports of crude petroleum to be revised up or down? Canadian refiners, to whom crude oil is a raw material, desire to have the duty reduced considerably.

REVISION OF THE TARIFF.

Industrial Canada publishes what it calls "a statement of the position taken by the Canadian Manufacturers' Association regarding the tariff," in which it says that the Association has declared itself during the past two years in favor of an early and thorough revision of the tariff. . . . "in order that the surplus requirements of the Canadian market may be supplied from British rather than foreign sources," which means, if it means anything, that what we want and don't make we must buy in a British market only. The wants of Canada, we are glad to say, are; practically insatiable; and we are also glad to say that Canadian manufacturers can and do, to a large extent, contribute to those wants. We can also say that the enormity of these wants is such that it is practically impossible for Canadian manufacturers to supply all of them, and that the deficiency must be supplied from other countries. This is not a remarkable condition of things, for there is no civilized country on earth that is capable, economically, of supplying all its wants for manufactured products, and therefore finds it desirable to import the deficiency from other countries. Canada's social and political connections with the Mother Country have impelled her to grant a tariff preference to British imports—a preference which is not shown to any foreign country. This preference is given in the hope that it would increase the trade between these countries, and to that extent obstruct and diminish the trade between Canada and foreign countries. It is to be observed, however, that the preference has failed to increase our trade with Great Britain except in textiles, and that in that line it has proven most disastrous to a most important Canadian industry. It is no disparagement to Canada to say that her manufacturers are unable to supply all her requirements. They are, as a general thing, doing well, are producing good qualities of goods, have their factories fully engaged, running to their utmost capacity, and are in a prosperous, money-making condition. But it is impossible for them to supply all the requirements of the country, and therefore what the country wants and our manufacturers cannot produce we must of necessity buy elsewhere. According to Industrial Canada the desire of the Association is to so remodel the tariff as to force the purchase of our "surplus requirements" from Great Britain, who cannot supply them, and to discourage the purchase of them from foreign countries which can supply them.

At the annual meeting of the Association held in Toronto

in September last, Mr. Young, the secretary, stated that the roster of the Association contained 1,272 names. This is a good showing, and indicates that that number of members were leagued together in the desire to advance the manufacturing interests of the country. But it does not indicate that all of them are unanimous in a desire for a thorough revision of the tariff. It is quite true that the tariff should be framed so that manufacturing in Canada may keep pace with the changing conditions of our market, and that Canada's resources might be developed and her industries built up. But this position is neither new nor startling, for there are not only the 1,200 members of the Association who favor it, but 12,000 or more other Canadian manufacturers who are not members who favor it; and not only they but every man in the country favors it. There are 641 items included in the tariff, and it is inconceivable that all these are to be thoroughly revised. Should such a thing be attempted there are hundreds of members of the Association whose interests would be adversely affected who would protest against the effort; there would be thousands of other manufacturers who would join in the protest, and millions of other voters would be quick to depose from power any government who might attempt it. When a man who is ill sends for his physician he does not merely say "I am sick," but he locates and describes his ailment. Why not pursue a similar method regarding the tariff? It can be shown that both the iron and textile schedules of the tariff need revision; but this does not imply that a "thorough revision" must be made affecting all of the 641 different articles enumerated therein, and such revision had better not be attempted.

This journal has always declared itself as being in favor of a protective tariff—a tariff that will give adequate protection to every Canadian manufacturing industry. Our opinion is that the tariff we now have does not afford such protection to our iron and steel, and to our textile industries, and that it should be changed in those respects; but it certainly cannot be in the best interest of Canada that it should be changed for sentimental reasons so as to give undue preference to Great Britain, or to restrict or prohibit imports from foreign countries from which we obtain our "surplus requirements"—requirements in excess of what home producers can supply, and which Great Britain is not disposed to compete for. In the December 18 issue of this journal was a tabulated statement which emphasized the situation in which Canada finds herself in this respect, in which it is shown that in a selected list of two hundred manufactured articles imported into Canada, and in strong demand here, Great Britain supplied us with less than 10 per cent. and the United States with more than 83 per cent., all the rest of the world, including all British possessions, sending us the small balance of 7 per cent. Loyalty to the Old Flag is a good thing, but if the Mother Country does not supply a larger proportion of our "surplus requirements," it is not to be supposed that we are to be deprived of them; but this is what the proposed "thorough revision" of the tariff means.

LET US HAVE PEACE.

Heretofore Harper's Weekly was considered one of the most staid and reliable journals published in the United States, not being given to hysterical nor fire-eating exclamations. But it seems to be getting over that, and preaches blood and thunder and other disagreeable things in view of what may result from Mr. Chamberlain's movement in Great Britain. In a recent issue it takes some of Mr. Carnegie's

utterances as a text, and threatens Great Britain and Canada with all sorts of dire calamities if the Mother Country should presume to give any tariff preference to her colonies, particularly to Canada, that is not also accorded to the United States. It tells us that American tariffs have not discriminated against any particular foreign country; that all foreign purveyors of a particular product are subject to the same customs duty; that the only preferences that that country has ever given have been accorded under reciprocity treaties in return for equivalent concessions; that Germany and France have framed their tariffs on protectionist principles, but which have not discriminated against the United States and that such a discrimination would be regarded as a provocation and would lead to tariff reprisals, which almost certainly would culminate in war. We quote from the Weekly:

Without the good-will of the United States the grain of Canada would never reach the Atlantic ports for shipment. It is obvious that to interrupt the railway communication between the seaboard and the North-West provinces which constitute the granary of the Dominion, would be child's play for the military power of the United States. It would be superfluous, however, for us to commit an act of war. We need not resort to overt hostility in order to cut off England from connection with her principal grain-growing colony during a large part of every year—that part, moreover, during which the wheat crop is moved. Here again Mr. Carnegie shows himself thoroughly alive to all the possibilities of the situation. As he points out in his pamphlet, a word from the President might cancel the privilege now generously granted to Canada, of reaching ice-free American ports through American territory, with all her foreign business, exports and imports free of duty, for five months in the year, when her own ports are ice-bound. As a matter of fact, the privilege is used all the year round. In 1902 the Canadian Dominion shipped through American ports 28,546,000 bushels of breadstuffs. The number of hushels shipped in the twelvemonth named through Canadian ports we are unable to state, but as the total value of Canadian foodstuffs exported to Britain in 1902 was only \$22,471,000, it is evident that a large portion of her shipments of breadstuffs reached Britain over American territory and through American ports. The simple withdrawal of this bonding privilege, which American public opinion would unquestionably demand, would suffice to convince the British people that in offering a preference to Canadian breadstuffs they had committed an act of folly. Negotiations for a restoration of the bonding privilege would soon begin, and the favor so foolishly forfeited would ultimately be regained. The bitterness, however, engendered between the two countries by discrimination and reprisal might retard for years a revival of the present cordial relations.

This means that should Great Britain give tariff preference to Canada and not to the United States, Canada is to be punished therefor. It would be superfluous for the United States, we are told, to commit an act of war against Canada, with gunpowder and things—but it is obvious that to interrupt railway communication between the seaboard and the grain-growing sections of Canada would be but child's play for the military power of our neighbor. That sort of warfare would not be undertaken at first, but the President would at once cancel the bonding privilege now so generously (?) granted to Canada. That would fix it, and Canada would at once be suffocated in the coils of the great American anaconda.

Harper's Weekly does not seem to be familiar with the question it discusses. It does not seem to comprehend that Canada bears similar relation to Great Britain that Maine or Oregon bears to Ohio or Texas—that the British Empire is as much bound to protect and defend the integrity of Canada as the United States is bound to protect and defend the integrity of any state of the Union. It tells us that the American tariff does not discriminate against any particular foreign country, and therefore Great Britain should not discriminate against

the United States. Of course, Maine could not pass a tariff law which would discriminate against Texas, both being integral parts of one country, but it fails to observe that Canada is an integral part of the British Empire, and the British preference to Canada would not discriminate against any particular foreign country. Great Britain does not find it a cause of war because the United States discriminates against all foreign countries in the matter of export duties on hemp from the Philippine Islands. But it is a most unfriendly discrimination aimed directly against the cordage industry of Canada. It might be said that the Philippine Islands are related to the United States somewhat as Canada is related to Great Britain. But if it is wrong and unfriendly for Great Britain to give tariff discrimination to Canada, to the detriment of the United States, is it not also equally wrong and unfriendly for the United States to give tariff discrimination to the Philippine Islands to the detriment of Canada? The United States imposes an export duty on all manilla fibre exported from these Islands, the full amount of which is remitted when the article is imported into the United States.

One of the non-gunpowder acts of war which the United States, according to Mr. Carnegie and Harper's Weekly, threaten to inflict upon Canada, and with wonderful and sudden effect, is the abrogation of the bonding privilege by which Canadian grain and other merchandise is allowed to be transported in bond from Canada through United States territory to shipping ports in that country to Great Britain and other countries; but it should not be forgotten that that privilege works the other way also, and that millions of tons of merchandise of United States origin are transported from New England points to the Western States, passing through Canadian territory. Suppose Harper's Weekly talk the matter over with the New England manufacturers and the western consumers. And what about the free use of Canadian canals?

No doubt great inconvenience and loss would occur to the commercial interests of Canada were the impractical ideas of Mr. Carnegie and Harper's Weekly be carried into effect, but it should be remembered that they are far astray in supposing that Canada has no Atlantic ports that are ice-bound and closed to shipping at any season of the year; and that Boston and Portland are our only dependence. These American ports are used as a matter of convenience and economy, not of absolute necessity. There is a large volume of trade done by Canada with countries other than the United States which would be affected, and it would be the transportation companies that would probably insist upon having something to say in the matter. During the fiscal year 1903 the value of the merchandise imported into and exported from Canada through the United States from and to countries other than the United States, was as follows:

Imported.....	\$24,843,380
Exported	49,509,926
	\$74,352,406

Do New York, Boston and Portland comprehend what the handling of nearly seventy-five millions of dollars worth of merchandise means to their commerce—merchandise to be transported to and from Canada? Do they comprehend what their loss would be were they deprived of the trade?

He who even threatens to disturb the friendly relations now existing between Canada and the United States can be no friend to either country—he who attempts to disturb them should be squelched. Let us have peace!

INDUSTRIAL CANADA—AN "ORGAN."

There is a paper published in Toronto called Industrial Canada, which is the official organ of the Canadian Manufacturers' Association; and is owned and run by the Association. In its January issue it has some pretty things to say about THE CANADIAN MANUFACTURER, preliminary to some things which are not so pretty—or truthful. It says:

THE CANADIAN MANUFACTURER for many years well deserved its name, but which might now be more appropriately called the "American Manufacturer," as its chief aim at present seems to be to promote the sale in Canada of United States manufactured goods. For about thirty years THE CANADIAN MANUFACTURER has been earnestly advocating adequate protection for Canadian industries, and during the past year it has published some admirable editorials in favor of higher protection, but a few weeks ago it made a sudden change of front and is now favoring a reciprocity treaty with the United States, alleging that Canadian manufacturers cannot supply the goods the people require, and opposing a general revision of the Canadian tariff. . . . It is true that our factories would have to be enlarged if American goods were, to a great extent, excluded by a higher tariff, but there would be no difficulty in securing capital for such extensions if adequate protection were given to Canadian industries. . . . THE CANADIAN MANUFACTURER certainly does not represent the views of Canadian manufacturers. Under its present name it is a wolf in sheep's clothing. It should change its name to suit its new policy.

A few weeks ago, that is, in our issue of December 4 last, in an editorial entitled "Which" we discussed the various tariff propositions that are before the voters of Canada, and which, in our opinion, deserved careful and intelligent consideration. We alluded to them as follows, but gave no opinion regarding either of them. We said:

Perhaps the most important questions now being forced upon the attention of Canadians are: tariff revision, as advocated by the Canadian Manufacturers' Association, where, as it is declared, the entire schedule should be revised; a tariff of a distinctly retaliatory character against imports from the United States, the idea being to make the tariff of Canada impose as high duties against the United States products as the United States tariff imposes upon Canadian products; a tariff granting an increased and enlarged preference in favor of British products, and the renewal of a reciprocal trade arrangement with the United States by which no duty would be imposed by one country upon imports of natural products from the other.

Industrial Canada, in alluding to this editorial, omitted entirely the above paragraph.

Tennyson, in writing of such omissions, says:

And the person made it his text that week, and he said likewise,
That a lie which is half a truth is ever the blackest of lies;
That a lie which is all a lie may be met and fought with outright,
But a lie which is part a truth is a harder matter to fight.

Had our critic been honest enough to have reproduced the above paragraph he would not have dared to have said that we favored a reciprocity treaty with the United States on the ground that Canadian manufacturers cannot supply the goods the people require, or on any other ground; nor could it have said that in that article we opposed a general revision of the tariff. As the caption "Which" indicated, the object of the article was to direct attention to the different propositions regarding the tariff now before the people. There was no allusion made to a reciprocity treaty with the United States which would in any way affect the manufacturing industries of Canada, the reference being to reciprocity in raw materials and natural products only.

A lie which is half a truth is ever the blackest of lies.

Is it an offence against good morals or Canadian interests that THE CANADIAN MANUFACTURER, or any other journal, or

any person whatever, should, in the way of legitimate business "promote the sale in Canada of United States manufactured goods?" Is it any more an offence than to promote the sale of goods from Great Britain, France, Germany, or any other country? There is not a member of the Association, if he is a manufacturer, reside where he may and be his occupation what it may, who does not consume United States materials in his business; notwithstanding which this journal is upbraided for publishing information to the members and others where such materials can be had. Why should Industrial Canada object to such goods? The very cover of it is ornamented and embellished with a design originated by a New York Yankee, to whom was paid good Canadian money, contributed by the Association. Is Canada so poverty stricken that no home artist could produce such a design, nor Great Britain either? And this impertinent organ of the Association undertakes to advise us that it would be appropriate to call this journal the "American Manufacturer"; that under its present name it is "a wolf in sheep's clothing." We suppose, however, that this is about the only answer it can make to our arguments.

EDITORIAL NOTES.

Mrs. A. T. Watt, secretary of the "Made in Canada" committee of the King's Daughters' of Victoria, B.C., has sent us a circular letter in which it is announced that a "Made in Canada" Fair will be held in Victoria immediately after Easter, believing that such a Fair would be an object lesson in the resources and industrial development of Canada, and result favorably to the increase in the growth of national sentiment. The ladies are asking the co-operation of Canadian manufacturers in the belief that such a fair would be of direct benefit to them; and if samples of their products are sent for exhibition at the Fair they will be well advertised.

