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VOL. 27.

TORONTO, MAY 4, 1894.

No. 9.

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OURSELVES.

Our inborn modesty would naturally deter us from directing attention to what might concern us individually, but a sense of duty to our friends impels us to allude to the CANADIAN MANUFACTURER, by which it will be observed that it now contains more pages than ever before which are required to accommodate the constantly increasing demands made upon us for advertising space. An in-

spection of the advertisements and business cards contained herein emphasizes the estimation in which this journal is held by our friends; and this favor is accepted by us as a reward for the efforts that have been put forth to make this the leading trade journal of Canada. We are not of those who expect favors without giving a generous quid pro quo; and we flatter ourselves that the gratifying prosperity which attends our labors on this journal finds its fountain in the fact that those who favor us with their patronage do so because they find it to their interest to do so. It is our desire and endeavor at all times to make this a distinctively representative Canadian journal; to build up and encourage our home manufacturing industries, and to inculcate a national spirit which teaches that Canada is as happy and prosperous a country as any upon the face of the earth, and that by the indomitable energy and perseverance of the people in all that makes a nation great Canada stands second to none. This is our platform.

The following briefly stated facts illustrate the growth of the CANADIAN MANUFACTURER since the beginning of last year, which, in view of the commercial and industrial depression that has prevailed throughout the world, are exceedingly gratifying. In January 1893 it contained 32 pages, which were increased in February of that year to 36 pages; in April 1893 to 40 pages; in June 1893 to 44 pages, and in May 1894 to 48 pages.

TARIFF TINKERING.

The recent action of what is called the Manufacturer's Section of the Toronto Board of Trade, and of the Council of that Board, touching the tariff, having been made public by their own volition, is fair matter for criticism. This Manufacturer's Section is composed, we learn, of some of the Manufacturers who are members of the Board, and who do business in Toronto and its environments. The Section was organized presumably to look after the interests of its members, bounded in its scope by whatever limits might govern the Board of Trade. This Board, composed as it is of business men of different occupations, and of very divergent views of politics, has never been active in supporting any particular political measures, and very properly, too, seeing that a different course could but produce dissensions which would impair its usefulness. But this Manufacturers' Section within the first month of its existence made a wide departure from the conservatism of its parent organization, and plunged very boldly and we think incautiously, first into a discussion of, and second into action regarding a political question of the utmost importance not only to the manufacturers who participated in what was done—not only to the city of Toronto—but to the whole country from ocean to ocean. This action is recited in the preamble and resolution passed by the Council of the Board of Trade in which it was stated that the Council had heard a delegation of the Manufacturers' Section who complained that the recent tariff changes had largely reduced the duties upon certain manufactured goods without affording the manufacturers of the same a proportionate reduction in the duty upon the raw materials entering into the same, and expressed its

sympathy with them, particularly as regards the high duties upon pig iron, bar iron, steel and other raw materials; and it authorized the Section to appoint a deputation to go to Ottawa to lay these views before the Dominion Government.

There is nothing to show in this action that the Government were to be requested to retain the old rate of duties upon the articles manufactured by those complainers; but it is specially stated that the development of the iron industry should not be by maintenance of the tax (duty) upon raw material. If this means anything it means that the iron industry should be encouraged not by any measure of tariff protection whatever, but by bonus upon production—that pig iron, bar iron and steel should be placed in the free list. The only articles specifically mentioned in the resolution were pig iron, bar iron and steel, but a vague allusion was made to "other raw materials;" and to show that the iron industry was the chief object of attack, the Government are advised that the only way, in the opinion of these Toronto Board of Trade men, to encourage the iron industry "should be by way of bounty on pig iron and puddled bars."

If these views of the Toronto Board of Trade were carried out, and pig iron, bar iron and steel placed in the free list, it would be the notes of a dirge indicating the death and burial of Canada's National Policy, we do not desire to believe that the Board of Trade intended to thus commit themselves; for we are well aware that among its members are to be counted some of the most sturdy and uncompromising supporters of the system of tariff protection to our manufacturing enterprises; and the conclusion may be fairly drawn that the move, from its inception, marked by the organization within the Board of Trade and by its authority, of this Manufacturers' Section, was ill advised, not in the interest of the Board, of the City of Toronto or of Canada, and from which the Board should recede. Whatever elements may have been active in the movement, resulting in the pilgrimage to Ottawa, we cannot but believe that it antagonizes not only some of the manufacturers who are members of the Board, but others also who are not manufacturers, and that it meets with but scant sympathy from manufacturers and believers in the National Policy throughout the country.

If these men who ask the Government to put pig iron, bar iron and steel in the free list because the duty has been lowered upon their products from 35 per cent. to 20, had stopped to consider they would have been reminded of a few facts which it would be well for them to bear in mind. They asked that the keystone of the arch of our fiscal system be removed for their benefit, allowing the whole structure to fall to the ground. A compliance with their request would mean an immediate change of Government and an order of things, or rather a disorder, that would result in widespread disaster to the country. They might have asked for a restoration of the higher duty, and that request would not have appeared unreasonable—for them. The duty upon bar iron and steel had been reduced 23 per cent.—the duty upon their product only 15 per cent. The change was in their favor. If they could prosper under the previous tariff they should not complain under the present tariff.

PROFIT SHARING.

As has been frequently stated in these pages, the system of profit sharing is gaining rapidly in the United States and other countries, and to some extent in Canada. The theory of this system is that in manufacturing and similar industries the divisions of profits should be perpendicular, not horizontal, and that the workman's interest should be bound up with those of his employer.

In the United States this system has resulted in the organization of The Association for the Promotion of Profit Sharing, with headquarters at Boston, Mass., of which Mr. Carroll D. Wright is president, and Nicholas P. Gilman secretary, with a board of directors which includes such well-known manufacturers as N. O. Nelson, of St. Louis, R. F. Cutting, Alfred Dolge, and R. R. Bowker, of New York, H. R. Towne, of Stamford, Conn., and Geo. A. Chace, of Fall River, Mass.

This Association have issued an open letter to employers and employes which contains many valuable suggestions which are quite as applicable in Canada as in the United States, and we therefore take pleasure in reproducing it. This letter says:

In anticipation of a revival of business and the consequent reopening of many mills and factories, which now seems probable, we would invite your attention to the importance of introducing some form of Profit Sharing as a feature of your industrial relationships. The method of paying a dividend to the workman out of profits as they are realized annually has been approved by most of the economists of Europe and America as thoroughly practical, and advantageous to both the employer and the employed. We will mention a few characteristics which should commend it to your careful attention.

Profit sharing can be adopted by an employer without risk of loss, inasmuch as he assumes under it no obligations except such as are to be discharged from profits actually made. His prerogatives as manager and his rights as proprietor are not curtailed. Profit sharing would establish a more friendly relationship of common interest between working-people and the employer. This would be the surest pledge of industrial peace and the firmest support in times of commercial distress.

The employee, responding to such an advance by the employer, can increase the quantity and improve the quality of the product under a deeper feeling of personal interest. By his diligence, care, and economy he can actually create an additional profit, which is to be used in supplementing regular wages. Profit sharing includes the payment of the best wages current, and promises a bonus beyond this, which, experience shows, the interested workman can invariably produce in good times.

Profit sharing, as a principle, may be applied in a large variety of ways; and it can readily be adapted to the great majority of productive and distributive enterprises. We invite applications for full information concerning the history and the results of the system, as it is now in operation in many establishments, small and large, in Europe and the United States. The address of the Secretary of our Association is No. 25 Beacon Street, Boston, Mass.

THE STEEL RAIL INDUSTRY—SHALL WE HAVE IT?

THE CANADIAN MANUFACTURER has continuously argued that, in order to the maintenance and extension of the iron industry, it is not only necessary that its promoters should be assisted by a fair measure of protection or bonus, but

that they must obtain some assurance of the permanence of the policy under which they are able to operate. It has been gratifying to those who have faith in the success of this enterprise to find that the Government at Ottawa have recognized this necessity, and have established rates of duty and bonus for a fixed term of years. The greater part of the men and capital hitherto engaged in iron manufacture has been employed in converting scrap into bars, etc., and comparatively little progress has been made in the conversion of our native ores into iron and steel. Under the new and liberal policy adopted, we may confidently look forward to the early erection of additional furnaces and of works for conversion into steel. However, this journal believes that much more remains to be done by Government and Parliament, in order to the full development and extension of the iron industry.

We have repeatedly shown that the manufacture of iron and steel in Canada will never attain to full importance and success, until it includes all the steel rails which are required for its railways and street railways, either for new lines or renewals. We have urged that this result can never be attained so long as steel rails are allowed to be imported free of duty. It appears to be an anomalous condition of the tariff, under the interpretation of which, steel rails of like weight and quality are admitted free of duty, if for general railways, but subject to a duty of \$6.00 per ton, if for street railways. This interpretation of the wording of the act is not challenged, and has been submitted to the courts for adjudication; the general opinion being that the distinction established by the Customs Department between the two kinds of railways will not be sustained. This decision must lead to a further consideration of the duties to be imposed on steel rails; and we sincerely trust that Government will decide, that inasmuch as the necessity for the exemption which arose out of the agreement for the construction of the C. P. R. no longer exists, all railways must hereafter contribute their fair proportion to the revenue of the country.

The quantity and value of steel rails admitted, free of duty, during the last three years have been :

	Tons.	Value.
1890-91	126,065	\$3,197,280
1891-92	82,747	1,738 661
1892-93	101,148	1,993,219
	309,960	\$6,929,601
Annual average	103,320	\$2,309,720

The most frequently raised objection of free traders to the protection policy is, that there is no scope for manufacturing in Canada, as the market is so limited. Here they can find at least one article for which there is an assured annual average demand of nearly \$2,500,000. Surely there is scope enough here for extensive manufacture, which may become the nucleus of a great industry. The demand must continue and increase, as every year must add to the requirements for renewals and replacements, irrespective of new railways or extensions. The manufacture of steel rails to the extent of about \$2,500,000 annually, would furnish employment for about 5,000 people, directly, and indirectly for thousands more, who, together with their dependents, will add quite a respectable addition to our present population. The avowed policy of the present Government is

to maintain existing industries and to create new ones. We cannot understand how, consistently with their general policy and in fairness to other industries, they can continue the present exemption in favor of railway companies, or decline to place steel rails on a parity, as to tariff duties, with other manufactures of iron or steel.