A deputation from the Carriage Makers' Section of the Canadian Manufacturers' Association waited upon the Dominion Government a few days ago to urge that a specific duty of \$50 each be imposed upon imports of carriages. They claim that the Canadian North-West is being flooded with cheaply made American carriages. In 1903 Canada imported from the United States 977 carriages valued at \$64,411, an average of \$63 each, and exported 438 carriages to that country valued at \$39,540, an average of \$90 each. The Canadian duty upon carriages is 35 per cent. ad valorem.

Regulations for the payment of bounties on lead contained in ores mined in Canada have been improved of by the Dominion Government on the recommendation of the Department of Trade and Commerce. It is provided that the smelting of ores is to be under the supervision of an officer of the department, who can at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes. All claims for bounty are to be substantiated by oath of the manager of the smelter works, and verified and certified to by a departmental officer. The cost of supervision must be borne by the claimants.

Efforts are being made in Washington and other parts of the United States to bring about the abrogation of the Rush-Bagot treaty of 1817 which limits the naval force of Great Britain and the United States on the Great Lakes. The ostensible desire is that United States war ships suitable for

training purposes may be permitted on the lakes. American shipbuilders on the lakes have long desired the abrogation of the treaty in order that they might build warships for the United States navy, which, they say, could be taken to the sea through the St. Lawrence river route. They also say that were the treaty abrogated Great Britain and Canada would enjoy the privilege of building warships on the lakes as well the United States. We hope that the Rush-Bagot treaty will not be meddled with. It has heretofore proved its value, and the purpose for which it was made is as imperative now as it was in 1817. Neither Canada nor Great Britain desire to build warships on the lakes, nor do they desire the United States to do so. As far as training stations are concerned, let the young man who inhabit the land on the American side of the lakes go to salt water to get their training; and God forbid that they should ever be called upon to exhibit their skill on our international fresh water seas. As to the shipbuilders, let them remember that peace has her victories no less renowned than war, and that they can do a flourishing business building grain carriers. Canada will never ask for the abrogation of the treaty, and if the United States insists upon it, no United States warships will ever reach the Atlantic Ocean via the St. Lawrence route. American warships on the lakes would always be a menace to Canada, as evidently intended. The treaty should be let alone.

In Industrial Canada of August, 1901, appeared the following:

As our readers will notice, the present issue is marked by a new addition in the form of a cover. The design for this was chosen from a number submitted to the committee having the conduct of Industrial Canada in charge, and the design of Mr. John Russell, of New York, was awarded the prize of \$50.

The Dominion Marine Association will ask the Government to enlarge the Welland canal; in order to take full advantage of the geographical advantages possessed by the Dominion. Were this done, they say the result would be a very decided advantage to Canada, which would bring to our waters much of the trade now going by American routes. The result of this improvement to the Welland canal would be that whereas freight by the American route would be carried in 6,000-ton steamers 900 miles to Buffalo, and 450 miles in 1,000-ton barges to New York, by the Canadian route it would be taken in 6,000-ton steamers 1,100 miles to the east end of Lake Ontario, and 2,000-ton barges 170 miles to Montreal. This would be both a gain in mileage and the capacity of boats, which the marine men say would practically give the Canadian waters the bulk of the traffic and amply repay the cost of the improvements to the Welland canal.

Mayor Urquhart, in his address at the inaugural meeting of the Toronto City Council gave a brief review of the progress of the city during the past ten years, showing that the net debenture debt of the city had decreased from \$18,188,735 in 1893 to \$15,843,398 in 1903. In the same period the population had increased approximately from 192,000 to 250,000. The net debt per capita is now \$63.37, instead of \$95.73, the figures of a decade ago.

The Imperial Oil Company's petroleum refinery at Sarnia, Ont., is said to be running at less than one-half its capacity, being unable to obtain crude oil to keep the plant in full operation. The Canadian production is going down, and the

duty of five cents a gallon on the American oil is prohibitive, as it cannot be brought in and refined in Canada at a profit. It is claimed that the industry is in a serious position, and that the only relief which will be effective is to admit oil from the United States by reducing the duty to two cents a gallon. Advocates of this measure say that the Canadian oil will still find a market, as it will cost the refiners about twenty cents a barrel less than the imported crude oil. The consumer will get the benefit of the lower price of Canadian refined oil, about one cent a gallon, on the extra production of the Canadian refineries. The capacity of the Sarnia refinery is 780,000 barrels a year and of the Petrolia refinery 96,000 barrels. At the present proportion of 54 per cent. of refined oil from 100 per cent. of crude, this would call for 1,600,000 barrels of crude oil annually. The Canadian production for 1903 is estimated to have been 483,500 barrels.

The Customs departmental returns shows that in the three months of October, November, and December since the surtax on German products came into full operation, our purchases from that country have decreased by 40 per cent. The following statement of imports of dutiable goods from Germany bears out this statement :

	1902.	1903.
October.....	\$935,324	\$609,943
November.....	657,926	392,166
December.....	789,504	353,926
Totals	\$2,382,754	\$1,356,034

It will be noticed that in November the shrinkage of German imports was more conspicuous than in October, and that in December the change was more noticeable still. This is the condition of things that brought Germany to time, and what prompted the recent request of Herr Bopp that Canada should reopen the question of tariff relations with his Government.

Arrangements are being made by the McGill University authorities for the inauguration of a new railway department, which is to be established in connection with the faculty of applied science. It is understood that the sum of \$20,000 is the amount required for the running expenses. Of this amount both the Grand Trunk Railway and the Canadian Pacific Railway have agreed to pay \$5,000 each, yearly, and the Canadian Northern Railway will also contribute \$2,000 as its share of the expenses. A request has been sent to the Government, asking that it donate a sum in the name of the Intercolonial Railway. So soon as the yearly amount mentioned is guaranteed the university will have only to furnish the accommodation required. In this connection, the details of the curriculum have not as yet been settled. It is known, however, that the course will include instruction in leveling, surveying, bridge-making, ballasting, track laying, and in all other subjects with which a practical road man should be familiar.

Henry Birchenough, a writer on statistical and political subjects, who was sent to South Africa by the British Board of Trade as a special commissioner, in a report, published in a Blue Book, lays stress on the magnitude of the South African market, which, he says, has increased 250 per cent. in the last ten years, the greatest increase having been shown in the last two years. The value of this trade now exceeds the sum of \$235,000,000. He points out that a decade ago British

exports to South Africa were under \$45,000,000, while during the last year they exceeded \$130,000,000. In 1893 South Africa stood sixth in the list of Great Britain's customers, but last year it was only beaten by India. The commissioner predicts that South Africa will this year be the largest buyer in the world of produce and manufactures of the mother country. The most serious competitors of the British tradesmen are the manufacturers of the United States and Germany. American rivalry is in concentrated and well defined branches of trade, but in the natural products, such as foodstuffs, timber and paraffin, which form a large portion of American imports to South Africa, the United States competes with Australia and Canada, but not with Great Britain.

An Order-in-Council has been issued approving the regulation for the payment of bounties on certain articles manufactured from steel, under an act introduced by Mr. Fielding last session. On rolled round wire rods sold to wire manufacturers for use in making wire in their own factories in Canada, the bounty is \$6 per ton. On rolled angle ties, joists, girders and other rolled shapes of iron, as well as rolled plates when sold for consumption in Canada only, the bounty is \$3 per ton. The manufacturer must furnish satisfactory evidence to the Minister of Trade and Commerce that the articles have been produced in Canada and sold to Canadian consumers. The manufacturer will have to take an oath before a Collector of Customs or a Justice of Peace, but as to production and sale, and a certificate confirming the claims for bounty will have to be procured from the purchaser. The manufacture subject to the bounty is to be under the supervision of such officer as may be appointed by the Minister of Customs, while the books of the company or individual claiming the bounty are to be subject to the inspection of an officer authorized by the Minister of Trade and Commerce. A claim for bounty must be made to the Department within four months after delivery of the articles for use or consumption in Canada. Persons or companies intending to claim bounty under the Act must give notice to the Department before commencing to manufacture the articles specified, and must also give the name of the company and its responsible officers, the place of manufacture, expected output, etc.

Mr. E. S. Busby, collector of the Port of Dawson, Yukon Territory, writing to THE CANADIAN MANUFACTURER, speaking of the increasing consumption of Canadian manufactures, says that since he has resided there he has seen the imports of such goods increase from 7 per cent. to 75 per cent. of all such imports; and if Canadian manufacturers are careful to send only really first-class goods, they will, in his opinion, control 85 per cent. of a trade, which, in 1903 amounted to about \$5,000,000. It was Mr. Busby who had charge of the Canadian Customs House at Skagway and put in force the bonding system via the White Pass and Yukon route.

One of the anomalies of the Canadian tariff is that barb wire is admitted duty free, and a heavy duty is imposed upon machinery for making barb wire. The Government gives a premium upon the home production of wire rods, but imposes a duty upon the machinery for drawing such rods into wire; and as far as our knowledge goes, there are no works in Canada which produce such machinery. If barb wire were made dutiable such machinery would be produced in Canada, and, of course, barb wire would also be made here.

ELECTRIC DRIVE FOR MACHINE TOOLS WITH METHODS OF VARIABLE SPEED CONTROL.

The question of whether or not in machine shops power shall be distributed by means of electricity is to-day hardly considered, as the advantages obtained by this method have been so successfully proven that there is little room left for doubt. The subject, therefore, which is given attention is what method of elec-

greatly increased first cost, provided that cost will directly bring about a reduction in the labor bill.

Besides eliminating the disadvantages of line shafting, belting and the inflexibility of location, the individual drive of machine tools by electric motors increases the efficiency and output of machine shops.

It is not necessary, therefore, to lay down any specific line of demarkation as to the size of the tool on which it would

If we fail to find that the advantages just mentioned offset the only objection claimed, before dismissing the problem there must be credited against the first cost of the individually driven tool the cost of countershafts, hangers and belts, also the cost of the increased power to overcome friction losses due to the shafts getting out of line and the tool operator's time lost in lacing and repairing the belts, to say nothing of the unhandy methods which are required for the starting

and stopping, and shifting from one speed to another. Upon giving all of these points careful consideration we will find that the first cost of the individually equipped shop is not much if any greater than one arranged for group drive, particularly so in the face of the advantages obtained by the former method of drive.

The practice of using portable tools and bringing the tools to the work rather than the work to the tools, which is becoming so popular to-day, is only a further development of the individually driven motor tool idea. The portable tool which cannot be operated unless it is driven with an individual electric motor serves as an excellent ex-

ample of what we should endeavor to accomplish in our efforts to make all our machine tools as simple and useful as possible. They should not be so arranged that they must always be in one particular location in a shop, for it may be desirable to use this portion of the shop, as time goes on, for other purposes, or possibly it will become necessary to crowd in additional machines of the same type as those already in use, and it is not every shop that is so arranged as to permit of the installation of additional tools without necessitating very awkward

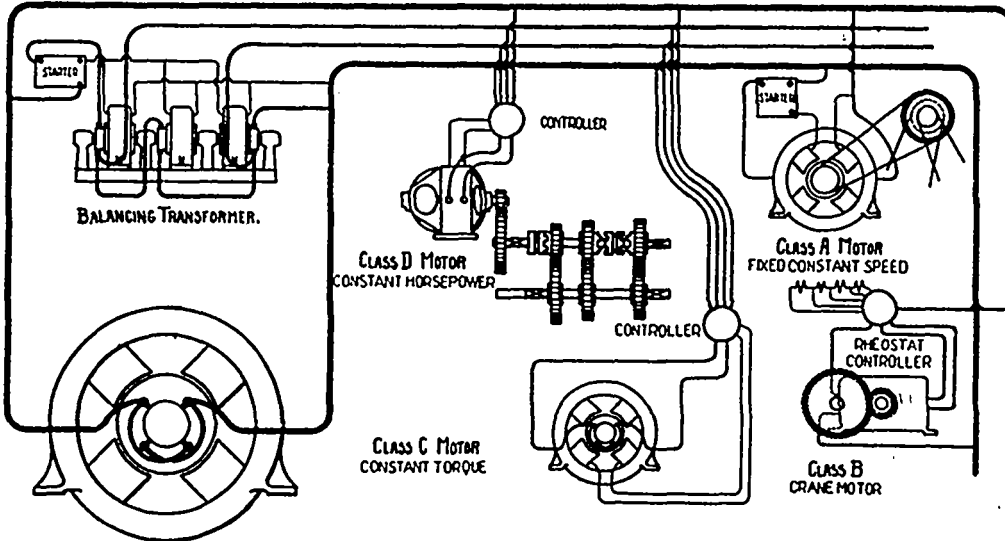


Fig. 1.—Diagram Showing Arrangement of the Multiple-Voltage System.

tric distribution shall be adopted and in what manner shall we arrange the electric motors with respect to the work which they have to accomplish.

In considering the subject of individual driving, some have said, "that while considered alone and for the individual tool, this method is ideal, yet the objection will occur that the enormous multiplication of small motors means increased complication and greatly increased cost and that if this method is employed, it should be limited to tools requiring from 5 to 10 h.p. and upwards, and that group driving should be used where the tools require less than these amounts."

If the saving in our coal bill due to the decreased losses in transmission obtained by individual drive throughout in a machine shop or factory only is to be considered, the objection above referred to might in a measure be correct, but as a matter of fact the coal bill in a year amounts to such a small percentage of the total operating expenses of any manufacturing establishment that a small variation in this one way or the other hardly merits more than passing consideration.

The element in our factory costs which requires our most careful consideration is that of the labor cost involved in turning out a given piece of work.

A very small percentage of decrease in our total labor bill will as a rule justify a

be advisable to apply an individual motor, but rather to determine in the case of each particular tool the class of work which is to be done and the character of the shop in which the system is to be installed, as to whether or not the increased facilities which the individual motor driven tool affords in the direction of variable speeds under instant control over any range with every speed constant, regardless of the load, and the horse-power of the motor but slightly in excess of that required by the tool, as well as the ability to maintain high cutting



Fig. 2.—Balancing Transformer for MV System, Subdividing Generator Voltage and automatically Balancing any Differences in Loads between the Circuits.

speeds due to superior facilities for manipulation and the absence of shut-downs due to belt troubles will not offset the objection claimed against the individual method of tool drive, which is "greatly increased first cost."

connections to the line shafting. If the tools are all individually driven, this difficulty does not exist. While the individual method of electric drive provides a material reduction in the cost of power, this factor is not its greatest re-

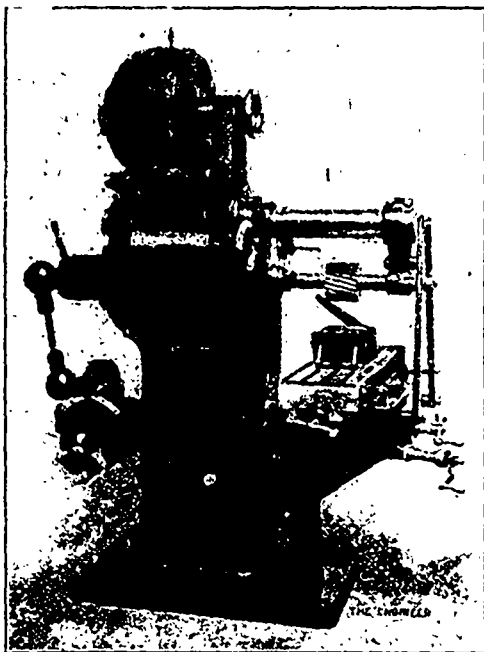


Fig. 3.—Milling Machine driven by a C-W Motor Controlled by the MV System.

commendation, the greatest benefit being derived from the elasticity which is obtained only by the adoption of this method. With individually driven tools there is no longer any necessity for the rigidity of arrangement which obtains with shafting and belting, so that if it becomes necessary to re-arrange the plant at any time, the expense is reduced to a minimum.

The valuable light which possibly the building has been constructed especially to provide can only be maintained by avoiding the adoption of any equipment requiring overhead construction which must necessarily prove an obstruction in this regard.

A study of the evolution of electricity into industrial plants, first for lights, second for cranes and elevators, third for constant speed motors for group drive, and lastly, variable speed motors individually connected to the tools, indicates clearly that the group method can hardly be compared with individual drive so far as advantages are concerned, or it would not have been necessary for manufacturers to spend their energies in developing the ingenious applications of individually motor driven tool equipments which have been offered to the market during, we may say, the past year.

While the driving of groups of tools by means of constant speed belted motors permits of the elimination of

vidual machines—it does not and cannot offer that which is by far the most important feature of electric driving, i.e., the possibility of placing speed control of the driven tool at the immediate will of the operator.

With these preliminary remarks as to general problems governing questions which have to be determined before a purchaser can properly select the electric system which is best suited for his own particular plant, we will pass now to a description of a particular system of electric drive which offers certain positive advantages due to its methods of variable speed control. The system which we will describe is that offered by the Crocker-Wheeler Co., of Am- pere, N.J., and the information given below will be particularly valuable to any one interested when making a comparison between the method of individually driving tools

and that of operating them in groups.

The ordinary belt driven tool usually has a speed range obtained by mechanical means, of from 20 : 1 to 50 : 1 with increased speed steps of about 30 to 50 per cent. The Crocker-Wheeler system for the multiple voltage operation of machine shops not only extends the speed range but also reduces the speed increment per step to about 10 per cent., which has been found by experience to be as small an amount as would be desirable to use. This system is a method

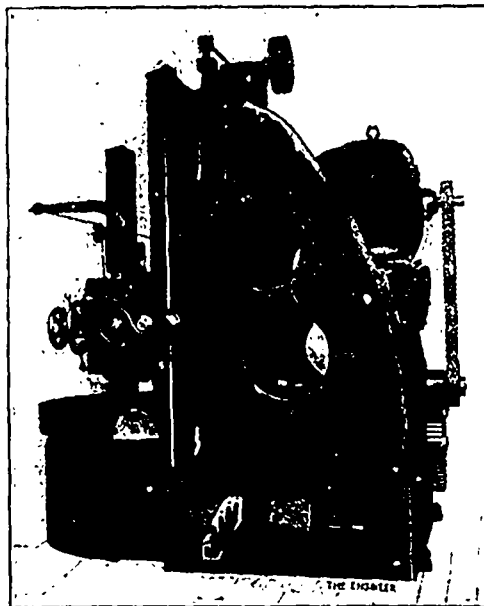


Fig. 4.—51-inch Boring Mill Driven by a C-W Form I Motor with MV System.

of the current at their terminals. The generating plant supplies the highest voltage of the system. This voltage may be termed the primary and is divided by a three unit balancing transformer into three unvarying voltages of unequal value which are maintained between the wires of a four-wire circuit, various connections of which offer six different and distinct voltages.

The principle on which this system of speed control is based is that in a separately excited shunt motor the speed of the armature is proportional to the volt-

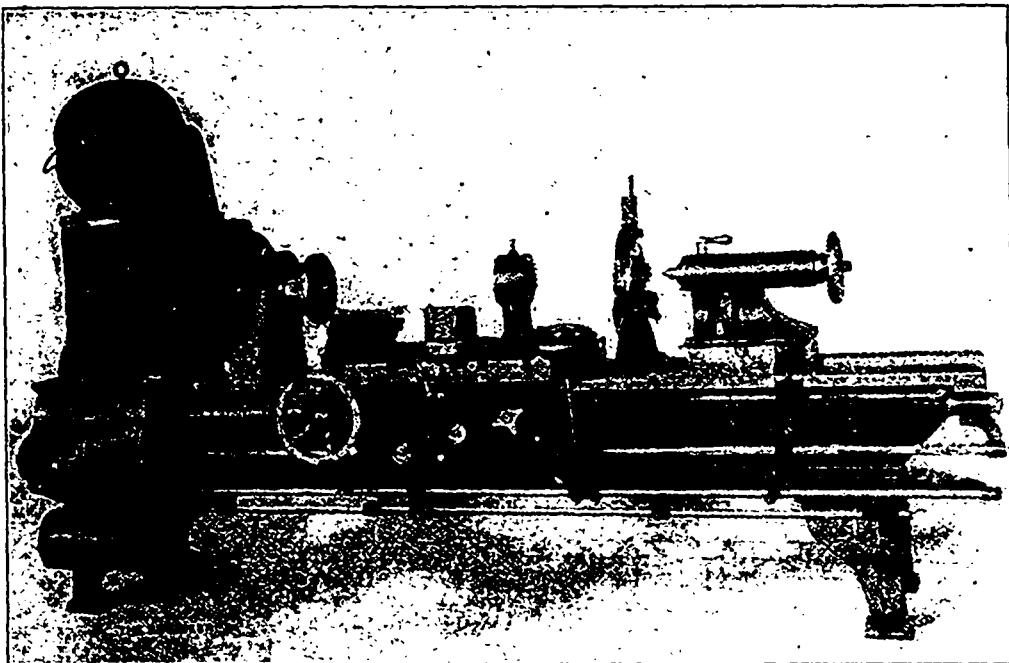


Fig. 5.—24-inch Screw-cutting Lathe driven by a C-W Form I Motor with MV Control.

very heavy belting and long line shafts, and in this regard is an advance towards the ultimate end—electric drive of indi-

vidual machines at different voltages which enables standard motors to be operated by changing the potential

ago supplied to the terminals. If this voltage remains constant the speed will remain constant even with varying loads.

It is the function of the balancer to maintain these voltages constant and to accommodate the unbalance of currents between the four wires of the distribution circuit.

As the conditions of machine tool operation will result in the various motors of the system being nearly equally distributed on the circuits, the unbalanced current will be but a small percentage of the total current taken by all the motors. The intermediate wires of the system are extended to the variable speed motors only, the constant speed and crane motors and the lighting being supplied in the usual manner from the outside wires at the generator voltage.

Those motors requiring variable speed are connected to the four-wire circuit by means of a controller of the drum type adapted for mounting on the tool in a place convenient to the operator. The action of this controller is such that as the drum revolves the armature terminals of the motor are connected to the six circuits—afforded by this system—in the proper sequence, and the travel of the drum from one position to the next is so quickened by the action of a spring that contacts are made and broken at a high rate of speed, preventing the formation of arcs and eliminating the possibility of the drum stopping between contacts. This gives six fundamental motor speeds which are subject to a further refinement by varying the motor's field strength sufficiently to cover the gaps between them.

The speed range obtained on the voltage points alone is 6 : 1, being proportional to the ratio of maximum to minimum voltages. The addition of field resistance points above the highest voltage points extends the total range of the controller to a value of 10 : 1. For exceptional cases the range may be increased to a maximum of 12 : 1, the proper range in any case being determined by the character of the machine and the work which it performs.

The Crocker-Wheeler system as outlined, has certain positive advantages of which the most important are the following :

1. Variable speed, under instant control, over any range.
2. Every speed constant regardless of the load.
3. Controllers simple and convenient of attachment.
4. The horse-power of the motor but slightly in excess of that required by the tool.
5. Output of machine tools much greater than when they are belt driven.
6. Easy of adaptation to existing shops with a 2-wire system of electric power distribution.
7. Employment of standard motors.
8. Ability to maintain high cutting speeds due to superior facilities for manipulation.

Motors used in an ordinary shop equipment may be divided in classes A, B, C or D, according to the nature of their duty.

Class A is constant speed motors such as drive groups of small tools by shafting, this class being kept as small as

possible consistent with best judgment based on careful study of all of the advantages which should be credited to the individual drive idea in comparison with the one disadvantage which may or may not exist, that of a possible slight increase in first cost. This may be lost sight of entirely in the face of the advantages which are to be obtained through flexibility of location and ease of manipulation.

Class B, controllable speed motors, generally of the series wound type, as used on cranes.

The duties which the motors in both of these classes have to perform is such that their demand for current is intermittent and often excessive, consequently they are best suited for connection to the outside mains and such speed regulation as they may require can be obtained by rheostatic control.

The other two classes, C and D, are controllable speed motors for the drive of individual tools where the speed should be maintained constant at any one of a number of fixed values.

Class C covers motors driving pressure blowers, punch presses, planers, etc., which demand approximately constant torque at all speeds, the horse-power diminishing with the speed. This characteristic of the tool being identical with the power characteristic of the motor on this system, the normal horse-power of the motor need not be greater than the maximum demanded by the tool.

Class D covers those motors operating lathes, boring mills, etc., where the torque increases as the speed diminishes. If the range required by these tools is to be obtained by using a motor through its maximum range, the motor would be very large and unnecessarily expensive. For this class a speed range of approximately 3 : 1 has been selected as a basis for the determination of the most suitable sizes of motors with respect to the duty which they have to perform. A motor, therefore, to give a constant horse-power throughout this range, must have a normal rating of about twice the horse-power required by the tool. This range, however, may be extended to cover the entire range required by the tool by using one or more additional gear runs. The method is an advantageous compromise between the use of an excessively large motor with no gears and a constant speed motor with many gears.

The extreme facility of manipulation which this system affords enables the machinist to push his tool to the highest limit of cutting speed, thereby giving large increases in output. Results show that as much as 20 per cent. increase in output over a belt-driven tool may be obtained by this system of motor drive. As by actual test in commercial plants it has been shown that 2½ per cent. increase is sufficient to warrant the outlay necessary for individual drive, the possibility of large saving in operating expense through the adoption of this system is at once apparent.

PUTNAM A. BATES.

The Bain Wagon Co., Woodstock, Ont., have increased their capital from \$250,000 to \$500,000.

THE HEATING QUESTION.

At the sixteenth annual convention of the Ontario Association of Architects, held in Toronto, January 12, Professor R. C. Carpenter, of Cornell University, delivered an address on "Heating" in which he said that local conditions affected their problems. On the continent of Europe 60 degrees of heat is considered sufficient for a house. In America 70 degrees is required. A lack of moisture in the air results, which affects furniture. Sixteen per cent. of moisture is required for the saturation of air. Most of us live in houses whose air is dryer than the air of the driest resort. This draws moisture from the body, and results in a much higher temperature being required for comfort. In a moist atmosphere a lower temperature feels comfortable. It costs money to provide proper ventilation. But if people could be persuaded that the cost of ventilation is less than the cost of a physician, pure air would be as commonly provided as heat now is. The fan system of heating is usually employed in the States, pure air being driven over heated surfaces, ventilation and heating thus being to some extent combined.

In many respects the hot water system is an ideal one for heating. Hot water systems require less coal than steam, and supply the steadiest temperature. A permanent ratio has been worked out in New York in the comparative value of steam and hot water, 100 square feet of steam surface being considered equal to 166 of hot water heating. Steam is open to the objection that the heat cannot be changed by varying the quantity of steam admitted to the radiator. Steam is less costly than hot water systems, and smaller and less conspicuous radiators can be used with steam.

The fact that steam under a lower atmospheric pressure can be generated at a lower temperature than 212 degrees is being taken advantage of. In a vacuum steam can be generated of as low a temperature as 120 degrees. Houses can thus be heated by steam at a lower and more comfortable temperature than has hitherto been the case, and where exhaust steam is available it can be used as a pressure less than atmospheric. Professor Carpenter described several new systems embodying this principle.

The objection to hot water was the large size of radiators required. Certain substances added to water raise the boiling point of water. Glycerine mixed with water raises the boiling point to 300 degrees. If a sufficiently inexpensive salt can be found to add to water, which will not affect the pipes and radiators, this problem will be solved. In hot air heating the furnace should be installed as closely as possible to the windward side of the house.

The architects of Ontario have obtained a notable position in the world from the noble and artistic works they have produced, said Professor Carpenter, and he hoped they would not forget the elements of health and comfort in the construction of their buildings.

A NEW AIR COMPRESSOR.

The new type of air compressor here shown is made by the Chicago Pneumatic Tool Co. (Fisher Bldg. Chicago and 95 Liberty St., New York) at their Air Compressor Works, Franklin, Pa., and is designed to meet the growing demand for an efficient, simple and compact compressor furnished at a moderate price. This form of compressor is made in a variety of sizes and styles, starting with a minimum capacity of 30 cubic feet of free air

base the compressor is entirely self-contained, obviating the necessity of expert services in erecting, and reducing cost of foundation.

Air cylinder and heads are completely water jacketed, with thorough circulation of water, affording equal cooling at all points.