It may be argued that railways are constructed in almost every instance for the purpose of opening up some new district which would not have been developed for many years, were there no railway communication; that these are the railways that are bonused by the Government, and that if they are worthy of a bonus they are certainly worthy of assistance in the other direction, viz., the remission of the duty on their rails; and it may be further argued that these bonused railways rarely prove paying investments. The reply to such argument is, (1) that the duty to develop new districts of the country is not more imperative than the duty to develop new industries, and that as the amount of bonus granted for railway construction was fully as liberal as Government could afford to pay, in justice to other industries, no further obligation was entailed upon Government to grant any special future consideration or exceptional favors. The new railway when established must contribute as other interests do, to the establishment of new industries by like assistance as was granted to the railway itself. (2) A large proportion of the rails imported is required for renewals or extensions of old railways, all of which obtained generous aid from Government. (3) If any interest in the country derives special benefit from the National Policy it is the railway interest, through the increase in passenger and freight traffic arising from the growth of cities, towns and villages.

From all these considerations, it is clear that so far from being entitled to claim special exemption from the imposts of the tariff, railway companies should be willing to contribute in fair proportion with other industries, both to the revenue of the country and to the policy necessary to its prosperity. With respect to the non-paying character of railway investments, if such a plea were to be admitted in their case for exemption, why not in the case of all non-paying industries; and if so, the list of exemptions would prove a long one. Believing, as we do, that railways must be specially benefited by the establishment and operation of every new industry, and that this would be particularly the case under the iron industry, we think that it is obviously the duty of Government to promote the latter by imposing a reasonable duty upon steel rails. If the duty should be fixed at \$5.00 per ton, this would yield a revenue of over \$500,000 per annum. We would suggest that in order to ensure the early establishment of works for making steel rails, Government should grant a bonus of \$5.00 per ton on all steel rails of Canadian material and manufacture placed upon tracks of Canadian railways. This should induce the Canadian Pacific and Grand Trunk Railway Companies to undertake the manufacture of their own rails.

THE BEET-SUGAR INDUSTRY.

We learn that the managers of the beet-sugar factories now in operation at Farnham and Berthierville in the

Province of Quebec, have been invited to Ottawa to meet the Ministers of Finance and Agriculture to discuss the conditions on which this industry can be maintained and extended, not only in that Province, but in the Province of Ontario also. We are informed that, under a reasonable bonus guaranteed for a term of years, sufficient capital can be secured at once for the immediate erection of two or three large factories. We sincerely hope that the negotiations with the Dominion Government may result in some satisfactory arrangement by which this most desirable object may be accomplished. THE CANADIAN MANUFACTURER has, during the last four or five years, strongly advocated the expediency of granting liberal government assistance towards the promotion of this industry, for which, it has been conclusively demonstrated, the Province of Ontario is admirably adapted, as to climate, soil, and experience of its farmers in root crops. None of the countries in Europe possess so favorable a combination of the elements requisite to success as are found here. Owing to the continuous decline of prices for grain in the world's markets, and the appearance of continual depression, the production of wheat and barley in the Province of Ontario, for export, has ceased to be remunerative to the growers, and the introduction of a new crop for which there is a reliable and extensive home market at remunerative prices will prove a great boon to the farmers, and this more especially because beet cultivation, instead of impoverishing the land, enriches and improves it by the higher cultivation demanded for this crop.

Four or five years ago, previous to the abolition of the customs duties on raw sugar, when the current price of this article was such as to induce capital into the beet-sugar industry without any Government aid, considerable progress had been made towards the organization of a strong company which proposed to erect a large factory at some point in this province. Mainly through the liberality of the preceding and present Ontario Ministers of Agriculture and partly by contributions from Toronto merchants, numerous experiments in all parts of the Province had been carried on for two or three years, in the cultivation of sugar beets from choice imported seed. At the season of maturity, roots were gathered at the fields and forwarded to the laboratories at the Guelph and Ottawa Experimental Farms for analysis. The results of these analyses have been officially published in the Agricultural Reports of the Provincial and Dominion Governments, and proved extremely satisfactory and gratifying to all interested. While the roots were being collected, the growers were questioned as to the cost of production, and their willingness to enter into contracts for the cultivation of a stated number of acres at a price named delivered at a factory if located within four or five miles from their farm. In this respect also the result was satisfactory, as there was reliable assurance obtained in many suitable localities, that the farmers would willingly enter into contracts to the full extent of the requirements of a very large factory. The principal requirements of a beet-sugar factory, next to an ample supply of good quality of beets, are abundant supply of water, good drainage facilities, and railway connections. All these requisites are to be found at scores of places in this province. The only questions left to be determined

were as to choice of location and the raising of the capital required. With sugar at these prices it was confidently anticipated that sufficient capital would be secured, as the inducements offered by the enterprise were very attractive. Just at this time it was announced that, following the course adopted in the United States, raw sugar was to be admitted into Canada free of duty. The reduction in the price of sugar extinguished the margin for profit, and the promoters abandoned the project, until, either by return to sugar duties, or by means of bonus such as was adopted in the United States, such a change in the position would arise as would justify the resumption of the enterprise.

It is hardly necessary to recapitulate the many advantages which this journal has so often pointed out, as certain to accrue to Canada from the successful establishment and operation of this industry. The consumers of Canada expend about \$10,000,000 per annum on foreign sugar. It is hardly possible to overestimate the stimulus which the production and manufacture of this large value in sugar would impart to every existing interest, besides creating other new industries. Every dollar of the cost would consist of Canadian material and labor, differing in this respect from many manufacturing industries, where a large proportion of the value of the output consists of imported material. To produce the quantity of beets required to make 150,000 tons of sugar, about 150,000 acres of land would be brought under cultivation. The amount of money derived by the farmer, from each acre of roots cultivated, would be fully five times as great as the value obtained from the crop of an acre of any kind of grain. There would undoubtedly, be a very much larger expenditure for labor and teaming, but the labor bestowed would largely benefit future crops, and the teaming would be distributed over four or five months, and could be so distributed as not to interfere greatly with the other work on the farm. Each factory would have cattle-feeding sheds in connection with it, which would largely help the farmer, by creating a home market for stock cattle, hay, straw, coarse grain, etc. There is an opening for 50 large factories in Canada, each having a capacity for working 300 tons of beets in each twenty-four hours. The buildings and machinery would cost about \$15,000,000. They would employ over 10,000 workmen during the four or five dullest months of the year. Each factory would necessitate the erection of quite a little village for its operatives, or would largely increase building operations in existing towns and villages.

All the United States Consuls at the different beet-producing and manufacturing centres in Europe dwell very extensively in their reports to their Government on the surprising increase and success of this industry there; and they are unanimous in urging and advocating the expediency of lending all the Government aid necessary to the promotion of this enterprise in the United States. They all agree that in respect of the latitude in which sugar beets can be successfully grown, and in respect of soil and climate, there are large sections in this country which are fully as well and in some instances better adapted for this crop, than many of the best beet lands in Europe. Whole volumes of statistics have been published, showing the wonderful development of the industry; the improvements effected in producing reliable seed; in the methods

of cultivating the crop ; and in the manufacture of the sugar. The success accomplished in beet sugar has stimulated the producers and manufacturers of cane sugar, so that the cost of sugar has been so greatly reduced within the last twenty years, that it is no longer considered a luxury for the rich, but it is now so cheap as to have become an article of common necessity for all classes. In Germany, in 1836, about 1,500 tons of beet sugar were produced, and 20 pounds of beets were required to make 1 pound of sugar. In 1855, the production had increased to 97,000 tons, and the quantity of beets required to produce 1 pound of sugar was reduced to 14 pounds. In 1885, the production had increased to 560,000 tons of sugar, and the quantity of beets required to produce 1 pound of sugar was reduced to 8¾ pounds. The production there is now over one million tons of sugar. The beet-sugar industry of Germany is now the most extensive and profitable of all its industries. Some idea of the extent of this industry in Europe may be formed from the following statement of the area devoted to beet cultivation in a few of the countries there, for manufacture in 1892-93.

	Acres.		Acres.
Germany.....	872,000	Prussia.....	749,964
France.....	552,281	Belgium....	125,840
Austro-Hungary....	755,260	Holland....	60,010

Total,.....3,115,525

The whole acreage under wheat in all Europe is a little less than 5,000,000 acres. The amount paid for the beet crop in the above six countries was greater than the value of all the wheat grown in the whole of Europe.

In Sweden, which is not included in above table, the development of the industry has been remarkable. In 1882, that country only manufactured 2,000 tons of beet sugar. Now there are 8 large factories in operation, and three or four more are being constructed, and it is confidently expected that in 1894-95 or in 1895-96, Sweden will produce 60,000 to 70,000 tons of sugar.

If this has been accomplished in Sweden, why may not a like result be accomplished in Canada within the next few years ?

One of the greatest objections urged against the establishment of the beet-sugar industry in Canada by means of Government assistance, is the heavy burden which, it is considered, would be imposed upon the people by means of the bonus which would be necessary to success. It is alleged that the industry has only been sustained in Europe by a thirty or forty years' continuance of heavy bounties, and that a similar necessity would prevail here and for the same length of time. The bounty system of Germany is adduced as evidence of this. It must be admitted that for many years Germany did submit to heavy sacrifice in maintaining this enterprise, but the day of sacrifice has almost passed away, and the industry would now be self-sustaining but for the competition to which its exports of sugar are exposed in foreign markets, with sugars from other countries where much larger bounties are being paid than in Germany. Very few are aware of the great reductions which have been recently made in the bounties paid in that country. The present bounty paid on highest class of refined sugar is only equal to 22 cents per 100 lbs. and will be reduced to 19 cents on July 31, 1895 ; the present rate

or hard sugars, granulated, crystals, etc., is equal to 18 cents per 100 lbs. and will be reduced in 1895 to 15 cents. The present law provides for the abolition of all bounties on July 31, 1897. That high bounties are not necessary to the maintenance of the beet sugar industry in Germany is evident from the fact that the successive reductions of bounty have not been instrumental in reducing production, but, on the contrary, have been followed by continued increase in manufacture and export. The beet-sugar industry in Canada will not require any lengthened assistance from Government, as companies which may embark in the enterprise will be able to take advantage at once of all the improvements in seed, best methods of cultivation, and the latest and most approved system of manufacture. All who have an intimate knowledge and experience in this industry agree that for the first few years, there would be many difficulties to encounter, which only experience could overcome. It will take time to ascertain the descriptions of seed best adapted to the climate and soil ; extra inducements will require to be given to farmers in order to encourage them to engage extensively in this new crop, and much care and attention will have to be given in educating them in the proper methods of cultivation. Considerable waste and inferior quality of sugar will inevitably result for a season or two from the inexperience of the operatives. These or similar difficulties will be found in this as in all new enterprises, and capitalists will be reluctant to invest in the manufacture of an article requiring so much chemical and other skill, unless they are secured, during the earlier years of its operation, from open competition with the long established factories of Europe. It is not likely that under any liberal bonus system, more than 3 or 4 factories would be erected until and unless the operations of these afford reliable assurance of success. The amount of bonus earned by the factories would not be very onerous, and if they prove profitable investments, the rate of bonus may be reduced for future factories, or perhaps withheld altogether.

Another objection urged against the enterprise is the comparative dearthness of labor in Canada. One of the heaviest expenses connected with the beet-sugar industry is that of transportation of the roots from the farm to the factory. The cost of teaming and transportation is fully as cheap here as in most of the beet-producing countries in Europe. The disadvantage of high wages here is more than counterbalanced by the interest or rent of beet lands there. Good beet land favorably located near a factory is generally worth from \$400 to \$800 per acre. Mr. John Wilson, U. S. Consul at Brussels, in reporting to his Government as to the expense of cultivating per hectare (2½ acres) allows 150 francs as average rent paid to the proprietor of the land. This is nearly \$12 per acre. As the whole expense of cultivating an acre of beets in this province, including rent (\$3.00), taxes, seed and manure, up to the time of teaming to the factory, has been ascertained not to exceed \$20 to \$25, it is seen that, taking rent into consideration, beets can be produced as cheaply here as there.

It has also been urged that beet-sugar companies in Europe find such difficulty in inducing the farmers to raise enough beets to supply their factories, that they are compelled to raise a large proportion of the roots required from

their own lands or from lands rented by the companies. This idea has arisen from the distinction made in most of the statistics for Germany, the production of beet roots being given in two columns:—One for "beets cultivated by factory owners," the other for "beets purchased." The reports of the United States Consuls are full of references to this subject. In many cases beet-sugar factories are wholly or partially owned and operated by farmers, who generally obtain, either through better arrangements for the sale of their roots or by their share in the profits of the factory, larger profits for their production than are realized by non-stockholders. In other cases the companies (not farmers) raise a large proportion of their own supply because they think they thus obtain a better and more uniform quality of roots than are generally produced by farmers. So far from its being reported by the American Consuls as a difficulty, the fact of the cultivators owning the factory or having a partial interest in its operation is considered a most favorable feature, as tending in a great measure to the improvement of the quality of the beets. It is not reported by any of them that sugar companies, where properly located, have any difficulty in finding farmers willing to furnish all the supply wanted. On the contrary, some of them report that in many cases the applications of the farmers for contracts are largely in excess of the capacity of the factories to work. Apart altogether from these consular reports, the objection is of the most flimsy character. If it pays factory owners to rent lands and raise beets by hired labor, they certainly could induce farmers or owners of lands to raise the same quantity of beets by offering them prices equivalent to those which the beets of their own raising would cost.

There are no great difficulties nor any valid objections in the way of success in Canada. The advantages which must result from the establishment of this industry are so obvious and so numerous, that it is the imperative duty of Government to grant such liberal and prompt assistance to the enterprise as will induce capitalists to invest in it. Fair consideration must be given to the difficulties and risks which enterprising men may be found willing to encounter. With sugar free of duty, the assistance must be by way of bonus, assured to the promoters for a term of years. This is the very description of enterprise which a National Policy is designed to establish and promote, and the establishment and extension of this industry, by liberal but reasonable assistance, will prove the most popular measure which any government in Canada has ever adopted.

THE CANADIAN TARIFF.

Since our last issue the following amendments have been made in the Canadian Tariff:—

Wall paper not including borders, printed on plain underground paper, and colored with any material except bronze gilt or flitter, thirty-five per cent.

All other paper hangings and borders, per roll of eight yards and under, and proportionally for greater lengths, one and a half cents per roll and twenty-five per cent. ad valorem.

Tarred paper, twenty-five per cent.

Tomatoes and other vegetables, including corn and baked beans in cans or other packages not elsewhere specified, one and one-half cents per pound, the weight of the cans or other packages to be included in the weight for duty.

Stearine, two cents per pound.

Tea and green coffee imported direct from the country of growth

and production, free. This item shall include tea and coffee purchased in bond in any country where tea and coffee are subject to customs duty, provided there be satisfactory proof that the tea or coffee so purchased in bond is such as might be entered for home consumption in the country where the same is purchased.

EDITORIAL NOTES.

A correspondent, who is a manufacturer, enquires of us the relative value, as a fuel for making steam, between dry ash and soft elm wood and bituminous coal; and if the same grates and chimney will do for coal as for wood.

In a recent speech, Mr. Dalton McCarthy, arguing in favor of a low tariff, or free trade, said that larger imports from Europe would lower freights on Canadian exports. In reply to this an old ship owner in Quebec writes to the Gazette as follows:—The truth is that the rates of ocean freight on Canadian produce were never as low as they have been during the past few years, and it is incredible that they should go lower, for they barely pay running expenses. Indeed grain and flour are carried below cost. In the sixties I often had 27c. per bushel for sailing ships, and the Allans had as high as 30c. per bushel for their steamships. In the seventies I had 20c. to 22c. and steamships still more. To-day grain is carried in first class steamships, in about nine days, at an average of about 8c. per bushel, and no steamship could live at such rates were it not for cattle and passengers. It is within my knowledge that many British steamship owners have been ruined by these rates, and hundreds of fine steamships have been kept idle rather than accept them. But if outward rates are to benefit homeward rates it must be by a rise, for they are now about one-fourth the old rates. And who would pay the advance? Why, Canadian consumers, so it is as broad as it is long. The tremendous competition now existing among steamship owners has been, and still is, a great advantage to Canadian farmers when prices are so low for their produce, and Mr. McCarthy is only misleading them when he complains of the cost of ocean transportation. The Cunard company, with all their prestige, only paid a 2 per cent. dividend last year, and the Allans could not make both ends meet if it were not for the profit on their underwriting account, and the fact that they pay no commissions to outsiders. The reason why rates are sometimes a little lower in New York than in Montreal is not because of excessive imports, but because of the enormous number of steerage passengers landed at that port from Europe, and the heavy subsidies paid by the United States Government to two lines, amounting to a million and a quarter dollars per annum.

At the recent spring Assizes held in Barrie, Ont., the grand jury's presentment included a remonstrance against the Barnardo system of importing the youthful scum of the great English cities and distributing it throughout the Dominion. Canada appears to be awakening to the pernicious influences of these slum-bred immigrants upon the community.

On the 30th of June, 1893, there were in the Dominion 15,320 miles of finished railway. The cost of all the lines has been \$872,156,475 or \$65,929 per mile. Ordinary and

preference share capital amounts to \$372,000,000, and bonded debt to \$307,000,000. The Dominion Government has contributed \$147,000,000 in capital expenditure and bonuses; and the rest of the money has been given by the provinces and by municipalities. The earnings of all the roads last year were \$52,042,397; and the working expenses \$36,616,033, leaving only \$15,426,364 to pay interest and dividends, or less than two per cent. on the cost of the roads. During the year 13,618,027 passengers were carried, equal to nearly three trips for each inhabitant; and 22,006,599 tons of freight were transported. Eleven passengers were killed. That is, one passenger out of 1,402,000 who started on a railway journey. The mileage of all the trains is equal to 1,800 circuits of the earth.

A few days ago the Railway Committee of the House of Commons gave full consideration to Col. Tisdale's bill to incorporate the St. Clair and Erie Ship Canal Company. Col. Tisdale engineered the measure safely through the committee, and although the bill was a lengthy one and the provisions numerous, very few changes were made. The difficulty with the municipalities in the matter of the drainage of the lands through which the proposed ship canal will run, was arranged by the insertion of a clause which provides that the canal company at their own expense will make provision to take care of all drainage and water courses they may interfere with, future alterations and enlargement of drainage to be referred to the Railway Committee.

Some of the members of the Toronto Board of Trade are a queer lot. A few weeks ago they passed strong resolutions urging the Dominion Government to take vigorous action looking to the building up of the Canadian pig iron industry, and later they send a deputation to Ottawa asking that pig iron be placed in the list of non-dutiable articles.

Mr. J. J. Morehouse, general manager of the Hamilton Iron and Steel Company, who are now building a blast furnace at Hamilton, has informed the secretary of the Canadian Manufacturers' Association that contracts have been made for the construction of all the machinery and apparatus necessary in the erection of the furnace, and that it will be ready for operation by the first day of January next. The contractors for this work are the Philadelphia Engineering Company of Philadelphia, Penn., the contract price being \$360,000. Mr. F. W. Gordon, of the construction company, is expected to be in Hamilton in a few days when every portion of the work possible to be done to good advantage in Canada will be let to sub-contractors. When this project was first started it was thought perhaps about 50 per cent. only of Canadian ores would be consumed in the furnace. But Mr. Morehouse informs us that it is now about certain that as much as 90 per cent. will be used and only a small matter of about 10 per cent. of American Lake Superior ores will be required to produce the most desirable admixture.

The Toronto Board of Trade does not do itself much credit by instituting a so-called Manufacturers' Section

thereof, and authorizing a deputation of that section to proceed to Ottawa to request the Government to go back upon the pledges it had made to the people of Canada as regards the National Policy and the encouragement and building up of a Canadian blast furnace industry, by placing pig iron, bar iron and steel in the free list. In view of some other actions it had previously taken it stultified itself very considerably.

The Hamilton, Ont., Facing Mill Company, manufacturers of foundry facings, etc., in a letter requesting us to continue their business card in this journal say:—"We have much pleasure in stating that we have been able to trace quite a large number of enquiries to our advertisement in the CANADIAN MANUFACTURER, and wish you to continue our agreement for same space for another year."