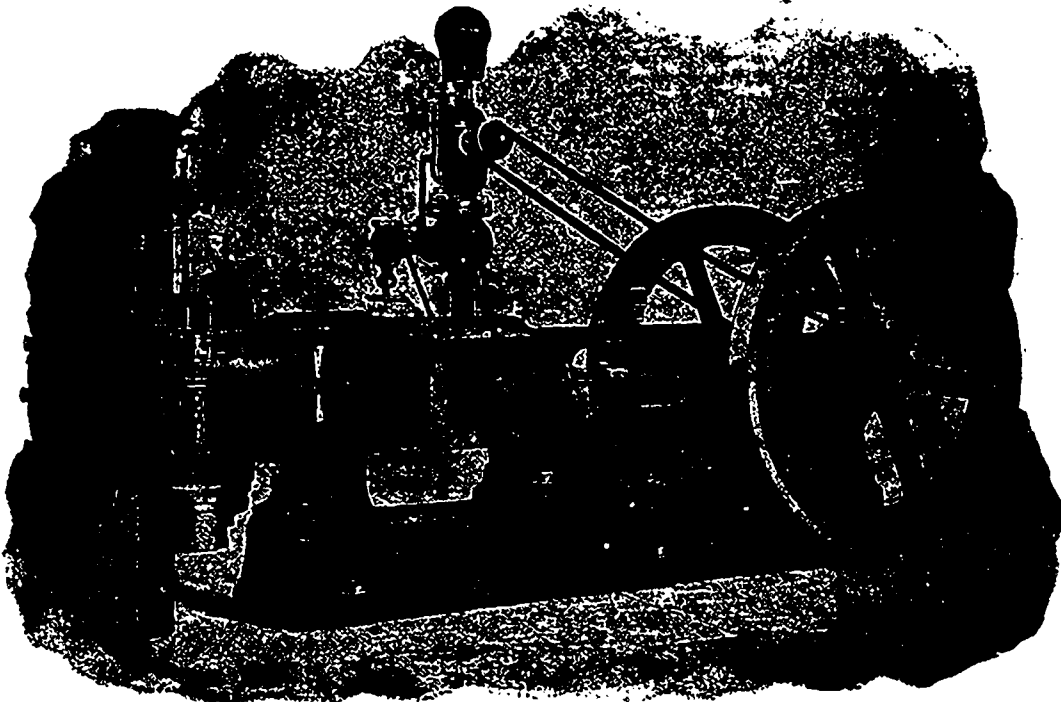
Steam valves on cylinders under 12 inches diameter are of plain slide type accurately scraped to seat and securely fastened to rod. Cylinders 12 inches diameter and larger are provided with

iron spring rings accurately fitted. Piston rods are of best machinery steel.

Shaft is of center crank type with exceptionally heavy crank arms, made of best open hearth steel of ample diameter, accurately finished.

Cross-head is of cast iron with adjustable shoes top and bottom.

Connecting rod is of best open hearth steel, with bronze cross-head pin boxes having wedge adjustment. Crank pin end is of Marine type lined with genuine babbitt metal.



New Type Air Compressor.

Compressor is furnished with two wheels, one on each side of compressor, turned true, and keyed to shaft, of sufficient weight to insure smooth operation.

An unloading device is provided to relieve the compressor of all load when the desired air pressure is obtained, and automatically cause it to resume delivery when the storage pressure becomes reduced.

Cylinders have provision for indicator connections.

A pressure regulating governor is provided, to automatically control the operation of the compressor in accordance with the demand for air, working in connection with a speed governor for regulating the speed of the engine.

These compressors are submitted to a working test before shipment and although designed primarily to supply compressed air power for operating pneumatic tools in railroad shops, machine shops, foundries, shipyards, and stone-yards, they are equally suitable for actuating rock drills, coal cutters and other machinery in mines, tunnels and quarries, pumping water by the air lift system and for every other purpose to which compressed air is applied.

per minute, single, duplex or compound, actuated by steam, belted, chain driven, or geared to an electric motor. The frame is of box section design, with large factor of safety to withstand all strains when working at maximum load. Graceful in outline, with bored cross-head guide and provision for catching and removing drip from bearings and stuffing boxes.

Compressors having cylinders 8" in diameter and larger are furnished with or without sub-base. When furnished with

Meyer Adjustable Cut-Off Valves and gear.

Air valves are of poppet type made from high grade steel, having removable seats and guides, easily renewed or repaired and thoroughly guarded from entering cylinder in case of breakage. They are placed radially in cylinder, making them readily accessible, ensuring accurate setting, and reducing wear to a minimum.

The pistons are of solid type with cast

SHAW MACHINERY CONTRACTS.

One of the best known American dealers in new and second-hand contractors' machinery in the West is Willis Shaw, of 171 La Salle Street, Chicago. Mr. Shaw is also sales agent for the "Davenport" locomotive, Flory hoisting engines, North Penn Iron Co.'s locomotive cranes and Blaisdell air compressors. He reports a continuance of good enquiries and satisfactory business. Mr. Shaw has just secured an order for eight carloads of Flory hoisting engines for the coal docks of Standard Coal Co., Milwaukee, and Two Rivers Coal Co., Two Rivers. Six Flory hoists, 100 h.p. each will be installed in the Milwaukee plant, and the Flory engines were selected in view of the satisfaction given at Es-

canaba and Green Bay docks where they are also used. The Hoisting & Conveying Machinery Co. of Chicago have the general contract, and the Flory machines are furnished by Mr. Shaw. Other Shaw contracts included the following: air compressor and rock drills for Rowley Mining Co., Buncombe, Wis.; 45-ton steam shovel, Porter Bros., Duluth, Minn.; prospecting mine hoist, J. T. Duffy, Louisville, Ky.; "Davenport" locomotive, Cole Creek Coal Co., Big Muddy, Wyo.; traction steam shovel, McDonald-McMillan Co., Winnipeg, Man.; Flory hoisting engine, Lincoln Park Commissioners, Chicago; mine drills, Antler Coal & Coke Co., Antler Sid-ing, W. Va.; hoisting engine, Stirling Co., Barberton, Ohio; traction engine, C. C.

Provino, Grenada, Miss.; revolving and travelling derrick and quarry drills, Onaway, (Mich.) Limestone Co.; Flory hoisting engine, M. Suck, contractor, Mobile, Ala.; steam shovel, South Bend (Ind.) Electric Co.; hoisting engine, Peoria, (Ill.) Water Works Co.; 28x30 inch saw mill engine, Tremont (La.) Lumber Co.; hoisting engine, Pepper & Register, Philadelphia, and stone crusher, Bickford Bros., New Orleans.

The Convertible Car Co., Toronto, have been incorporated with a capital of \$75,000, to manufacture convertible cars, railway cars, etc. The provisional directors include R. G. Dickson, C. A. Johnson and P. H. Drayton, Toronto.

CAPTAINS OF INDUSTRY.

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

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

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

The Education Publishing Co., Toronto, will erect a large office building.

The United Typewriter Co., Toronto, was organized at the beginning of 1902 with a capital of \$250,000. The officers and directors include W. H. Shaw, of the Central Business College, Toronto; H. P. Lawson, R. I. Creelman, Georgetown, Ont.; and J. N. Shelston, T. A. Russell, and J. J. Seitz, Toronto, who is the managing director, and to whose recognized business ability the rapid progress of the company is largely due. The secretary-treasurer of the company is Mr. C. J. Gillooly, who was for many years with the Creelman Bros. Typewriter Co.

Mr. Joseph Steele, Saginaw, Mich., who is interested in the Jack Lake Mining Co., has bought the stamp mill and mining machinery of the Golden Star mine, and will remove it to the St. Anthony Reef property at Sturgeon Lake, Ont., north of Ignace. He proposes to set up the mill and machinery there and work on the ore from the mine. There is now about four years' supply of ore on the dump and blocked out.

The People's Natural Gas Co., Dunnville, Ont., have been incorporated with a capital of \$100,000, to produce electricity, petroleum oil, etc., and to take over the Dunnville Natural Gas Co., The Consumers' Natural Gas Co., of Dunnville; The Imperial Natural Gas Co. The provisional directors include John Brown, Dunnville; H. Cockshutt, Brantford, Ont.; and H. Eagle, Attercliffe Station, Ont.

The Goderich Planing Mills, Goderich, Ont., have been incorporated with a capital of \$40,000, to manufacture lumber, etc. The provisional directors include J. T. Goldthorpe, Colborne, Ont.; John Lawson and Jas. Buchanan, Jr., Goderich.

The Fairbanks Co., a United States incorporation, have been licensed to manufacture scales, implements, machinery, etc., in Ontario, with a capital of \$100,000. C. J. Brittain, Toronto, is their attorney.

The Union Petroleum Co., of Canada, Limited, Toronto, have increased their capital from \$25,000 to \$125,000.

The McLean Lumber Co., Windsor, Ont., have been incorporated with a capital of \$40,000, to manufacture lumber,

etc. The provisional directors include A. N. McLean and W. T. Carter, Windsor, and W. J. Pulling, Sandwich, Ont.

The Leishman Maundrell Co., Woodstock, Ont., have changed their name to The Woodstock Lumber & Mfg. Co., Limited.

The Robertson Varnish Co., Toronto, have been incorporated with a capital of \$25,000, to manufacture varnishes, paints, oils, glass, etc. The provisional directors include A. A. McMichael, H. S. Harwood and G. F. Clare, Toronto.

The Dr. Unger Medicine Co., Toronto, have been incorporated with a capital of \$60,000, to manufacture proprietary and patent medicines, etc. The provisional directors include A. W. Granger, Eldon, Ont.; F. K. Reesor and R. J. Reesor, Markham, Ont.

The Tait, Carrs, Lumber Co., Orillia, Ont., have been incorporated with a capital of \$40,000, to manufacture laths, shingles, etc. The provisional directors include A. Tait, S. E. Carrs and C. C. Carrs, Orillia.

Messrs. Wm. R. Perrin & Co., Limited, Toronto, have been incorporated with a capital of \$40,000, to manufacture hydraulic presses, power presses, filter presses, etc., and to acquire the business of Wm. R. Perrin & Co. The provisional directors include Wm. R. Perrin and M. H. Perrin, Chicago, Ill., and W. H. Parmelee, Toronto.

The Arndt Tree Protector, Limited, Toronto, have been incorporated with a capital of \$40,000, to manufacture the Arndt Tree Protector. The provisional directors include Geo. E. Bradshaw, N. W. Tovell and E. E. Wallace, Toronto.

The Lindsay Portland Cement Co., Lindsay, Ont., have been incorporated with a capital of \$500,000, to manufacture cements, etc. The provisional directors include J. D. Flavelle, Thos. Sadler and R. Sylvester, Lindsay.

The Stevens Co. Limited, Galt, Ont., have been incorporated with a capital of \$20,000, to manufacture tools, castings, forgings, etc., and to acquire the business of Stevens & Co. The provisional directors include J. J. Stevens, W. A. Rothwell and E. C. Jones, Galt.

The Fenelon Falls Milling Co., Fenelon Falls, Ont., have been incorporated with

a capital of \$20,000, to carry on a general milling business. The provisional directors include Francis Sanford, H. Puley and G. J. Nie, Fenelon Falls.

The Canada Steel Goods Co., Leamington, Ont., have been incorporated with a capital of \$75,000, to acquire the business of the Dominion Steel Whiffletree Co., and to manufacture articles made of steel, etc. The provisional directors include R. O. Y. Ainslie and W. J. Ainslie, Comber, Ont., and A. F. Hatch, Toronto.

The Ontario Electric Light, Heat & Power Co., Toronto, have been incorporated with a capital of \$40,000, to acquire the Colborne Electric Light & Power plant, and to manufacture electrical machinery, etc. The provisional directors include A. J. Walker, O. B. Clarke and R. W. Eyre, Toronto.

The Union Cereal Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture oats, etc., and to carry on an elevating and milling business. The provisional directors include W. A. Strowger, J. B. Hallworth and H. Green, Toronto.

The Westinghouse Machine Co. have recently received an order from Joseph Benn & Sons for a turbo-generator set to be used in furnishing light and power for driving machinery in their new alpaca mills which are to be built at Olneyville, R. I. This factory will be an American branch to their Yorkshire, England, mills. The turbine is of the Westinghouse-Parsons type, of 400 kilowatts capacity and is to operate under a steam pressure of about 150 pounds. Superheated steam will probably be used. The turbine will drive a 400-kilowatt three-phase Westinghouse alternator which will deliver power to the motors situated in the various parts of the mill for the purpose of driving machinery in the different departments.

The Eureka Mineral Wool & Asbestos Co. 74 York St. Toronto, of whom Mr. James M. Sinclair is manager, have been appointed sole representative in Ontario and Western Canada for the Cling-Surface Mfg. Co., of Buffalo, N. Y., for the sale of their well-known cling-surface belt dressing, etc. The Eureka people are in close touch with Canadian Power users in the lines of engineer's supplies and requirements.

The Temiskaming Railway commission have a splendid record to their credit. It was formed during the summer of 1902, no difficulty was found in financing the project, and shortly thereafter tenders were asked for the first 60 miles of the proposed railway. Plans were matured so rapidly and work carried out with such enterprise that at the present time 57 miles of railway have been constructed and are in operation, while grading has been done in portions of the balance of the 110 miles from North Bay to New Liskeard. In addition, exploratory work has been conducted beyond Lake Temiskaming, with a view to the extension of the line some 60 miles to the intersection of the Grand Trunk Pacific. At the present time, less than two years after the Legislature authorized the railway, there is a tri-weekly

train service over the completed 57 miles. From this terminus to New Liskeard a winter road traverses the route of the railway, and over this traffic in mails and passengers is being carried this winter. The contract for the whole 110 miles to New Liskeard, at the head of Lake Temiskaming, has been let, and the work is to be completed by the end of the year. The commissioners have charge of the operation of the railway as well as its construction until such time as it is leased or running privileges given to one of the trunk lines.

The Sand & Dredging Co., Toronto, will establish a plant for the manufacture of hard wall plaster.

The Keewatin Flour Mills Co., Ottawa, Ont., have been incorporated with a capital of \$2,000,000, to construct and operate flour mills, etc. The provisional directors include John Mather, A. W. Fraser and R. M. Cox, Ottawa.

Messrs. Sheldon & Sheldon's scratching shop at Galt, Ont., was destroyed by fire January 28.

The High & Public school building at Omamee, Ont., was destroyed by fire January 28. Loss about \$4,000.

The "Hub" building owned by the Barnesdale Trading Co., Stratford, Ont., was destroyed by fire January 28. Loss about \$60,000.

A block of stores was destroyed by fire at Campbellford, Ont., January 10. Loss about \$20,000.

Messrs. Frost & Wood's implement shop at Brussels, Ont., was destroyed by fire January 14. Loss about \$5,000.

The Safety Folding Bed Co., Windsor, Ont., have been incorporated with a capital of \$40,000, to manufacture folding beds, etc. The provisional directors include I. W. Durfee, and H. Blackwell, Detroit, Mich., and F. H. Macpherson, Windsor.

The Canada Linen Works, a Nova Scotia incorporation have been licensed to manufacture linen, cotton, woolsens, yarns, etc., in Ontario, with a capital of \$500,000, E. J. H. Pauley, Toronto, is their attorney.

The Central School building at Oil Springs, Ont., was destroyed by fire January 16. Loss about \$2,500.

The J. H. Woods Advertising Agency, Toronto, have been incorporated with a capital of \$25,000, to carry on a general printing, publishing and advertising business. The provisional directors include A. L. Massey, J. H. Woods and Henry Wright, Toronto.

The Congregational church building at Embro, Ont., was destroyed by fire January 31.

The Scott Mfg. Co., Toronto, have been incorporated with a capital of \$25,000, to manufacture paper vessels, boxes, etc. The provisional directors include H. J. Scott, F. L. Ratcliff and S. J. Douglas, Toronto.