A couple of years ago great prominence was given to the richness and extent of our nickel deposits at Sudbury, the claim being made that in a few years Canada would supply the demands of the whole world, possibly excepting that of France, who would draw her supplies from New Caledonia, her possession in the South Pacific Ocean. Until the year 1891 no mention was made in our Trade and Navigation Returns of any exports of nickel ore or matte; but the returns for that year and since show quantities, value and destination as follows, of fine nickel contained in ore, matte or speiss:

	pounds	value
1891 Great Britain.....	847,660	\$30,180
United States.....	4,504,383	210,319
Total.....	5,352,043	\$240,499
1892 Great Britain.....	2,700,124	151,122
United States.....	12,532,904	466,517
Total.....	15,233,028	\$617,639
1893 Great Britain.....	516,000	\$27,600
Germany.....	234,000	11,700
United States.....	8,174,000	388,257
Total.....	8,924,000	\$427,557

This shows a falling off in exports in one year of 6,309,028 pounds in quantity and \$190,082 in value.

It will be observed that no Canadian nickel goes to France; but the increase of shipments from New Caledonia to Great Britain within the last few years are rather remarkable, the receipts of ore at one works on the Clyde for month of March, 1894 aggregating 8,198 tons, an increase of 6,242 tons over the corresponding month of last year. For the quarter ending with March, 1894, the Clyde receipts of New Caledonia nickel ore were 12,798 tons, an increase of 4,380 tons over corresponding quarter of 1893. It is only eight years since this trade began, and the growth of it is indicated by receipts as follows:—

	tons		tons
1886	700	1890	17,856
1887	3,348	1891	30,562
1888	9,596	1892	32,110
1889	10,639	1893	25,796

What are our Sudbury people doing that their shipments should be decreasing while those from New Caledonia are increasing at the rate indicated?

The customs department has been informed that goods

shipped in bond for foreign countries, and passing, while en route to such countries, through the United States, are frequently included in the export returns as being shipments to the United States direct. Collectors have therefore been instructed to use every effort to ascertain correctly the country of destination of all goods entered for export at their ports, to the end that the export statistics of the department shall be as correct as possible as to such foreign destination. It is this lack of accurateness in ascertaining the destination of merchandise exported from Canada that has heretofore told so unfavorably against our trade with countries other than the United States. We have occasion to know that much of our exports of agricultural implements to Australia has been credited to the United States trade with that country because the shipments were made to a United States shipping port without the statement at our export port of the precise destination; and in the same manner much of our Canadian lumber, intended for the West India and other foreign markets, sent in bond through the United States, has been credited to this latter country through the lack of accurateness alluded to, and which the Government is now seeking to remedy.

The womanly side of Queen Victoria is pictured exceedingly well and appropriately too, in this the month of her seventy-fifth birthday—in an article on "The Womanly Side of Victoria," which Arthur Warren contributes to the May issue of the Ladies' Home Journal. Among the pictures in the article, those showing the Queen at breakfast and in her pony carriage, are interesting and new. The biography of the number consists of sketches, with portraits, of Mrs. Edward Everett Hale, the wife of the famous preacher-author, and of Miss Nancy Bailey, the wonderful woman indexer of England. Altogether this May issue is singularly attractive and worth many times its modest price of ten cents. Published by The Curtis Publishing Company, of Philadelphia, for ten cents per number and one dollar per year.

Scribner's Magazine for May opens with an article entitled "Some Episodes of Mountaineering," by Edwin Lord Weeks, describing some of his own adventures, while mountain-climbing in the Alps, with illustrations furnished by the same hand.

Captain John G. Bourke, U.S.A., the Indian fighter, who has long been stationed in Texas, has written the story of one of the most romantic regions—the Mexican border along the Rio Grande, under the title, "The American Congo."

Clara Sidney Davidge (who as Miss Potter was most efficient in the organization of "Working-Girls' Clubs" in New York) has written an article on that subject which is one of the best statements possible in small compass of the actual machinery and organization of these excellent clubs.

Other illustrated articles in the number are "The Provincials," by Octave Thanet, with illustrations by Frost; "Climbing for White Goats," a narrative of hunting adventures in the Rocky Mountains by George Bird Grinnell, and Philip Gilbert Hamerton's brief article on Jules Muenier, whose painting, "A Corner in a Market," serves as a frontispiece for the number.

F. J. Stimson writes a brief essay on "The Ethics of Democracy" with particular application to liberty—an essay that is of unusual significance at the present time when socialistic laws are so much discussed. Mr. Stimson has classified the laws of this kind which have been recently added to the statutes of various States.

The Popular Science Monthly for the May number opens with another of Dr. Andrew D. White's New Chapters, dealing with Theological and Scientific Theories of an Evolution in Animated Nature, in which the persistent efforts of theologians to discredit this great truth are set forth. The spring season is reflected in an illustrated article on The Guests of the Mayflower, describing this charming plant and its insect visitors, by Prof. Clarence M. Weed, also in Up the Chimney, which is a delightful sketch of bird-life by the late Frank Bolles, while there is a reminiscence of winter in Frost forms on Roan Mountain. The paper on The Ice Age and its Work, by Alfred R. Wallace is continued with an account of the Erosion of Lake Basins. Under the title Economic Uses of Non-edible Fish, Robert F. Walsh tells with illustrations how an oil and a fertilizer are made from menhaden or "muss-bunkers," while Frederic G. Mather sets forth the manifold uses of cotton-seed oil, and describes its preparation. Peculiar Sound Effects, by A. A. Knudson, is a simple account of everyday phenomena that many will be glad to have explained. In the Editor's Table the every-present conflict of theology (not religion) with science, and the timely topic, A Dangerous Class, are considered. New York: D. Appleton & Company. Fifty cents a number, \$5 a year.

Woolen Manufacturers' Competition.

EDITOR CANADIAN MANUFACTURER.

SIR.—As a change has taken place in our tariff and competition from Europe likely to be keener than before, I think it a good time to draw the attention of manufacturers to the competition existing amongst themselves, in too many cases needless and unwarranted, and could be lessened if each would apply himself exclusively to the manufacture of the special lines for which his machinery is best adapted, and confine themselves to such special lines. He could, undoubtedly, produce much cheaper, turn out goods more perfect in finish, and in fact make more money while selling at quite as low prices as now prevail. It is a well-known fact in the trade that just so soon as a certain mill gets a run on some particular quality or style of cloth which is being produced at a profit, and make it acceptable in every respect, that other mill: which do not happen to be full up with orders for the goods they are accustomed to make, or have not struck the market aright, rush in with something similar and inferior, at a lower price, with the result of a glut in the market and a lot of badly manufactured goods as well. The consumer having bought these goods one season recognizes them as being a Canadian product, and as they were so unsatisfactory he buys no more Canadian goods but pays an extra price for imported goods.

Then again the wholesale buyer has got into the pernicious habit of giving clippings taken from one mill sheets to another mill to copy and make at a lower price if possible and as an inducement to give a cut of 2½ cents a yard promises a large order. This, to say the least is hardly honorable towards the mill from which he originally obtained the samples.

Does the buyer do this because he has no confidence in himself, or does not know when value is offered him, or to grind down the manufacturer and keep him on lower priced goods so he may import the better qualities?

A little more backbone among Canadian manufacturers might stop this, if they would absolutely decline to accept orders for such goods, knowing them to be made at other mills which are specially fitted up to make them. When the mills do this each one will gradually work into its own special lines (as they do in England and Scotland). They will get larger orders on one line and pattern, lessen cost of production, make more perfect goods and raise the standard of Canadian woolens.

CANADIAN.

Direct Driven Dynamos.

BY GEO. H. HILL.

One has but to look at the tendency at present existing for this style of apparatus to feel sure that it is the coming plant, if, in fact, it has not already come. Not only are nearly all the large continuous current plants in England run by direct connected dynamos, but we hear of many large units of this style being installed in the United States. The average engineer has come to look upon this simple combination as one fit only for large units, whereas, in all cases where high efficiency, quietness of running, and economy of space are important, a direct driven dynamo should be used. As far as economy of space is concerned, it will require little or no argument to convince the public on this point, as a one thousand light direct driven plant will only require a floor space of 4 ft. 6 in. by 9 ft., this being based on the size of a Crompton dynamo connected to a Willans & Robinson engine.

These engines are of the high speed type, thus enabling the use of smaller, and therefore less expensive and generally more efficient, dynamos. An engine of this class is extremely economical of steam, and will compare favorably in this respect with any other engine of equal power in the market. They have been most extensively used for driving dynamos both for central station and private installations, and are made up in simple, compound, and triple expansion condensing and non-condensing. Units are from five to two hundred horse power.

The total efficiency of such a plant, i.e., the ratio of electrical horse power at the dynamo terminal to the indicated horse power of the engine cylinder, of these sets is probably the highest yet recorded of any style of steam driven dynamos. With plants of this class, a total efficiency of 86% has been reached in a 200 I.H.P. set, and even with an 80 I. H. P. set, 84% is a very usual figure. The following figures made entirely from tests carried on in Willans & Robinson's Works, Thames Ditton, show the excellent results obtainable:

Terminal output of the dynamo.....	153 E.H.P.
Loss in dynamo.....	7.5
Loss in engine.....	17.8
I. H. P. of engine.....	178.3
Total efficiency.....	85.8%
Commercial efficiency of dynamo.....	95.3

These results are due partly to the high efficiency of the engine, in which the frictional losses are extremely small, but largely also to the great improvements which have been made in the details of dynamo construction—one detail alone, viz: the Crompton patent compressed armature conductor has probably increased the commercial efficiency of dynamos of this class as much as 3 to 4%, and is now being largely used by other makers.

As far as silent running is concerned, a plant of this style would

specially recommend itself to all cases where the noise of a belt driven plant might be considered an inconvenience. Take for instance our large Insurance and Office buildings, many of which we enter and find them vibrating from the speed of the engine and the continual flapping of the belt upon the pulleys, whereas with a direct driven plant there is none of this, the speed of the dynamo being reduced about two thirds, while the engine is so compact as to be almost noiseless. A plant of this style can be set up in a small room, started, and left running, with practically no attention, for hours at a time. We have in Canada several of this type of apparatus, prominent among which might be mentioned the plants in the McGill College and Royal Victoria Hospital in Montreal, both of which are connected with large storage battery plants which enable the users to have light at any time of the day or night, whether their steam plant be running or not. This is undoubtedly the ideal combination, and with a thoroughly reliable cell such as they have in either of these plants, the storage battery may be considered a very valuable accessory to any plant.

Diamine Black H. W.

Wm. J. Matheson & Co., New York and Montreal, have sent us the following description of their Diamine Black H.W.:— We take pleasure calling to your attention a new mark of our series of Diamine Black Dyes, viz: Diamine Black H.W., Pat.

This mark is distinguished from our other marks of Diamine Black by the following characteristics:

1. On account of its different shade,
2. Its favorable operation in the dyeing of mixed goods,
3. It does not change in hot pressing or drying.

On Cotton Diamine Black H. W. is dyed in a boiling bath with the addition of 3 to 5% soda and 10 to 15% Glaubersalts, or from 15 to 25% Glaubersalts or common salt, the same as our other marks of Diamine Blacks.

It is an advantage to use our Diamine Black H. W. in some cases for gray and mode shades, and in other cases to produce dark blue and steel blue shades, in mixtures with the other Diamine Dyes, which are preferred for this work.

On account of the great evenness of this color, as well as its green tone, it is a valuable supplement in the production of the more violet blue shades made with the other marks of Diamine Blacks.

In fastness to washing, light and acid, Diamine Black H. W. is equal to any of the other marks of our Diamine Blacks. It can be dyed in copper vessels as well as in wooden vessels, and owing to its easy solubility, is to be preferred where the dyeing is done in mechanical apparatus. (Cops and fine loose wool).

Piece Dyeing.—For Piece Dyeing our experiments prove that Diamine Black H.W. on the jigger, can be dyed as well with soda, or soap and Glaubersalts, as with Glaubersalts alone. The color dyes on well and exhausts the bath. Its fastness to hot drying and pressing, makes the H.W. mark particularly valuable for this class of dyeing.

The dyeings can be discharged with zinc dust as well as with white tin salts. (Zinnsalz.)

Padding and Printing.—For padding 1 kilo of Glaubersalts per 100 liters of water, is added to the necessary quantity of dye-stuffs.

As well as being generally adapted for piece dyeing, Diamine Black H. W. will produce light to medium shades in padding and printing.

Printing.—In printing good results have been obtained by proceeding as follows: 50 gr. Diamine Black H. W., 1500 gr. water, 1800 gr. thickening, 50 gr. phosphate of soda, 400 gr. water. Boil well. Steam with or without pressure after printing.

Diamine Black H. W. can be used as a diazotizing color, but one cannot attain with it in the diazotizing and developing the same degree of intensity or fastness to washing, as with the older marks of Diamine Black.

Half Wool, Half Cotton.—As mentioned above, one of the particular merits of the new product is its adaptability for dyeing mixed goods. The Diamine Black H. W. dyes mixed goods (wool or cotton) almost equally alike. With the addition of Glaubersalts (about 20%) the cotton is dyed a little deeper, and by the addition of acetic acid (about 3%) the wool is dyed deeper. If desired, the shade of the wool can be deepened by the addition of Naphthylamine Black D.

Wool.—An equal combination of the marks H. W. and R. O. will produce on wool in a neutral bath, (dyed boiling with 30% Glaubersalts) a milling and sulphur fast black color, also especially fast to light and acid, which has the advantage (or property) of dyeing loose wool, as well as yarns and goods, so as to cover all the burrs (nopen), and the heaviest textures, like felt, uncarbonized hat felt, etc., will be thoroughly penetrated.

Half Silk can be dyed with Diamine Black H. W., both fibres being equally dyed, and darker shades of the cotton yarn are produced by the addition of soap and Glaubersalts. For this class of dyeing, also, the "H. W." is particularly valuable.

Silk.—On Silk "H. W." will produce shades very fast to washing and sulphuring, and on this account will be welcomed as a valuable supplement to our series of Diamine Dyes, which are winning for themselves an important position, owing to their ability to produce dyeings fast to soaping.

We shall be glad to send you if you are interested in it, a sample card showing all the dyeings referred to herein and several dyeings on mixed goods, of which the beautiful and evenly dyed pattern No. 21, done in one bath, a mixture of wool, cotton and silk, will be found

particularly interesting. In producing this dyeing, the quantities of Naphthylamine Black and Diamine Gold serve to cover the silk effects, while in most cases, a deep black on half wool will be very satisfactorily produced by an equal mixture of Diamine Black H. W. and Diamine Black R. O.

Electricity Applied to Looms.

The application of electricity to looms as a motive power is receiving continued demonstration in this country and abroad. With each demonstration it becomes more and more manifest that all that is claimed for power of this kind is capable of being realized. The means applied may not have been brought to the highest or even to a high state of efficiency, yet it seems to be satisfactorily established that its economy as compared with shafting and belts is entitled to consideration. As we stated in a very recent issue, already a cotton spinning mill in the South has its plant equipped with electrical conveniences for operating all of its machinery by electricity. It appears in one of our foreign exchanges that a weaving factory of some prominence in Germany has tried the experiment of operating 80 of its looms by electricity, each machine having its own electric motor. A number of doubling and twisting machines are also run in the same way. It is noted that the looms required no alteration except in some minor details that might easily be imagined by anyone acquainted with looms. The alterations found necessary were of little consequence. Though the application of electricity in this particular direction is in a tentative state, it has been made evident that much greater uniformity of speed, so very essential to the running of a loom, can be attained than when pulleys and belts, alone, are depended on. Each machine is made independent of all others in the factory, and the throwing off or on of heavy machinery in disturbing the regularity of speed is no longer feared. The cost of apparatus and installation is still an object in the general and immediate adoption of the system. This overcome, and the revolution will be accomplished.—Manufacturers' Gazette.

Heating Surface of Steam Boilers.

The heating surface of a steam boiler of any kind is the surface exposed to the action of the fire which has water on the other side. The extent of this surface is measured exactly the same as any surface would be.

For instance, we have a boiler 60 inches in diameter, with 66 tubes 3 inches in diameter and 15 feet long, what is the amount of heating surface?

The operation of finding the effective heating surface in this case is best divided into three parts.

First—The surface of the shell. As the brick-work is, or should be, closed in at the centre of the shell, we have as the effective heating surface one-half the circumference of the boiler multiplied by the length of the tubes, that being the length of shell exposed to the fire.

½ circumference of shell 5 ft. diam.,..... = 7.85 ft.
Length of shell..... = 15 ft.
7.85x15 = 117.75 square feet in shell.

Second—That portion of the two heads between the two tubes. As the water-line comes but slightly above the centre of the boiler, we usually assume it is half-way. Then we have a surface equal to one entire head of the boiler covered with water and exposed to heat.

A tube sheet, 5 feet in diameter..... 19.63 sq. ft.
66 tubes 3 inches in diam = 3.23x2 = 6.46 sq. ft.

Total heating surface on heads..... = 13.17 sq. ft.

Third—The tubes. It is usual to reckon the inner surface of the tubes as heating surface. Then we have 66 tubes each 15 feet long. 66x15 = 990 feet of 3-inch boiler tubes. By the manufacturers' standard table the length of 3-inch tube required for one square foot of inside surface = 1.373. Then 990 divided by 1.373 = 721 square feet in the tubes.

Adding the above together we have—
For the shell..... 117.75 sq. ft.
For the heads..... 13.17 sq. ft.
For the tubes..... 721.05 sq. ft.

Total..... 851.97 sq. ft.

We must proceed in a similar manner to obtain the heating surface of any boiler whatever. Usually about 15 square feet of heating surface in a tubular boiler is reckoned equal to one nominal horse power.

Bridge Swung by Electricity.

The swinging of the draw of the Omaha Bridge and Terminal company's structure across the Big Muddy has been accomplished by the aid of the Waddell-Entz storage battery now in position. For four months Engineer V.A. Hewes has been working on the motive power to swing the span, and yesterday, in the presence of a number of the officers of the terminal company, and for the benefit of Chief Engineer J.A.L. Waddell, who came up from Kansas City to see the test made, the span swung out over the river, without a jar or hitch, thus completing the bridge which connects two of the great sisterhoods of States.

The power used consists of two forty-horse-power motors, weighing 3,900 pounds each, and is the same system now in use on the Sec-

ond avenue line, New York. The storage battery is of the well-known zinc-copper alkaline type, the positive element consisting of an agglomeration of finely divided copper held about a central copper wire by fine wire netting. To still further secure the finely divided copper in position an outside covering of cotton is woven around it, thus giving the finished product the appearance of insulated magnet wire. This wire, as it may be termed, is then wound spirally to form a flat rectangular sheet the thickness of the insulated wire. A number of these sheets or plates, usually seven, are then united together to form the positive side of the cell, and are placed in an iron case divided so that there is an iron partition between each of the positives. A solution of potash in which zinc has been dissolved forms the electrolyte. Upon charging the cell the zinc in the solution is deposited upon the sides and partitions of the case, and the copper of the wire is oxidized; in discharging the battery may be considered a simple oxide of copper and zinc cell, the zinc being redissolved into the solution from the iron surfaces and the copper oxide reduced.

Eight racks are used to manipulate the power, 384 cells being contained in the racks. The cells are connected in series on each rack, each two racks being in a series, thus forming four units, being the same as four individual batteries. These are led into a controlling device, from which wires run to the armatures of the motors. The controller has a single lever that works a cylinder and on which are contact points, by means of which the batteries are coupled in series, giving the different speed of the motors. By turning the lever in the opposite direction there is given three different speeds in reverse direction. On coming to the zero point of the controller the armatures form a magnetic brake, which stops the motor instantly. While in operation the machinery is under the most perfect control by simply working the lever of the controller.

The switch board has a number of switches so arranged that the batteries may be charged from the trolley wire of the East Omaha street railway company, or the batteries may be renewed by the same current. The whole battery may be charged in series or it may be divided into separate parts and each charged separately. In operating from the batteries the switches can be thrown in such a manner that the machinery may be worked from one half the battery independently of the other half, one half thus being in use while the other half is being charged.

The armatures of the motors are of the gramme ring type, with internal fields, these fields being unique in their way, having eight poles and a single magnetizing coil. The motors are geared to the lifting and interlocking shaft and also to the main or turning shaft. Upon the interlocking shaft are friction clutch gears, and upon the centre shaft, which carries the pinion driving the equalizer, are two friction clutch couplings. The turning shaft is cut at the centre and the equalizer introduced, this equalizer being for the purpose of equalizing the strain upon the large rack. The main gear wheel of the equalizer is five feet in diameter, with a six-inch face.

The matter of moving and stopping the motion of such an immense weight, at present being 3,000,000 pounds, but which will be increased to 4,000,000 when the carriage and footways are completed, has been carefully studied out, so that the machine in position can move the draw as easily as a child can lift a lead pencil. In fact, a child could swing the draw of the largest span in the world by moving the lever which controls the current.