The Crown Brass & Steel Works, Limited, Stouffville, Ont., have been incorporated with a capital of \$40,000, to acquire the business of The Stouffville Brass & Steel Works, and to manufacture

brass and steel articles, etc. The provisional directors include C. A. Michell, F. A. Dales and J. F. Lennox, Stouffville.

The John Campbell Co., St. Thomas, Ont., have been incorporated with a capital of \$100,000, to manufacture flour bags, barrels, etc. The provisional directors include John Campbell, R. N. Price and D. M. Tait, St. Thomas.

The John C. Winston Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture books, maps, calendars, etc. The provisional directors include J. C. Winston, Philadelphia, Pa.; A. H. Sinclair and F. C. Ruel, Toronto.

The William A. Greene Co., Waterloo, Ont., have been incorporated with a capital of \$50,000, to manufacture textile fabrics into shirts, collars, etc. The provisional directors include Wm. A. Greene, F. S. Kumpf and J. Uffelmann, Waterloo.

The Craig-Cowan Co., Toronto, have been incorporated with a capital of \$20,000, to manufacture leather goods, etc. The provisional directors include J. T. Craig, H. S. Cowan and G. F. Adams, Toronto.

The Willson Carbide Works Co., St. Catharines, Ont., have changed their name to The Willson Carbide Co., Limited.

The Orion Mining Co., Niagara Falls, Ont., have been incorporated with a capital of \$1,500,000, to carry on a mining, milling and reduction business. The provisional directors include M. Stewart, L. K. Hyde and T. B. Westgate, Titusville, Pa.

The Cornwall Paper Mfg. Co. have called for tenders for the erection of new works at Mille Roches, Ont. Work on the structures will be begun as soon as the weather permits.

A large tannery will be established at Cumming's Bridge, Ottawa. J. Laing, Berlin, Ont., is the principal mover in connection with the enterprise.

The Temiskaming Railway Commission have awarded the following contracts for supplies: Angle bars, Hamilton Steel & Iron Works; spikes, Pillow & Hersey Mfg. Co., Montreal; bolts, Toronto Bolt & Forge Works; nutlocks, W. C. Nun, Montreal.

The Public Works Department, Ottawa, Ont., are preparing the plans for the Victoria Memorial Museum.

The Syracuse Smelting Works, Montreal, have just installed a plant for the production of ingot copper of fine quality, which will be marketed under the brand "M. C. C." The output of these ingots will be ten tons every twenty-four hours.

Messrs. J. T. Marchand & Co., Limited, Montreal, have been incorporated with a capital of \$45,000, to acquire the business of J. T. Marchand & Co., and to manufacture lumber, timber, etc. The provisional directors include J. T. Marchand, F. J. Pelletier and J. T. Scanlan, Montreal.

The Canadian Associated Press, Limited, Montreal, have been incorporated with a capital of \$5,000. The provisional directors include J. S. Brierley, S. White,

Montreal; and J. R. Robertson and J. A. Macdonald, Toronto.

The Pentecoste Navigation Co., Quebec City, have been incorporated with a capital of \$10,000, to carry on a general transportation and navigation business. The provisional directors include L. A. Taschereau, F. Roy and L. A. Cannon, Quebec City.

The Canada South Africa Lumber & Produce Co., Montreal, have been incorporated with a capital of \$50,000, to manufacture lumber, furniture, pulp, paper, etc. The provisional directors include G. A. Campbell, L. Skaffe and A. E. Abbott, Montreal.

The shareholders of the Light, Heat & Power Co., at Sherbrooke, Que., voted to accept the city's offer of \$200,000 for their electric plant.

The Shawinigan Lakes Power Electric Co., Shawinigan Falls, Que., have been incorporated with a capital of \$100,000, to construct mills and dams for the fabrication of electricity, etc. The provisional directors include J. E. Thibodeau, Shawinigan Falls; J. A. Delisle, Levis, Que.; and J. Falardeau, Quebec City.

The St. Cuneonde Roman Catholic church, Montreal, was destroyed by fire January 19. Loss about \$100,000.

Messrs. Swift, Copeland & Co's. wholesale warehouse, Montreal, was destroyed by fire January 18. Loss about \$50,000.

The decorating establishment of Marcel Beullac, Montreal, was destroyed by fire January 7. Loss about \$15,000.

An important sale of a timber limit has been consummated, whereby a Quebec city firm have acquired part of the limits of Messrs. F. L. & A. Herdritter. The latter are New Jersey men, and own and operate extensive mills at St. Gabriel, Que., on the Jacques Cartier River.

The Kent Electric Co., Richibucto, N.B., have been incorporated with a capital of \$20,000, to operate a telephone and electric lighting system. The provisional directors include R. O'Leary and H. H. James, Richibucto, and Wm. J. O'Leary, Montreal.

The Canadian Plumbing Improvement Co., St. John, N.B., have been incorporated with a capital of \$12,500, to acquire the Canadian Patent for Bryar's improvement in joint for lead pipe and to carry on a general foundry and metal manufacturing business. The provisional directors include J. M. Smith, M. A. Harding and Geo. Bryar, St. John.

The Charlotte Telephone Co., St. Stephen, N.B., have been incorporated with a capital of \$7,500, to establish and operate a telephone system. The provisional directors include F. W. Andrews, J. E. Gauong and L. F. Mills, St. Stephen.

The output of coal from the Dominion Coal Co's. mines in Nova Scotia for the month of January 1904 amounted to 201,721 tons.

The Central Telephone Co., St. John, N.B., have been incorporated with a capital of \$10,000, to operate a telephone system in the cities of St. John and Fredericton, N.B. The provisional directors include J. M. Scovil, St. John; Wm.

Pugaley, Rothesay, N.B.; and E. G. Evans, Hampton, N.B.

Messrs. C. Flood & Sons, Limited, St. John, N.B., have been incorporated with a capital of \$100,000, to acquire the business of C. Flood & Sons, and to manufacture fancy goods, stationery, etc. The provisional directors include C. Flood, E. H. S. Flood and G. H. Flood, St. John.

The W. F. Hatheway Co., Limited, St. John, N.B., have been incorporated with a capital of \$75,000, to acquire the business of W. F. Hatheway & Co., and to manufacture groceries, etc. The provisional directors include W. F. Hatheway, W. L. Harding and C. E. S. Robertson, St. John.

The Chapin-Berringer Syndicate, Saginaw, Mich., have closed a deal with Wm. S. Montgomery, of Dalhousie, N.B., whereby they take possession of his mill property and equipment at Dalhousie and his valuable tract of lumber limits on the Restigouche, N.B.

The Arbutnot Lumber Co.'s offices, Winnipeg, Man., were partially destroyed by fire January 25. Loss about \$5,000.

The North-West Machinery & Iron Co., Limited, Winnipeg, Man., have been incorporated with a capital of \$40,000, to manufacture machinery, hardware, agricultural implements, etc. The provisional directors include H. J. Macdonald, R. L. Richardson and John Dunn, Winnipeg.

The Imperial Importing & Fur Mfg. Co., Winnipeg, Man., have been incorporated with a capital of \$20,000, to manufacture cloth, furs, haberdasheries, etc. The provisional directors include D. Boyaner, I. P. Kosenstein, and G. F. Munroe, Winnipeg.

The Imperial Plumbing & Building Co., Winnipeg, Man., have been incorporated with a capital of \$150,000, to manufacture electrical supplies, paints, oils, hardware, etc. The provisional directors include Chas. E. Randall, Jas. Young, and Angus McIver, Winnipeg.

The Springsted Land Co., Winnipeg, Man., have been incorporated with a capital of \$20,000, to acquire lands and construct buildings, etc. The provisional directors include F. C. Blunderfield, W. R. Springsted and H. W. Whitla, Winnipeg.

The Manitoba Builders' Supply Co., Winnipeg, Man., have been incorporated with a capital of \$450,000, to manufacture builders' and contractors' supplies, etc. The provisional directors include Wm. J. Hodgins, Robt. Watson and H. J. Macdonald, Winnipeg.

The Brandon Woolen Mills Co., Brandon, Man., have been incorporated with a capital of \$60,000, to manufacture woollens, etc. The provisional directors include C. R. Dunsford, and P. Livingstone, Morden, Man., and N. Fraser, Brandon.

The Swan River Milling Co., Swan River, Man., have been incorporated with a capital of \$20,000, to construct and operate grain elevators, chopping mills, etc. The provisional directors include A. McFadden, L. Klinck, Swan River, and J. D. Mather, Winnipeg, Man.

Clark Bros. & Co., Winnipeg, Man., have been incorporated with a capital of \$100,000, to carry on a general mercantile and manufacturing business. The provisional directors include D. A. Clark, J. H. A. Clark and Geo. Wilson, Winnipeg.

The Lightcap Hide & Fur Co., Winnipeg, Man., have been incorporated with a capital of \$5,000, to manufacture hides and furs, etc. The provisional directors include F. Lightcap, H. U. Lightcap and O. F. Lightcap, Winnipeg.

The Manitoba Electric Engineering & Supply Co., Winnipeg, Man., have been incorporated with a capital of \$20,000, to manufacture electrical apparatus, etc. The provisional directors include A. L. Boucher, C. E. Taylor and R. S. McWatters, Winnipeg.

Steele Brothers Investments, Limited, Winnipeg, Man., have been incorporated with a capital of \$200,000, to improve lands, construct buildings, manufacture builders' supplies, etc. The provisional directors include F. Steele, Wm. B. Steele and Jas. McDiarmid, Winnipeg.

W. Johnston & Co., Winnipeg, Man., have been incorporated with a capital of \$75,000, to manufacture agricultural implements, etc. The provisional directors include Wm. Johnston, L. J. Ostrander and G. H. Watts, Winnipeg.

The Manitoba Hayes Pump Co., Morden, Man., have been incorporated with a capital of \$20,000, to manufacture pumps, etc. The provisional directors include Thos. G. Elliott, J. F. Stephenson and Wm. J. Sutton, Morden.

For the first four months of the fiscal year Canadian goods and goods imported and handled by Canadians to the value of \$2,800,000 were received in the Yukon district, as against \$956,124 foreign goods.

A fire occurred in Calgary, N.W.T., on January 15, which destroyed The Norman block, owned by Senator Lougheed; J. A. Glanville's dry goods store; Wm. Robertson's clothing store; Sale's Clothing Store; Kerr & Terrill's grocery store and D. J. Young & Co.'s book store; a total loss of \$200,000. The Normandie Theatre will be rebuilt at once.

The Ladue Co.'s warehouse and The Ames Co.'s mercantile building at Dawson, Yukon, were destroyed by fire January 21. Loss about \$100,000.

The Keystone Mines, Limited, have been incorporated at Victoria, B.C., with a capital of \$50,000, to carry on a mining, milling and reduction business.

The Dominion Exhibition Commissioner has received from the Skeena River, B.C., mining division, several samples of ore taken from the deposits along the Portland Canal, near the boundary line, as settled by the Alaskan Boundary Tribunal. The ore is taken from the Canadian side, and the report of the recorder at Port Simpson says that 148 tons of ore shipped recently netted \$130 per ton. Another sample of ore which they have received from the same district shows \$90 per ton gold, \$60 copper and \$34 silver.

E. L. Wrigglesworth & Co., who have the contract for the construction of 250

coke ovens for the Crow's Nest Pass Coal Co., at Michel, B.C., state that owing to the delay in the delivery of the brick they were unable to complete their contract within the specified time. They have already completed 116 ovens and have entered into a bond to complete the remainder by July. The contract price for the 250 ovens will exceed \$250,000. In a contract of this kind 300,000 silica brick and 155,000 firebrick are used. The latter are very expensive, and cost delivered at Michel from 8 to 14 cents apiece. The fire brick are imported from Pittsburg. Experience has proven in the coal fields of Pennsylvania, where coke is made at Connellville and elsewhere, that the silica brick for crowns is the best. These are also imported from Pittsburg. The duty and the cost of transportation are large items, and cut quite a figure in the cost of the construction of the ovens. —Mining Review.

The Bright Stationery Co., Vancouver, B.C., have been incorporated with a capital of \$10,000, to manufacture stationery, smallwares, etc.

The Max Freed Furniture Co., Limited, Vancouver, B.C., have been incorporated with a capital of \$50,000, to acquire the business of the Max Freed Furniture Co., and to manufacture furniture, hardware, etc.

The Richmond Oil Co., have been incorporated at Victoria, B.C., with a capital of \$12,000, to carry on the business of oil refiners and the supplying of natural gas, etc.

The Crothers Lumber Co. have been incorporated at Victoria, B.C., with a capital of \$24,000, to carry on a general lumbering and milling business.

The Amalgamated McKeo Creek Mining Co. have been incorporated at Victoria, B.C., with a capital of \$20,000, to carry on a mining, milling and reduction business.

The Empire Lumber Co. have been incorporated at Victoria, B.C., with a capital of \$3,000,000 to carry on a saw-milling and lumbering business and to manufacture woodenware, etc.

The Cranbrook Brewing & Malting Co., Cranbrook, B.C., have been incorporated with a capital of \$25,000, to acquire the business of the East Kootenay Bottling Co., and to manufacture aerated and mineral waters, etc.

The Victoria & Vancouver Stevedoring Co., Victoria, B.C., have been incorporated with a capital of \$150,000, to acquire the business of The Victoria & Vancouver Stevedoring & Contracting Co., and to carry on a general ship-building business.

At a meeting of the Silver-lead Miners' Association held in Sandon, B.C., a few days ago, a resolution was passed deprecating the reports circulated to the effect that silver-lead mining in the province had not been benefited by the Government bounty on lead. Such a statement was directly contrary to the facts, for such work as that now in progress and in contemplation would not have been undertaken but for the bonus. The association also expressed the view that the

suggestion, emanating from local Boards of Trade, that the Government should bonus zinc production, was premature, but a decision was reached to memorialize the Dominion Government, making the request that an expert of zinc and zinc ores be engaged to visit the Kootenays and report comprehensively on the subject of the zinc occurrences there, the best methods of treating and reducing the ores and, further, investigate market conditions and the opportunities for local manufacture.

Mr. James Stables, of Atlin, B.C., is reported to have discovered some time ago coal measures extending over an area of five miles near the Tooya River, that province. The claims, which were abandoned by the original discoverer, have now been relocated, and a syndicate formed to prospect and develop the property. The coal is said to be bituminous and to occur in several large seams.

A company has been formed in Montreal with a capital of \$4,500,000, to operate the coal areas on Fording River, east and south of the town of Michel, B.C. The coal embraced in these areas is bituminous and of good coking quality. There are at least ten seams of workable size, extending from north to south for over 25 miles. It is understood that development operations are to commence at once.

Mr. A. Dick, inspector of coal and metalliferous mines for East Kootenay, B.C., recently paid a visit of inspection to the Crow's Nest Collieries. The output from these mines, he states, is steadily increasing. Michel is now producing 1,400 tons daily. At this property the workings have just been lit by electricity. All but 40 of the 220 new ovens at Morrisey have been completed, and at Michel 160 ovens are ready for use.