Those who were present pronounced the test perfect, Mr. Waddell being particularly sanguine that the storage battery would revolutionize the power used in swinging draw spans of bridges. —Omaha Rec.

The folly of indiscriminate public relief to the unemployed has been again demonstrated at Indianapolis, Ind. When the pinch of hard times came on in that city the wealthy and philanthropic citizens made provisions for caring for the unemployed. Over a thousand persons professing their willingness to work if work offered itself were fed and lodged on charity. Last Monday a heavy snowstorm struck all sections of the country, and an opportunity arrived for the guests of the city of Indianapolis to earn their board. Of the thousand unemployed only a hundred would go to work. The other nine hundred flatly refused to do so. It is against public policy to harbor such lazy vagabonds. —American Artisan.

The construction of the 350-foot chimney at Chicago calls to mind previous cases where iron or steel has been substituted for brick or stone in the building of factory stack. The largest which has hitherto been erected in England is the one of wrought iron at Darwen, Lancashire. It is used for carrying off the gases from the blast furnaces of the Darwen & Mostyn Iron Company. The dimensions and particulars are as follows: Total height, including foundation, 275 feet, depth of foundation 15 feet, external diameter at base 27 feet six inches, external diameter at top 11 feet, time occupied in erection of iron work 11 weeks, total weight, including foundations and lining, 1100 tons, total weight of a brick chimney same height and external diameter, 3000 tons. At Schneider's works at Creusot there is one 280 feet high, and at the Bhkolden paper mills at Kineshnia, Russia, there is one 170 feet high. There is one 165 feet high at the Acklam Iron Works, Middlesbrough, England. In this country the largest hitherto built is that at the Cleveland Rolling Mill Company's works at Cleveland, O. It is 213 feet high. The Pennsylvania Steel Company has no fewer than eight wrought-iron chimneys varying in height from 110 to 170 feet. —Manufacturer's Gazette.

The New York Homestead says:—"Nebraska's beet sugar factory at Norfolk, Madison county, turned out nearly 4,000,000 pounds of the granulated sugar the past season," double the amount produced last year. The industry is only three years old. The Wilson bill proposes to destroy this industry and all like it.

A writer in the Scientific American describes how he drills a hole in glass as follows: Take a small common three-cornered saw file and break off an inch of the end of it. Then take to a grindstone and grind a blunt triangular point on it, being careful not to hurt the temper. Leave the file in the handle and bore just like you would with an awl. The point of the file should not be longer than the file is thick. Use turpentine as a lubricant, and keep the cutting edges on points of the file sharp with an oil stove. I have bored holes 2 inches deep in a short time by hand in glass by this method. In boring a plate I have found it best to bore from both sides, using very light pressure toward the last, always laying the plate solid on a paper-bound book.

A useful point is made by a writer in The Economist, in regard to the term "fast colors," as applied to printed and woven cottons. The rule is laid down that the more delicate in shade the dye is the more difficult it is to fix it in the cotton fibre, but even the crudest colors will fade if goods are imperfectly treated in the laundry; any of the goods, in fact, that are sold as fast colors, whether of domestic or foreign manufacture are practically fast, but when subjected to the powerful chemicals of which many of the washing soaps are composed, or when hung out for hours on a clothes line and exposed to the bleaching influences of sun and air, the colors must necessarily fade to a greater or less extent. It is well known that the chemicals contained in washing soaps and similar compounds are in many cases as powerful as those employed in the process of bleaching muslins, in not a few instances, too, they are probably of a greater degree of strength, the result being that they weaken the cloth to an extent that the bleacher would not be disposed to risk.

A prominent civil engineer, in a recent communication to a technical journal, draws some interesting comparisons between the service of the intramural railway of the Columbian Exposition and the Chicago Southside elevated system, operated by steam locomotives. He points out that for a given passenger capacity the aggregate weight of the steam train is approximately double that of the electric train. The style of cars now in use, and the economy of putting as many cars in each train as can be started by the locomotive, induces the running of heavy trains at comparatively infrequent intervals, both for suburban and municipal traffic. The result is that whenever the electric trolley car, with its one-minute intervals and no-time schedule, competes with the steam line with trains fifteen or twenty minutes apart, it naturally takes the lion's share of the business. The opinion is expressed that the best practice in electric transportation will be found to be separate locomotives for long and infrequent trains, and electric motors attached to the tracks of passenger cars for light trains making frequent stoppages.

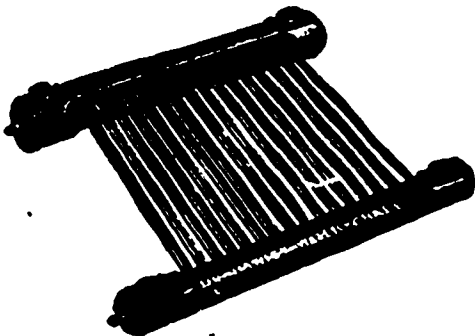
The lighting of large buildings is done cheaper by electricity than by any other means. Rooms that are high and covering much space, where quantity of light is required, are best lighted by arc lamps. The arc lamp gives an intensely bright light, and it casts a shadow of corresponding intensity, but it is the cheapest for lighting large areas. Incandescent lamps give a soft, steady light, agreeable to the eyes, and are best suited when the eye comes close to the work and require a light to be steady and near. Incandescent lamps are admirably suited for rooms that require a soft, even light, not harmful to the eyes. One arc lamp of 2000-candle power requires the same power as 10 incandescent lamps of 16-candle power. The incandescent lamp does not consume the oxygen in the air, nor heat the same to a perceptible degree. It is perfectly safe to use when there are explosive gases or floating matter in the air, like cotton fibres. It is safe where gas cannot be used. The cost of producing incandescent electric light has been brought to a point where large consumers can produce it for the price of gas at \$1 per thousand feet. At this price it should be used in place of gas, where cost, comfort and safety are concerned. Once used, the wonder will be why the use of it was delayed so long.

Senator Lodge, of Massachusetts, thinks that if the treaty between the United States and Hawaii shall be abrogated, as is proposed by the Wilson bill, the islands will inevitably fall into the possession of Great Britain. Speaking of this subject recently, Senator Lodge said:—"The abrogation of the treaty will not merely deprive us of valuable privileges, but will force the islands into the arms of England. Quite recently the Canadian Minister of Commerce, on his way home from a cable convention in Australia, stopped at Honolulu. He then told the Hawaiian Government that if we abrogated our reciprocity treaty with them Canada would be glad to renew it. The Canadian market is, of course, far from being so valuable as ours, and the people of Hawaii have no desire to connect themselves with Canada; but if we strike down their prosperity by abrogating our treaty, for mere self-preservation, they will do the next best thing and come to an agreement with Canada. Canada, of course, means England, and thus by these amendments to the Wilson bill made by the Democratic members of the Finance Committee, we are throwing away the islands and driving them into the arms of England. This is something which I do not believe the American people would ever tolerate, and which might lead to serious complications."

The Hawley Down Draft Furnace.

The down draft system of combustion has received quite extended consideration recently on account of its peculiarly interesting features. The accompanying illustration of the Hawley down draft furnace will show the manner in which combustion is produced with this system, in such a way as to increase the efficiency of a plant, and at the same time entirely consume all smoke. It is seen by reference to the illustration that the upper grate bars consist of a series of water tubes, opening at both ends with steel drums or heaters. These are connected by pipes to the boiler, and a constant circulation of water passes through the grate bars, making them the equivalent of a small water tube boiler. This, it is claimed, greatly adds to the efficiency, since the tubes are in the hottest part of the flame. The fuel is thrown loosely upon this grating and when partially consumed it is carried between the grate bars by a strong down draft, and falling upon the lower gratings, it meets with an updraft from the lower doors and finishes combustion completely; thus all gases and particles of carbon, which escape unconsumed from the upper flame, are caught by the fire below and wholly consumed. It is this special feature, it is claimed, which gains so much efficiency for the down draft system.

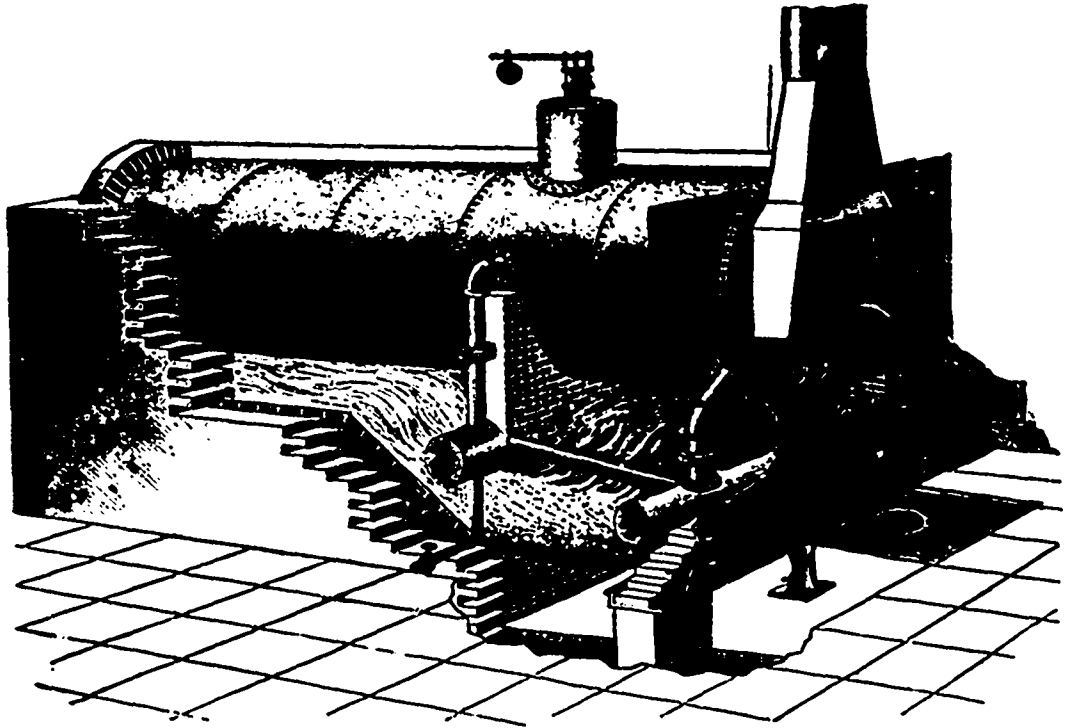
Another feature claimed to be of very great advantage is



the fact that the poorest quality of slack or refuse fuel is consumed with almost as great a rate of evaporation as with coal costing several times as much. Thus great economy is obtained in two ways by an addition to the boiler of a water tube grating, which,

as claimed, increases both the capacity and economy of the plant by almost fifty per cent., and a perfect combustion by which refuse fuel may be burned with high efficiency. No steam jets or other mechanical devices are used, since they are entirely unnecessary and only waste live steam.