The White Bear Mining Co. at Rossland, B.C., have selected a site for a new mill east of their new shafthouse, the lay of the ground there being peculiarly favorable to economic construction.

The Jeffrey Mfg. Co., of Columbus, Ohio, through their connection with the Ohio Malleable Iron Co., of the same place, are now in the field soliciting orders for high grade malleable castings.

The ventilation and heating of a theatre presents a problem not easily mastered by the ordinary heating engineer. In a crowded auditorium of this kind ventilation is the all important question. It may be a simple matter to heat the building to a required temperature before the curtain rises, but to maintain a constant temperature and a pure atmosphere while the play progresses is not so easily accomplished. The heat given off from the bodies of the closely seated audience is sufficient to raise the temperature in the house from 5° to 10° during the performance. Fresh air to breathe must be supplied constantly to the occupants and the impure air must be removed. Evidently a system giving a forced circulation of air is necessary to meet these requirements. A good example of this system is the recent installation in the New Franklin Sq. Theatre at Worcester, Mass. The heating and ventilating apparatus consists of

an electrically driven fan and heating coils, located in the corner of the basement. Fresh air is drawn from the outside and circulated through coils of steam pipes enclosed in a fire-proof casing and distributed through ducts by means of the fan to the desired parts of the theatre. There are plenum chambers under the orchestra floor and first balcony from which air is admitted through openings in the chair legs giving an even distribution throughout the house. The low velocity with which the air enters prevents annoyance from draughts. The foul air is exhausted through grills in the dome of the theatre and by means of an electric exhaust fan is discharged through the roof. The B. F. Sturtevant Co., Boston, Mass., were the heating and ventilating engineers, and the apparatus installed is of the Sturtevant manufacture.

PERSONALS.

At the annual meeting of the New Ontario Exposition Association held at Port Arthur, January 21, the following officers were elected: President, D. F. Burke; first vice-president, ex-Mayor Dyke, Fort William; second vice-president, B. McKenzie Oliver; directors, J. A. Osborne, Fort Frances; G. W. Brown, James Tonkin, J. K. Ollis, P. J. Pilkey, Fort William; John Ritchie, R. A. Burriss, Edward Ross, L. U. Bonin, Port Arthur; A. A. Burriss, secretary-treasurer. The directors were authorized to ask the Dominion Government to grant \$5,000 and the Provincial Government \$3,000; to hold a fair midway between the towns, and to ask Port Arthur and Fort William to guarantee the bonds for \$10,000 for building purposes, etc., and also to grant \$500 annually.

The vacancy on the Temiskaming & Northern Ontario Railway commission, caused by the resignation of Mr. A. E. Ames, the chairman, has been filled by the appointment of Mr. Robert Jaffray. The selection of chairman of the reconstituted board rests with the members themselves and will probably be made at their next meeting. Mr. Jaffray has taken an active interest in public affairs for many years, and is now a member of the Niagara Falls Park Commission. He is a native of Scotland, where he was born in 1832, but has been a resident of Toronto since 1852. The other commissioners are Messrs. Edward Gurney, Toronto; B. W. Folger, Kingston; F. E. Leonard, London, and M. J. O'Brien, Renfrew. The chief engineer is Mr. W. B. Russell, with headquarters at North Bay, and the secretary-treasurer is Mr. E. E. Ryan, Toronto.

The offices of Mr. Guy Tombs, general freight and passenger agent of the Great Northern Railway of Canada, have been removed from the city of Quebec to corner of Moreau and St. Catherine street, Montreal.

Messrs. Wm. Grace & Co., Chicago, Ill., who have offices in Montreal, have charge of the construction of the new machine and building shops of the Canadian Pacific railway Co., now being built at Montreal.

Messrs. R. W. Hunt & Co., Chicago, Ill., are experiencing considerable demand for their services in Canada in the way of inspecting and testing steel rails, bridge materials, etc., for the Intercolonial Railway Co., the Prince Edward Island Railway Co., the Grand Trunk Railway Co., the Canadian Pacific Railway Co., Canadian Northern Railway Co., and other such concerns, including the Temiskaming Railway now being constructed by the Ontario Government; also the Dominion Iron & Steel Co. and several of the Canadian bridge building concerns. Messrs. R. W. Hunt & Co. maintain agencies in Toronto, Montreal, St. John and Moncton, N.B.

Dr. Eugene Haanel, Dominion Superintendent of Mines, left Ottawa, Ont., January 22 for Europe, where he will spend six months investigating the processes of electrical smelting, and also the manufacturing of peat. Dr. Haanel will visit Great Britain, France, Germany, Italy and Sweden. He is accompanied by C. E. Brown, Peterborough, Ont., electrical expert, Eric Lystrom, draughtsman and Thos. Cole, secretary.

The officers of The Engineers Club of Toronto, for 1904, are as follows: President, Capt. Kellaly Gamble; first vice-president, R. F. Tate, Canada Northern Railway; second vice-president, James McDougall, engineer of York County; directors, W. H. Patton, Grand Trunk Railway; J. G. Sing, Dominion Department of Public Works; A. J. Van Nostrand, and C. H. Rust, City Engineer; secretary, Willis Chipman, 103 Bay street; treasurer, A. C. Larkin.

INDUSTRIAL PUBLICATIONS.

On January 1 the Daily News, of Nelson, B.C., published a supplement review of the mining industry of South British Columbia; and since then, on January 10, it published an article dealing with the principal mines of the Nelson and Ymir districts which had not been adequately dealt with in the New Year issue, and which gives a very comprehensive statement of the mining industry of those sections of British Columbia.

Messrs. Baldwin, Tuthill & Bolton, Grand Rapids, Mich., have just issued a complete pocket manual of sawmill and woodworking machinery which they manufacture and which have a large sale in Canada. The book will be sent free to any one mentioning this paper.

The Hawley Down Draft Furnace Co., Chicago, Ill., are putting on the market a new line of metal smelting furnaces. Founders will be interested in these furnaces which are fully described in catalogues just issued by the company.

Messrs. Hart & Co., Monadnock Block, Chicago, are introducing in Canada their "Red Cross" commutator lubricant which prevents wear, cutting and eating away of commutator bars and brushes. A free sample will be sent to any owner of an electric power plant who mentions THE CANADIAN MANUFACTURER when writing.

In a booklet just issued by the International Boiler Compound Co., Chicago;

Ill., some valuable information to boilerers relative to prolonging the life of boiler is given.

Mr. J. Castell Hopkins, the editor and compiler, has sent us a copy of *The Canadian Annual Review*, for 1902, published by the Annual Review Co., Toronto. The fact of Mr. Hopkins' connection with the publication commends it at once not only to all Canadians but to all who are interested in the history of Canada and in the events which are making the history of the world. The different divisions of the book relates to the government and politics of Canada: relations of Canada with the Empire: Canada's connection with its war in South Africa; relations with foreign countries, militia, finance, transportation interests, agriculture, trade and commerce, manufacturing, mineral and other industries, the labor question, etc., and reference is also made to the Imperial and other British Governments. The book is handsomely bound, beautifully illustrated, and just the thing for the busy man who needs a comprehensive encyclopaedia close at hand under his study lamp.

"Industries," our bright, sprightly and always interesting contemporary at Durban, South Africa has sent us a Christmas souvenir "with all good wishes." "Industries" is a regular visitor at our desk, and through it we obtain much valuable information of what is transpiring in that portion of "The King's Dominion beyond the Seas."

The Jeffrey Mfg. Co. Columbus, Ohio, have sent us their circular No. 77 having reference to their "Jeffrey Grab Buckets" some of the enumerated points of excellence being, will work in ore mine-run coal, broken limestone, gravel and sand; absolutely self-filling; will excavate in clay, gravel and soft earth; will handle materials soft or cold, wet or dry, up, down, straight-along, side-wise, any size and any distance. Interested parties should write for further particulars.

The Canada Chemical Mfg. Co., London, Ont., have sent us a circular having reference to the Tri-Sodium Phosphate Boiler Compound manufactured by them. We are informed that it will remove the scale from any steam boiler, and will prevent scale from forming.

O. P. Austin Esq., Chief of Bureau of Statistics, Washington, D.C., has sent us a document entitled "Diplomatic and Consular Service of the United States," which presents a full list of the consular representatives of the United States in all parts of the world, and maps showing the location of each embassy, legation, consulate, consular agency, etc., in all parts of the world. This list of names, and especially the maps, cannot but be of great use for reference by those who are interested in foreign trade, and will without doubt, be retained for permanent reference.

D. Sleeth, Montreal, general agent for Canada for Lord's boiler compounds, has sent us a convenient desk blotting pad upon which allusions are made to the value of these compounds for the purposes indicated.

The Blue Printing & Copying Co., Toronto, are sending out a card in which is mentioned the merits of the blue print work they do, and inviting correspondence.

The Canada Foundry Co., Toronto, have begun the manufacture of the Beaver post-hole digger, the merits of which are described in a neat folder. They say of it that railway contractors and fence builders cannot afford to do without it.

The Thorn Cement Co., Buffalo, N.Y., have sent us their "Mid-Winter Pocket Reminder" in which the different points of excellence of their "Lehigh" brand of Portland cement is described.

Messrs. H. C. Baird & Son, Parkhill, Ont., manufacturers of brick and tile machinery and yard supplies, have sent us their 1904 calendar which shows a view of their Eagle Foundry and also several illustrations of the machinery they handle.

The Standard Tool Co., Cleveland, Ohio, manufacturers of twist drills, milling cutters, etc., have sent us their 1904 calendar which contains valuable and practical mechanical information.

OPPORTUNITIES.

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

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

1172. A firm manufacturing patent paper bags of various kinds desires to be placed in communication with a first class Canadian importing house prepared to handle the goods.

1173. A London, England, firm asks addresses of Canadian shippers of black currant and other fruit pulps.

1174. A firm handling large quantities of wood acetic lime invites correspondence from Canadian producers of same.

1175. A Manchester, England, timber merchant wishes to purchase supplies of birch veneer lengths, 24, 30, 36 and 42 inches by 8 inches wide and one-thirtieth inches thick and invites quotations from Canadian firms who can furnish the article.

1176. A firm manufacturing cane and wicker furniture and also children's mail carts, etc., is prepared to appoint a suitable Canadian resident agent.

1177. A firm manufacturing picks, shovels, spades, and other implements used in railway construction asks to be placed in communication with importers of these lines.

1178. A London, England, steel and iron merchant is open to act as buying or selling agent for Canadian firms or public corporations.

1179. A firm of Australian wine importers wish to open up negotiations with

a first-class house in Canada with a view to establishing an agency for the Dominion.

1180. The makers of certain gas and electrical light fittings are making enquiry respecting the possibility of doing business with their goods in Canada.

1181. An enquiry comes from Antwerp, Holland, for iron pyrites, in lumps from Canada.

1182. A firm of paper exporters wish to get into touch with Canadian stationery houses with the object of introducing a speciality.

LIGHTING THE WELAND CANAL.

The Welland Canal, which is about 28 miles long, is to be equipped with 2,000 candle power series alternating current enclosed arc lamps, which are to be spaced 400 feet apart along the banks of the canal, with six lamps at each of the 27 locks. The total number of lamps will be in the neighborhood of 550. A transmission line is to be constructed along both the new and the old canal, to distribute current to the arc lamps and for power purposes.

The electrical energy for the operation of the lamps and for motor purposes will be furnished by the Lincoln Electric Light & Power Co., of St. Catharines, Ont., the supply coming from the DeCew Falls power house of the Hamilton Light & Cataract Power Co., of Hamilton, Ont.

The erection of the transmission line poles is now in progress, and tenders will shortly be called for the remainder of the construction work, also the lamps, transformers, switchboards and other apparatus which is to be installed. The amount voted by the Dominion Government for the purpose of construction work for the current year is \$100,000, and it is expected that the entire installation will be completed within two years.

The plans, specifications, details and construction of the work, as adopted by the Government, is in the hands of Mr. Roderick J. Parke, C.E.E., of Toronto.

AN OPPORTUNITY.

Messrs. A. C. Leslie & Co., Montreal, inform us that they are in correspondence with a leading English manufacturer of a patent ice-making and refrigerating machine, made in different sizes, who wish to become in correspondence with some reliable Canadian engineering concern who would purchase the Canadian patent, or to manufacture the machines under royalty. The English company make an extensive line of such machines, which can be operated by electricity, gas, oil or steam, at prices running from \$2.50 upward. Any interested in this matter should write to Messrs. A. C. Leslie & Co. as above, for further information.

CANADIAN ELECTRIC LIGHT COMPANIES.

The use of electric light in Canada has increased greatly during the past year. According to the report of the officers carrying out the Electric Light Inspection Act there were last year 324 plants in

the Dominion with 14,780 arc lights and 1,212,861 incandescent lights. Taking the arc as equal to 10 incandescent lights the country had on June 30 last 1,360,661 lights in use. This is an increase of 236,865 lights in the twelve months, or over 21 per cent. Where there were five lights in 1902 there were six in 1903.

The growth since 1898 has been:— Establishments (1903) 324, increase 65; arc lights 14,780, increase 4,391; incandescents 1,212,861, increase 749,246, showing an increase of 42 per cent. in the number of arc lights, and of 161.6 per cent. in the incandescents.

Of the provinces, Ontario is far away the chief employer of the electric light. This province has 203 of the 324 plants in use in the Dominion. It has considerably more than one-half the total number of arc lights, and 47 in each hundred of the incandescents. All over the province, cities, towns and villages are lighted with electricity, supplied either by companies, firms, or the municipalities themselves. Of the latter thirty-four in the province supply themselves with electric lighting.

The province of Quebec, though possessed of enormous water power, has not adopted electric lighting to the same extent as the sister province. It has 53 plants, 3,853 arc lights, and 409,503 incandescents. It is therefore, behind Ontario by 4,571 arcs and 153,990 incandescents. It has made, however, greater proportionate gain since 1898 than Ontario, the gain in arcs being: Ontario, 36.2 per cent.; Quebec 47.6 per cent.; and in incandescents, Ontario, 138.6 per cent., and Quebec, 212.3 per cent. During the period, 1898-1903, the number of plants in Quebec increased by 13.

The plants in Quebec are larger than those in Ontario, the average of Quebec's 53 being 15,000 arcs and incandescents, that of Ontario's 203, being 3,215 arcs and incandescents.

The largest single plant in the Dominion is that of Toronto, with its 170,000 lamps, arcs being taken as each equal to 10 incandescents. The next largest is that of the Lachine Rapids Hydraulic Co., 158,503. The third in size is the Ottawa Electric Co., with 111,927 lights.