Recent exhaustive tests have been made on these furnaces in the Edi-



son stations in Chicago and at the city gas and water works. The reported results as regards economy have been surprising. From thirty to forty-five pounds of coal may be burned per hour upon each square foot of grate surface with an evaporation of ten per cent. more water per pound of coal than is usually obtained. This shows at once both capacity and economy. In every part of the heating surface a uniform temperature over 2,500 degrees Fahrenheit is reached.

It is said that experience has shown that repairs are seldom or never needed, and it is a very easy matter to keep the boiler clean, since all impurities are ejected from the steel drums at the end of the water tube grate bars. The Hawley offices are at 805 to 807 Security Building, Chicago. Lewis Skiffie, New York Life Building, Montreal, is agent for the Dominion of Canada.

Underground Trolley Wires.

An electrical constructing engineer from Milwaukee, Wis., has invented and patented an underground conduit for the use of electric trolley roads, which, it is said, is a solution of the problem of keeping the conduit free from moisture. Many other objectionable features of other plans for underground trolleys are also said to be overcome. It is claimed that the new invention will obviate all danger to pedestrians from electric shocks, as the fluid cannot escape from the conduit to the rails. A return wire is used, and the whole system is so well insulated that there is no danger of leakage to gas or water pipe or to any metallic underground system.

The question of keeping the conduit free from moisture has always been the problem which has vexed and baffled electricians. There has never been a scheme tried which would overcome all atmospheric conditions and keep the damp air from penetrating the conduit and thereby causing a leakage from the wire to the ground. This trouble is said to be overcome.

The conduit is divided into two compartments. The first contains the slot through which the trolley arm passes precisely as in the cable systems. Any cable road can easily be changed to the underground trolley electric system without much expense. The other compartment is made practically air and water tight. It contains the two insulated rails, making a complete circuit, in which the usual amount of power is carried. This department is kept perfectly dry by a continuous blast of cold air, which is forced through by large fans at the power house. The only connection between the compartments is the slot through which an arm from the trolley passes and through which the contact with the rail is gained. The connecting slot is furnished with a self-closing device, which opens as the car approaches and closes as soon as the trolley arm has passed. All the moisture and dirt entering the surface slot is caught in the first compartment.

Openings are made which connect with the sewer at frequent intervals. Each trolley arm is provided with a brush intended to sweep all dirt and water along and deposit it in the sewer openings. Another feature of the invention is a simple device by which the motive power can be taken either from an overhead or underground system. The change requires but a moment, and can be done by the motor-man without leaving his platform. This makes it possible for the underground system to be used in the more crowded parts of a city, and the overhead plan on suburban streets, where it is less objectionable.

A working model of the invention was on exhibition at the Sherman house yesterday. Every detail of the miniature road was complete. The little motor traveled back and forth over a track that had the outward appearance of an ordinary cable road.—Chicago Tribune.

The Sand-Blast in Glass Making.

It is stated that the sand-blast was first used in the glass trade about 20 years ago by Mr. Tilghman, an engineer of Philadelphia, who observed that the surface of glass exposed to a stream of sand thrown against it by an air current in a few minutes becomes perfectly dull. He at once constructed a rotating bellows for producing the air current which was conducted through a perpendicular tube, at the upper end of which the sand was brought into contact with the current. The glass was held over the mouth of the tube at a distance of about an inch, and not more than 20 or 30 seconds were required to dull the surface. In cases where designs or ornamentations had been put on the glass with some elastic substance, as rubber, thick oil paint or papier mache, the sand attacked only the uncovered portions, so that it became possible to produce dull ornaments on a bright background or vice versa.

Tilghman had his invention patented and since the expiration of

his patent the sandblowing machine has undergone considerable improvements, and is now constructed in different sizes to accommodate any class of customers. Sand-blowing machines are used principally for dulling and ornamenting all kinds of hollow and plate glass; also for polishing metal castings and cleaning plates previous to gilding or silvering them, and for engraving wood, metal or stone. The simplest way of protecting that portion of the surface to remain untouched by the sand is to cut the designs out of strong paper and paste them on with glue, which, however, must be carefully done to avoid the formation of blasts. A more rational method is to cut the patterns out of sheet metal, which is especially advisable by plate glass. This method possesses the further advantage that such designs may be used repeatedly, for which purpose they should be covered with a protecting coat, for instance of oil paint, which must be renewed several times.

The French treaty binds Canada to reduce the duties on wines by 30 per cent.; on nuts, plums and prunes by one-third, and on castle soap by one-half. On the basis of the imports of these articles in 1893, as shown by the trade returns, the direct loss to Canada's revenue would be, on champagne and sparkling wines, \$50,350; on non-sparkling wines, \$112,500; on nuts, \$36,200; on plums and prunes, \$4,700, and on soap, \$3,350; a total loss of \$206,980. The loss to France of revenue on the basis of imports of 1892 was stated by Hon G. E. Foster to be \$53,000, or a net balance against Canada of \$153,980 in round figures.

Draft.

One of the most important features of a boiler plant, and one which is overlooked as often as any, is the chimney.

Some people seem to think that almost anything in the way of size and height will do for a chimney, and this is especially noticeable in the smaller plants. Of course, when a man is constructing a new plant nowadays, he has someone who knows about such matters, figure out his whole steam system, but the trouble comes when a man who has had his mill built for several years and finds it necessary to enlarge. He builds on wing after wing, puts in more and more machinery, finds his engine too small and buys a larger one, or perhaps two; then, finding his boiler plant too small, enlarges it by adding, perhaps, double the number of boilers or more, but the chimney is not thought of. The same chimney which has done duty for years when the plant was smaller, is supposed to do the same now that it is doubled or more. In other words, he expects that a hole one foot square will, without enlarging, do the work, or accommodate the same quantity, as one double the size would be intended for, and what is the result? In the first place, the fireman may come to an untimely end worrying because his fires will not burn, or his boilers steam, and he is kept raking, cleaning and fussing with his fires.

But this is not all; coal that should be all consumed is only partially burned, and the rest is rattled through into the ashpit, while more is thrown on the fire to try and make up for what has been lost. Any one can see where the loss of money comes in, so far as coal is concerned. It is also well known that a good, clear, free draft means economy in fuel. But why do they stick to the old chimney? Simply because it is there, and to construct a new one means expense for the time being.

Another idea which seems to pervade the minds of some people is that a chimney is simply an arrangement to carry smoke away from a building; and so far as other work for a chimney is concerned, they think nothing about it, and would as soon have a pipe lead directly from their furnace out through the side of the building as any other way except that it is the fashion to have the smoke-stack stick up in the air.

One of the latter sort of men is Mr. S., who, strange to say, owns a large number of steam plants which, very fortunately, are under the charge of a chief engineer who, though, at times has his hands full in trying to keep his employer from making too bad blunders, but a few years ago he had occasion to erect a large barn on one of his estates and put in a 35 horse-power boiler; he had a chimney of ordinary size constructed, but when completed was several feet below the top of the barn. It was suggested to the owner that the draft might be better when the wind was in a certain quarter if the chimney was built above the roof, but all to no use. The owner declared that the chimney was "just as good as though 50 feet above the roof," and there it stands to-day, a monument to his stupidity.

A chimney really determines the quantity of fuel that may be burnt per hour, the quantity varying with the kind of fuel and depending somewhat upon atmospheric conditions. Its office is to remove waste gases whose quantity varies but little, whether smoke be with them or not, also to supply air enough to oxydize all fuel.

Draft is simply the difference in weight between a column of hot or light gas in the chimney and a column of air outside of the same height and area. The greater the draft, the greater the speed of the spent gas leaving and fresh air entering the furnace; and, consequently, the greater the quantity of fuel which the same chimney area will burn.

You will note I say burn, or consume might be a better word. Now for every pound of coal burned so much steam should be made, and if your draft is good, then your steam is made easier or with greater economy. Now do not distort this into meaning that the greater the draft the more coal will be burned to make a given quantity of steam, for just the reverse is true, and the greater the draft

the more steam you can make to a given point, and the fact that the coal is burned and not wasted is where the saving lies.

The draft depends upon the height and temperature of the column of waste gas, and may be increased by either building the chimney higher or allowing the waste gas to escape into the chimney at a higher temperature, as of course the higher the temperature the greater the difference in weight between it and the outside air; but to allow the gas to reach the chimney at a high temperature is very wasteful, as every degree of heat carried to the chimney means so much heat lost to making steam.

The larger the chimney of course one would think the less height would be necessary, but this is true only in a measure, or it would do away with building chimneys altogether, by just removing the boiler house roof or building a house without a roof.

The nature of the fuel should be always taken into consideration when building a chimney for the reason that the air must be brought into close contact with all the particles of fuel.

The frictional resistance to the passage of air through a bed of solid fuel of any kind, increases as the size of the pieces grows smaller. Consequently a sharper draft is required for sawdust than for cord-wood, for screenings than for pea or furnace coal. On the other hand the smaller the grain of the fuel the more surface is presented to the oxidizing action of the air and the more uniform the combustion. For this reason many firemen break their lump coal before throwing it into the furnace.

Build your chimney of the right size and height to give you a good strong draft, as it will give you a much more even one and not the variation occasioned by gusts of wind that a small or sluggish one will. The sluggish draft is sure to be seen where the fireman complains that when the wind blows from certain points of the compass he "cannot make his fire burn."