The other provinces have made considerable progress. To the West Manitoba has increased in 1898-1903, its arc lights from 162 to 373, and its incandescents from 13,800 to 31,905.

The North-West Territories have not increased as rapidly as the other parts of the Dominion, their arcs numbering 29, an increase of four in the period named, and their incandescents numbering 6,677, an increase of 1,997.

British Columbia shows the largest proportionate increase of any of the divisions of Canada, its increase of arcs being 377, or 82 per cent., and of incandescents 74,297, or 257 per cent. In 1898 British Columbia and Nova Scotia had almost the same number, British Columbia having seven more arcs and 169 more incandescents; Nova Scotia has increased the number of its incandescents by 32,140. The Maritime Provinces had in 1898, 951 arc lights and 46,977 incandescents, and in 1903 they had 1,267 arcs and 93,120 incandescents, an increase of 33½ per

cent. for arcs and of over 98 per cent. for incandescents.

These figures which were compiled by Mr. George Johnson, Dominion statistician, show that increased use of electric light is general throughout the Dominion, and that proportionately British Columbia stands first in that increase, with Quebec second, Ontario third, Manitoba fourth and Nova Scotia fifth.

THE TORONTO STREET RAILWAY.

For the first time in its history the gross yearly earnings of the Toronto Street Railway Co. have passed the two million mark. According to the agreement with the city the latter now begins to receive a considerably larger proportion as its share of the earnings of the company. The gross earnings for the year ending December 31, 1903, were \$2,172,087.87. By arrangement the city receives 8 per cent. on the gross earnings up to one million, 10 per cent. from one to one and a half millions, 12 per cent. from one and a half to two millions, and 15 per cent. on all over two millions. The amount, of which the city received 15 per cent., was only \$172,087.85, but at the present steady rate of increase it should be about doubled next year.

The city's total share of the Street Railway Co's. earnings for the year is \$298,839, as compared with \$255,551.07 for the year previous. As was pointed out at the annual meeting of the shareholders of the Street Railway Co., this amount is fast approaching that received by the shareholders in dividends.

The dividend at 1½ per cent. quarterly, amounted to \$326,548.26. The company's statement shows a large increase in business. The increase over the gross earnings of the previous year, which amounted to \$1,834,908.37 was \$337,179.48. The net earnings increased 18.5 per cent., the figures being \$971,264.46, as compared with \$819,547.05, and the amount of the increase \$151,717.41.

This expansion of business is attributed by the officials to increased facilities and additional mileage. Mr. W. J. Moore stated that 42 large motor cars had been placed in service during the year and that 14 more were now in process of construction. These large cars had a seating capacity equal to about 75 trailers.

The number of passengers carried increased by 8,617,644 from 41,437,678 persons in 1902 to 53,055,322 in 1903. The number of transfers increased by 2,680,124. The operating expenses were \$1,200,823.39 as compared with \$1,015,361.32 in 1902, an increase of \$185,462.07. The proportion of operating expenses to the earnings is the same for both years, being 53.3 per cent.

In addition to the dividend of \$326,548.26 and pavement charges amounting to \$71,986.33 paid to the City Council, \$50,000 was transferred to the contingent account, leaving a surplus of \$180,628.92.

The company expended for general purposes and charged to capital account \$379,615. It is explained in the annual report that this expenditure includes that made for extensive alterations and additions at the power house, new motor equipments, additional track and over-

head construction, new rolling stock, and buildings necessary for the increased business of the company.

The net income for the year, after deducting all expenses and fixed charges, was \$628,349.49. In addition to this the company realized \$814.02 from the sale of new shares not taken up by shareholders.

CANADIAN TEXTILE MILL CONSTRUCTION.

The statistics of textile mill construction in Canada in the calendar year 1903, as compiled by the Textile World Record, show as follows:

Woolen mill, Warton, Ont. The Freeman Woolen Co., capital \$40,000, H. C. Kennedy, president, T. E. Tanner, superintendent. Make tweeds, flannels, blankets, yarns, etc.

Knitting mills, Berlin, Ont. Berlin Robe & Clothing Co., \$100,000 capital, Geo. Moore, president; W. J. McMurry, superintendent. Make robes and coats, using worsted yarns and cotton. Six sewing machines.

Dunnville, Ont. Monarch Knitting Co., capital \$20,000. F. R. Lalor, president, John Stingsby, superintendent. Make sweaters, golf vests, etc.

Hamilton, Ont. Ellis Mfg. Co. (see Port Dover, Ont.), a new mill. Make mens' and women's fine grades spring needle ribbed underwear. Thirty sewing machines.

Toronto. Gordon McKay & Co's. Puritan Mills. Make ladies', children's and infants' cotton and woolen underwear.

Walkerton, Ont. Walkerton Hosiery Co. Capital \$40,000. J. Henderson, president, D. Williams, superintendent. Make worsted and cashmere hose and mitts. Three sewing machines.

Silk mill, Peterborough, Ont. Colonial Weaving Co. Capital \$60,000. F. J. Jamieson, president, C. Hasselman, superintendent. Make woven labels.

Linen mill, Bracebridge, Ont. Capital \$125,000. E. J. Powley interested. (Mill under construction). Propose equipping plant with 100 looms.

Enlargements and improvements:

Nova Scotia, Oxford. Oxford Woolen Mills. New mill, 202x58 feet, two stories high. Part of old plant used for storing wool.

Ontario, Almonte. Golden Fleece Mills. Added one set of new cards, two 200-spindle mules, looms and finishing machinery.

Dundas. Empire Carpet Co. Formerly at St. Catharines. Taken building formerly occupied by Ontario Felt Co. Equipped plant with new machinery.

Elmira. The Elmira Felt Co., Limited. Addition 100x50 feet, 2 stories, built.

Guelph. Guelph Carpet Mill Co. Addition built. Added eight new carpet looms. Installed an electric lighting plant. Also built boiler house, installed two 115 h.p. boilers and a 115 h.p. engine.

Markham. Maple Leaf Woolen Mills Co. New dye house erected and considerable new machinery put in.

Toronto. Toronto Carpet Mfg. Co., Limited. Capital stock increased to \$300,000. New addition under construction; will add 50 new looms. Expect to have in operation in April.

CALIFORNIA-OREGON EXCURSION

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

NOVA SCOTIA ENGINES IN AUSTRALIA.

Mr. D. H. Ross, Commercial Agent for Victoria, South and West Australia and Tasmania, writes as follows:—At the Power House of the Perth Electric Tram

Co., I was pleased to observe two 300 h.p. engines, manufactured by the Robb Engineering Co., Amherst, N.S. These engines (Nos. 472, 473,) have been working almost continuously 18½ hours daily, for over three years. The engineer in charge intimated the excellence of their work. The general manager and engineer of the Perth Electric Street Railway is Mr. H. J. Somerset, formerly of Winnipeg, to whom I am indebted for many courtesies. Mr. Somerset is also engineer of the Kalgoolie Tram Co., and the chief authority on electric traction in Western Australia.

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General Superintendent, state experience and salary.

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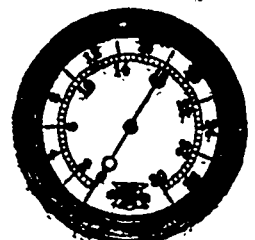
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By its use the cost of present structures is greatly cheapened, while at the same

time the bar provides many new uses for concrete. It is largely used for the building of fire proof buildings, highway and railroad bridges, culverts, etc. We are indebted to Mr. Alfred Stevens of Toronto, the Canadian manager, for useful data and information upon this system.



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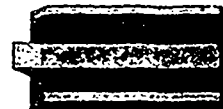


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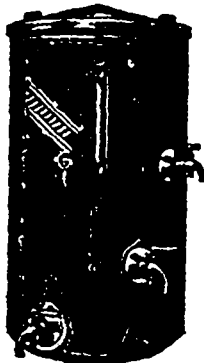
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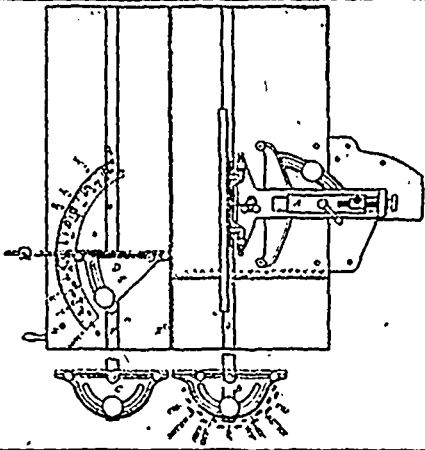


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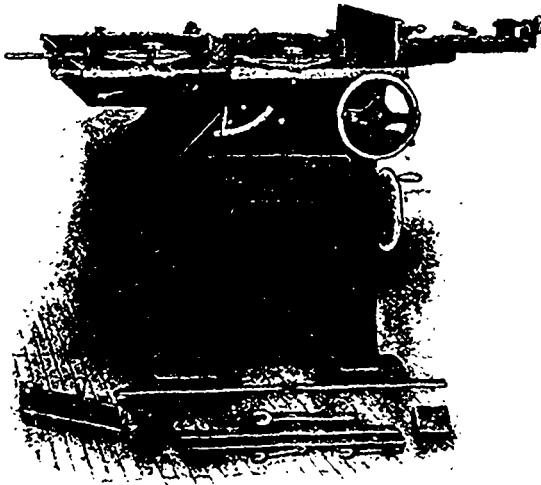
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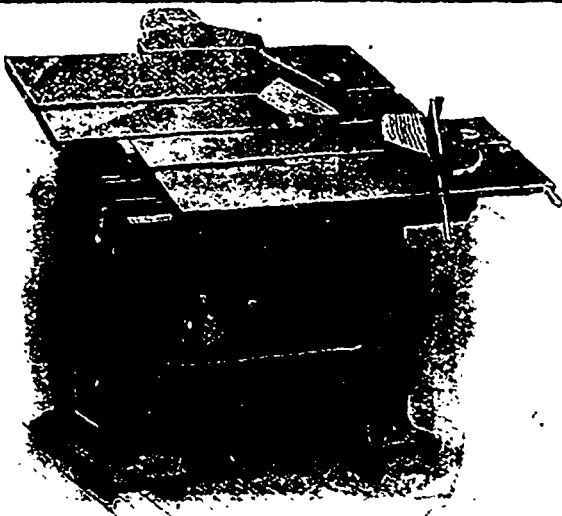
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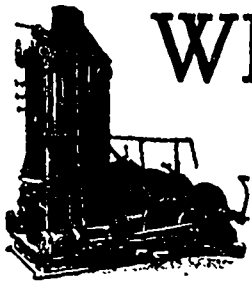
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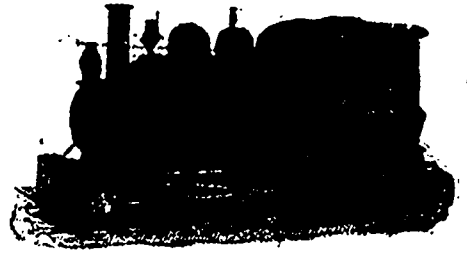


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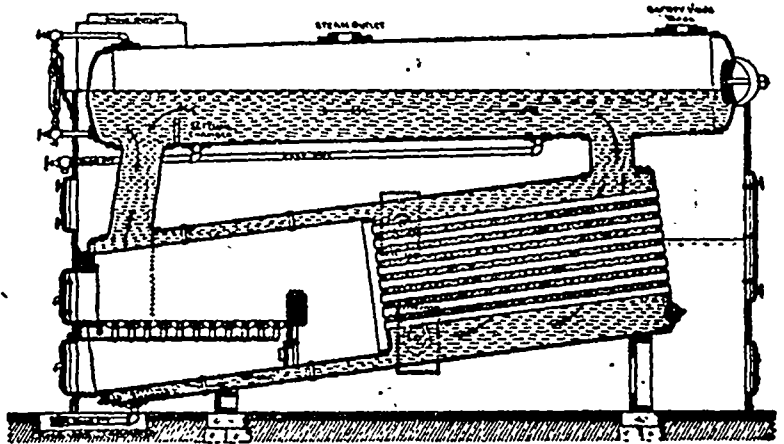
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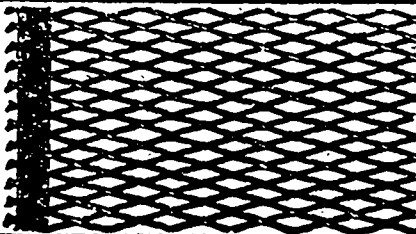
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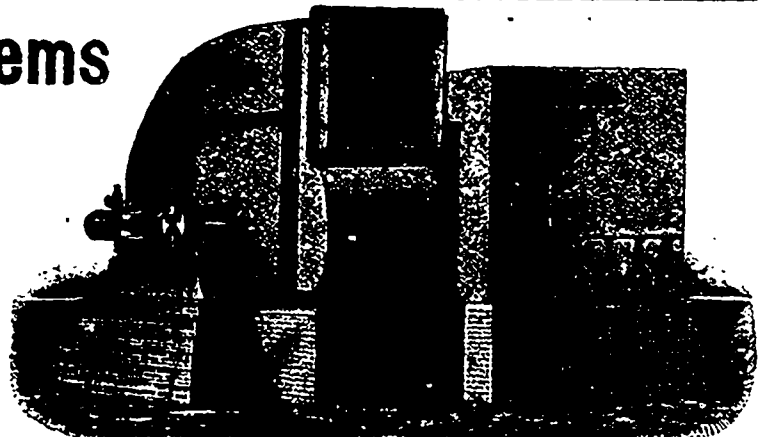
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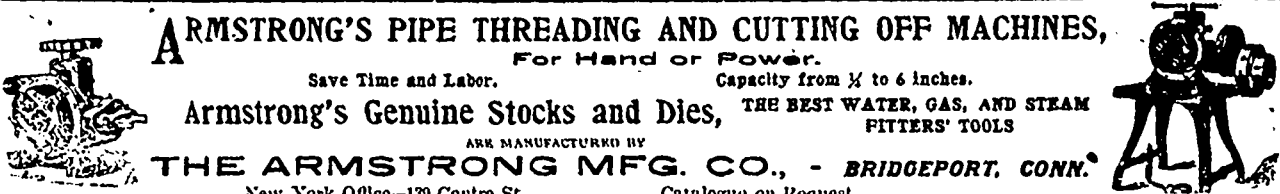
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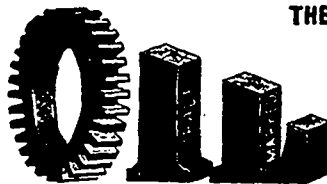


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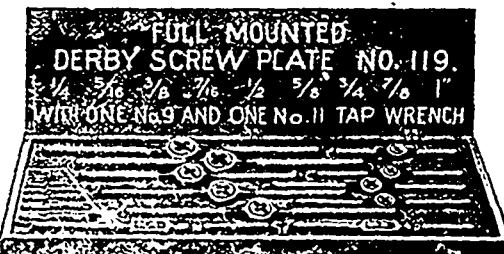


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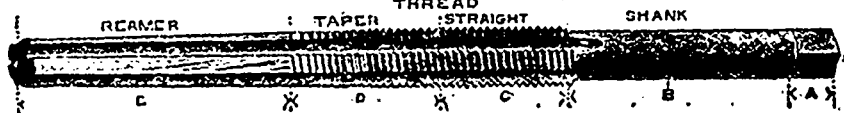


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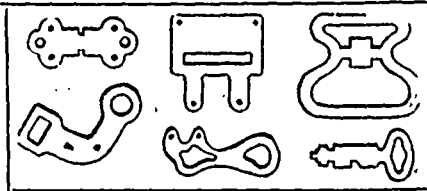
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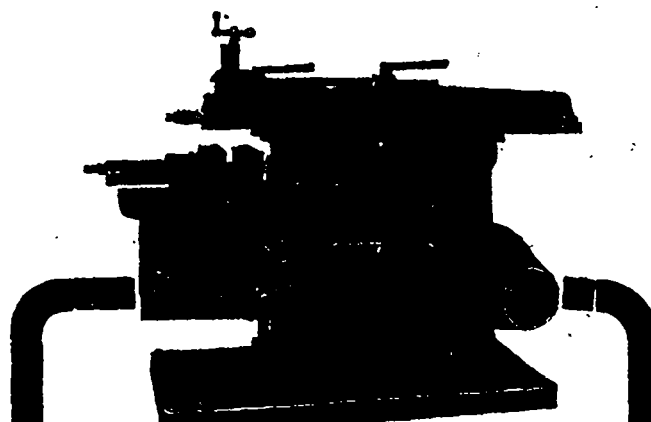
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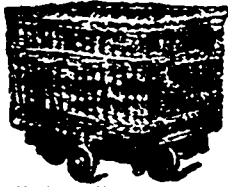
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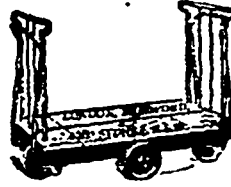
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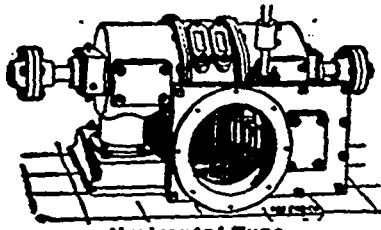
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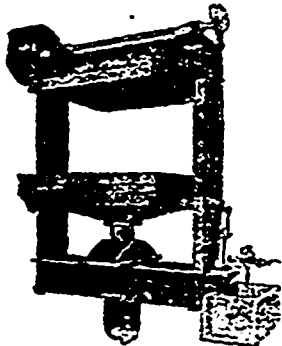
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(CONTINUED).

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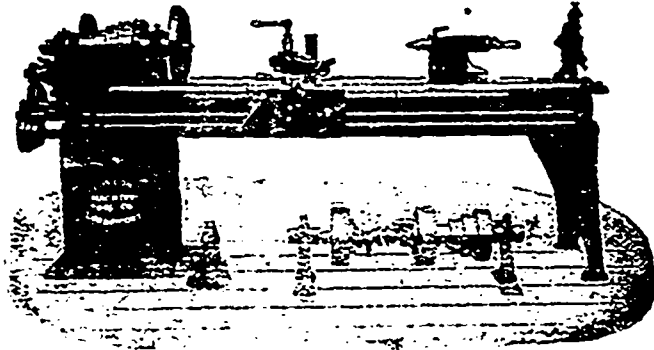
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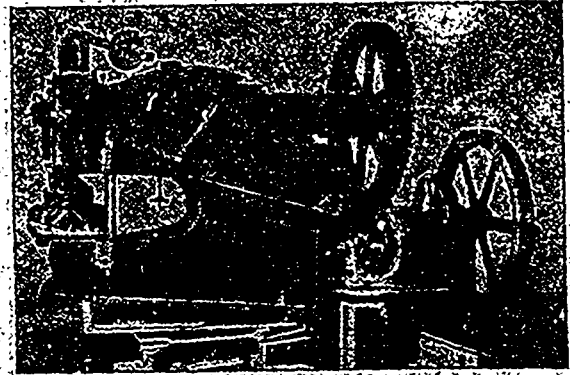
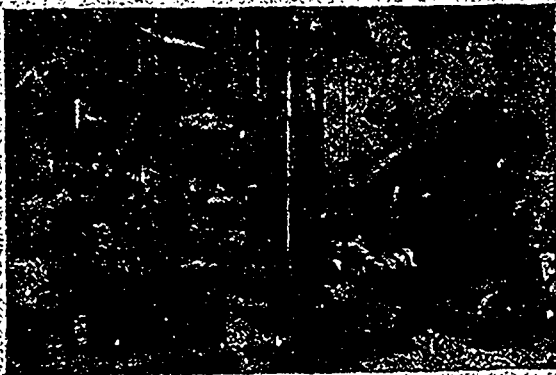
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Chicago Pneumatic Tool Co., Toronto and Chicago, Ill	7	London Machine Tool Co., London, Ont.	0
Cleveland Twist Drill Co., Cleveland, Ohio	ofc	Lowell Crayon Co., Lowell, Mass.	44
Continental Iron Works, New York, N.Y	0	Meadows, Geo. B. Wire, Iron & Brass Works Co., Toronto	10
Cooper, James, Montreal	47	Metallic Roofing Co., Toronto.....	43
Cowan & Co., Galt, Ont	4	Mills, S. D., Toronto.....	9
Crosby Steam Gauge & Valve Co., Boston, Mass.....	30	Milnes, J. H. & Co., Toronto	5
Darling Bros., Montreal..	30	Montreal Pipe Foundry Co., Montreal.....	4
DeLano-Osborn Engineering Co., Toronto	9	Morgan Construction Co., Worcester, Mass.	31
Dixon, Jos., Crucible Co., Jersey City, N.J	41	Morrison T. A. & Co., Montreal	9
Dodge Mfg Co., Toronto	35	Morrow John, Machine Screw Co., Ingersoll, Ont	37
Dominion Belting Co., Hamilton, Ont	57	McArthur, Cornelle & Co., Montreal	ofc
Dominion Oil Cloth Co., Montreal.	39	McCullough Dalzell Crucible Co., Pittsburg, Pa.	32
Dominion Wire Rope Co., Montreal	ofc	McKinnon Dash & Metal Works Co., St. Catharines, Ont.	ofc
Downie Pump Co., Downsville, Pa	41	McLaren, D. K., Montreal and Toronto	37
Drummond, McCall & Co., Montreal, Que	41		
Dun R. G. & Co Toronto	44		
Dunbar Fire Brick Co., Pittsburg, Pa.	8		
		Neff & Postlethwaite, Toronto	9
		Northern Aluminium Co., Shawinigan Falls, Que., and Pittsburg, Pa.	7
		Nova Scotia Steel & Coal Co., New Glasgow, N.S.	4
		Oakey, John & Sons, London, England	3
		Ontario Collection Association, Toronto	9
		Ontario Malleable Iron Co., Oshawa, Ont.	ofc
		Ontario Wind Engine & Pump Co., Toronto..	43
		Owen Sound Portland Cement Co., Owen Sound Ont.....	8
		Packard Electric Co., St. Catharines, Ont.	12
		Pago Wire Fence Co., Walkerville, Ont.	35
		Parke, Roderick J., Toronto	9
		Patent Exchange & Investment Co., Toronto	9
		Penberthy Injector Co., Windsor, Ont.	2
		Pennsylvania Fire Brick Co., Lock Haven, Pa.	8
		Perrin, William R. & Company, Limited, Toronto and Chicago, Ill	40
		Peterborough Canoe Co., Peterborough, Ont.	45
		Petrie, H. W., Toronto.	12-38
		Petroleum Iron Works, Washington, Pa	7
		Phillips, Eugene F., Electrical Works, Montreal	13
		Pittsburgh Coal Co., Pittsburg, Pa.	5
		Pittsburg Shafting Co., Detroit, Mich	ofc
		Quebec Central Railway, Sherbrooke, Que	ofc
		Queon City Oil Co., Toronto	ofc-36
		Reiche & Co., Bradford, England	41
		Rice Lewis & Son, Toronto	36
		Robb Engineering Co., Amherst, N.S	31
		Rossendale Belting Co., Toronto	ofc
		Rountree Publishing Co., Birmingham, Ala.	45
		Ryall Machine Screw Co., Montreal	41
		Samuel, M. & L. Benjamin & Co., Toronto	5
		Scalfe, Wm. B. & Sons Co., Pittsburg, Pa	5
		Scoto Fire Brick Co., Sciotoville, Ohio	8
		Shaw, Willis, Chicago, Ill	31
		Sheldon & Sheldon, Galt, Ont	35
		Sicho Gas Co., Toronto	13
		Simpson, T. T., Deschene, Que	9
		Slingaby, H. C. for Canada, Montreal	40
		Smith Mfg. Co., Toronto	42
		Smith's Falls Malleable Castings Co., Smith's Falls, Ont	ofc
		Spence, H. & Co., Hamilton, Ont.....	45
		Steel Age, Pittsburg, Pa.	45
		Steeple, John Shaper Co., Cincinnati, Ohio.	37
		Stevens, Alfred J., Toronto.....	9
		Storey, W. H. & Son, Acton Ont	9
		Sturtevant, B. F. Co., Boston, Mass.	32
		Syracuse Smelting Co., Montreal and New York	6-39
		Toronto & Hamilton Electric Co., Hamilton, Ont.....	13
		Toronto Iron & Brass Bedstead Co., Toronto.	42
		Toronto Paper Mfg. Co., Cornwall, Ont	42
		Turner, Vaughan & Taylor, Cayahoga Falls, Ohio.....	34
		United Electric Co., Toronto	ofc
		United Typewriter Co., Toronto	39
		Vogel, C. H., Ottawa	9
		Walkerville Malleable Iron Co., Walkerville, Ont.	ofc
		Wardlaw T. D., Toronto.	11
		Wentz, R. F. Engineering Co., Toronto	9
		Wilby, P. H., Toronto	ofc
		Williams, A. R. Machinery Co., Toronto.....	30
		Winn & Holland, Montreal	11
		Wilson Bros. Bobbin Co., Todmorden England	40
		Wilson J. C. & Co., Glenora, Ont.	40
		Wire & Cable Co., Montreal	ofc
		Worth & Martin, Toronto	37
		Wynn, W. H. & Co., West Decatur, Pa.	9

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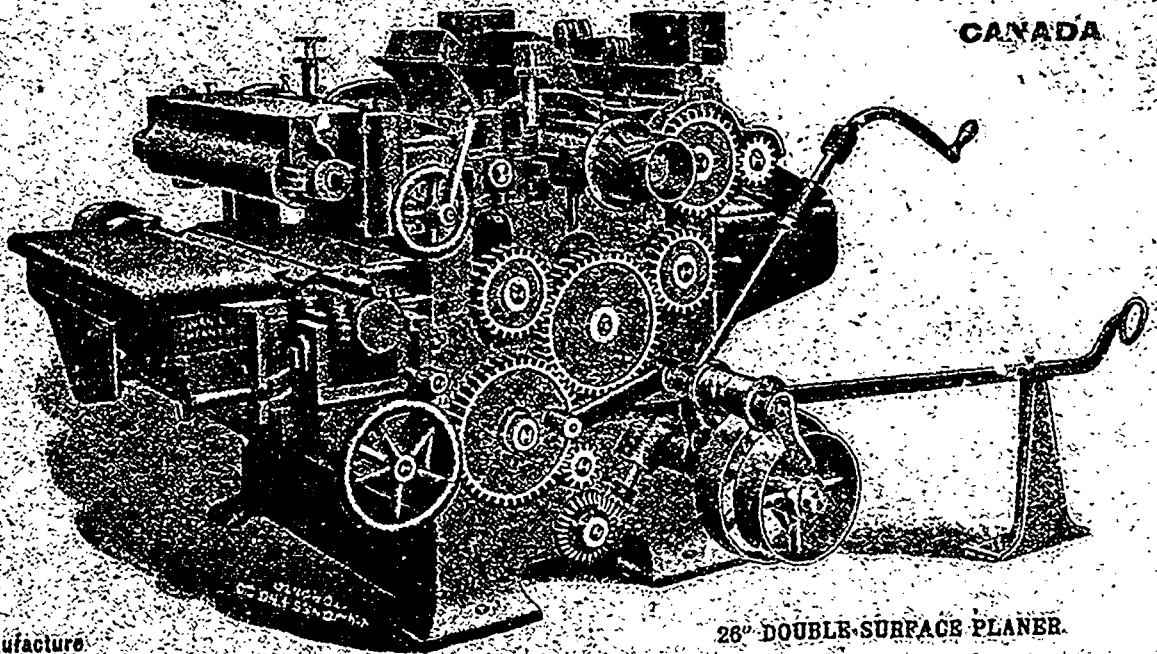
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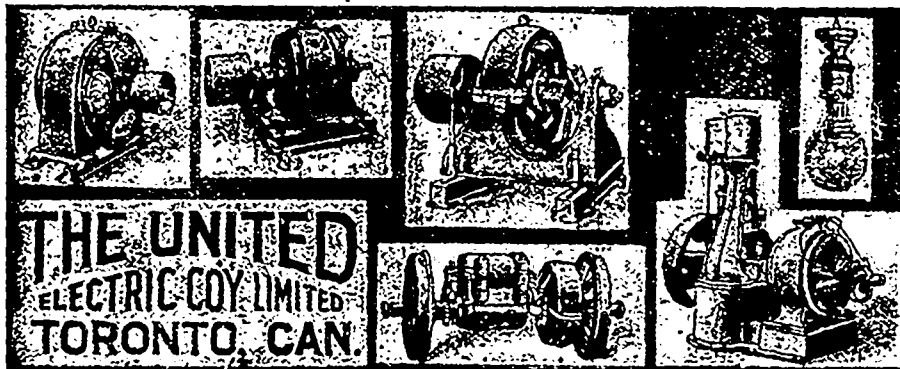
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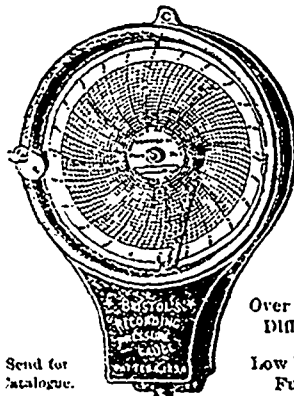
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