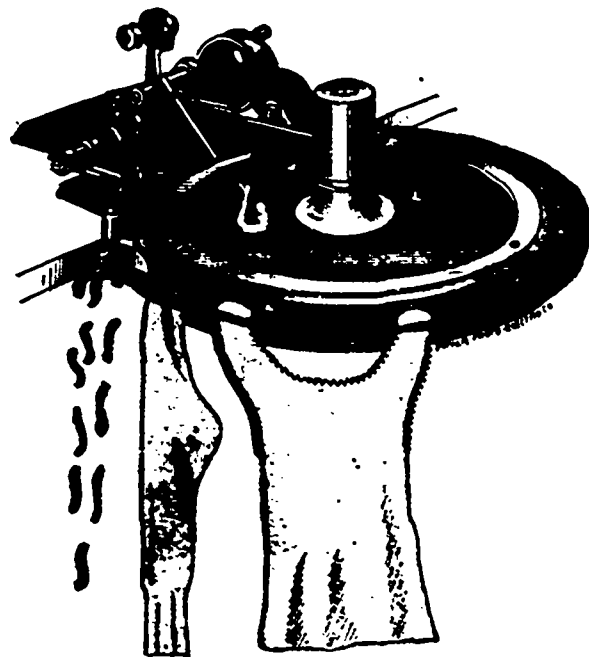
Many employ a forced draft introduced into the ash-pit by blowers of different kinds. This should be used only where the natural draft is not strong enough, and it never replaces a tall chimney for combustion, is never as perfect under pressure as under a slight vacuum, and excessive forced blast which more than counterbalances the draft of the chimney, causes a loss by leakage through furnace wall or doors.

It has always been admitted that it is very hard to improve upon nature, and this is true in the way of furnace draft as in anything else.

Another point that should be observed is to have your flues as free from short turns as possible, for as abrupt turns or contractions of area obstruct the flow of liquids, the same will be the case with your chimney draft.

The Rightmire Looper, Raveler and Trimmer.

The accompanying illustration is of the Rightmire looper, raveler and trimmer, combined, manufactured by the American Knitting Mills Supply Co., 523 Arch St., Philadelphia, Penna. Every manufacturer of hosiery and underwear readily appreciates the importance of a good raveler as a labor saver, and particularly of hand labor. This is one of the machines that dispenses with hand labor to a vast extent, and especially when experienced help is hard to secure.



RIGHTMIRE'S LOOPER, RAVELER.

Manufacturers who are using the machine claim that from one to three cents can be saved on shoulders, and from one to four cents on sleeves, while on "borders" there is a saving of from three to six cents. On hosiery the saving is from one to three cents per dozen.

The raveler is simple and substantial in construction, easily oper-

ated, and all parts are absolutely interchangeable. An operator of ordinary intelligence can work the machine successfully without any instructions, as the raveler is thoroughly automatic in all its operations, and is adapted to all grades of knit goods, fine or coarse. Great care has been exercised in perfecting it, and no expense has been spared to place it among the best.

There are now quite a large number of them in use, all of which are giving entire satisfaction. The manufacturers of it claim that it has no superior as a production increaser and a labor reducer, and the price at which it is sold enables every manufacturer of hosiery and underwear to introduce it in his mill to investigate its merits for himself. The increased production is given at from eight to fifteen dozen per day, according to the gauge of goods. The raveler is so constructed that it does not come in contact with the looper points or working parts, and it is so positive in all its operations, that it does not matter whether the operator runs the work on straight or varies a few courses.

This company also manufacture the celebrated Excelsior semi-automatic seamless knitting machine, a high spliced heel made on it being herewith illustrated. The cut shows a 160-needle half-hose.



HIGH SPLICED HEEL AND ROUND TOE.

After each stocking is finished the needles are raised and lowered, automatically, in knitting the heel and toe. Address all communications for prices, samples and full particulars to the American Knitting Mills Supply Co.

In connection with the Excelsior semi-automatic seamless knitting machine the American Knitting Mills Supply Co. are also placing on the market a patented device consisting of a desirable elastic stitch looping machine, which obviates the breaking of the threads of looping across the toe of the sock or stocking. This has been a point of great annoyance in the past, especially in fast black dyes, where, when the goods are pulled on the thread form or shaped for wet goods, the looping usually breaks. This device is now being used by some of the most prominent manufacturers throughout the United States and Canada.

The claim is made for this device that the single stitch looper will give the greater elasticity. Hosiery and underwear manufacturers would do well to make a thorough investigation of the advantages and results which are obtained by the use of the elastic stitch device. The builders claim it is a great benefit both to the operator as well as the manufacturer. All drop stitches are obviated, thereby reducing the seconds at least seventy-five per cent. The device, we understand, can be applied to any make of looper. The device can be seen in operation at the office of the American Knitting Mills Supply Co., 523 Arch street, Philadelphia, to whom all correspondence should be addressed for samples, prices, etc.

This company also make a specialty of forged steel cylinders for any make of seamless knitting machines, also cylinders and dials for all makes of rib knitting machinery. They guarantee all of their work, and report they have made over 300 different cylinders since January 1, 1894. This is strong evidence that their cylinders and dials have met with flattering success. They have been running their shop overtime for the past six months in order to catch up with the demand.

The heel and toe can be made larger or smaller as desired, and one operator can make eight and nine dozen per day on each of these machines.

The goods made on the Excelsior semi-automatic knitter are a perfect size and fit, equal, the builders claim, to a full fashioned stocking or sock. They are knit uniformly and with close gores in the heels and toes. The builders use nothing in its construction but the best forged steel, and the cylinders used have the hevel top for perfecting the stitch. By this device, it is claimed, menders and seconds are reduced to a minimum.

This machine has many improvements and affords some valuable advantages. The clamp is made of a solid ring, which holds the needle cylinder perfectly firm and obviates all danger of being higher on one side than on the other. The stitch regulating device is controlled by an eccentric, making it positive and bringing the needle cylinder perfectly even and level, thereby avoiding all uneven knitting in the heels and toes.

The stop motion is one of the most complete ever invented; it is automatically returnable.

The imports of sugar into the United States during the fiscal year 1893 reached a value of \$102,108,537, Cuba sent \$60,637,631 of this amount; Puerto Rico, \$3,227,522; Germany, \$9,475,615; Brazil \$2,054,201, and(?) the British West Indies, \$9,487,434. All these countries have reciprocity arrangements with the United States, and if those arrangements continue in force, and their sugar remains free of duty, the amount subject to duty under the tariff bill will be about 15 per cent. of the gross imports.

CAPTAINS OF INDUSTRY

This department of the Canadian Manufacturer is considered of special value to our readers because of the information contained therein. With a view to sustaining its interesting features, friends are invited to contribute any items of information coming to their knowledge regarding any Canadian manufacturing enterprises. Be concise and explicit. State facts clearly, giving correct name and address of person or firm alluded to, and nature of business.

Mr. S. M. Wharton is building a saw mill at New Denver, B. C.

The granite quarry at Eels creek, Stony lake, Ont., has begun operations.

Mr. J. S. Harris is the chief mover in the matter of the electric railway for Moncton, N. B.

A lighthouse and range lights are to be erected on the eastern end of Toronto Island this spring.

Bailey & Sparks saw mill, at Vancouver, B. C., was destroyed by fire, April 7, loss about \$2,000.

The engine and machinery for the Edmonton (Alta) cheese factory is now on the way to its destination.

Abram McFarlane and Isaac Steeves have both got their saw mills running at Dawson Settlement, N. B.

Considerable enlargement is about being made to the factory of the Woodstock, N. B., Woolen Mills Co.

The Renfrew Creamery Company, Renfrew, Ont., are applying for incorporation with a capital stock of \$100,000.

Napanee Paper and Pulp Company, Napanee, Ont., are applying for incorporation with a capital stock of \$90,000.

D. Graham & Son, Inglewood, Ont., are building a new dyeing room and making other improvements to their knitting mills.

The town council of Knowlton, Que., are advertising for some manufacturing concern to establish works there. The town would assist.

The engine and boiler have been placed in position in the Ledyard mine in Belmont, Ont., and the crusher and other machinery will arrive this week.

The woolen mill at Bridgewater, Ont., recently purchased by Mr. D. Allport, of Smith's Falls, was burned a few days ago. The loss is estimated at \$1,400.

Tenders will soon be asked for the construction of both iron and wooden bridges over the Assiniboine river at Maryland, Man., estimated cost \$22,000 and \$15,000 respectively.

The steamer Greyhound has been sold by Messrs. Gooderham to Mr. Cooper, of Belleville, for \$13,000. Capt. Van Vlack is to have command of her this summer and she is to ply on the Bay of Quinte route.

At a meeting of the Campbellton, N.B., town council held lately, it was decided to grant ten years exemption of taxes to the company that offered to put in a system of water works. They had asked for exemption for twenty-five years, but it is thought they will accept ten years.

The Bertram Engine Works, Toronto, are pushing the work of putting a new Scotch-type boiler into the steamer A. J. Tyron. Capt. McSherry claims that it is one of the finest of the kind in Canada. This season the Tyron is to ply on Lake Eric, between Buffalo, Crystal Beach and Port Colborne, Ont.

The T. Eaton Co., Toronto, have placed an order with the Royal Electric Company for another 45 K.W. direct current dynamo for use in the new addition to their establishment. This makes 1,300 incandescent light capacity of the Royal Electric Co.'s apparatus in the T. Eaton Co.'s place besides one 50-light and two 35-light arc dynamoes.

The foreign coal shipments from British Columbia during the month of March, 1894, and also during corresponding month in 1893, were as follows:

	1894	1893
	TONS.	TONS.
COLLIERY.		
New Vancouver Coal Co.....	25,415	32,607
Wellington.....	23,660	22,130
East Wellington.....	—	3,445
Union.....	21,408	7,688
Total.....	70,483	65,870

R. J. Blackwell, has started a foundry at Wingham, Ont.
 T. W. Birks & Co., London, Ont., have started a shoddy mill.
 Mr. Geo Wilson, Durham, Ont., will put roller choppers in his mill.
 W. J. Reed, Reedsville, Ont., is making improvements to his flour mill.

Gemmell & Son., Perth, Ont., will add more machinery to their woolen mill.

The Montreal Canning Co., has secured a site for a cannery on Sea Island, B.C.

The Etna mills, Tavistock, Ont., recently destroyed by fire, will be rebuilt at once.

Gillies, Son & Co., Carleton Place, Ont., are making some repairs in their woolen mill.

The machinery is now being put into S. V. Clutton's new woolen mill at Vienna, Ont.

Waterloo Woolen Co., Waterloo, Ont., have just put a new steam engine into their factory.

An effort is being made to re-organize the St. Thomas Pipe and Foundry Co., St. Thomas, Ont.,

The electors of Victoria, B. C., have passed a by-law to borrow \$55,000 for electric street lighting purposes.

Nie & Whitfield, Hamilton, Ont., are building some very heavy mangles for the Parisian Steam Laundry's new branch at Hamilton, Ont.

Wellington Coal Company, Nanaimo, B.C., have ordered an electric mining locomotive for their mines, from the Royal Electric Co., Montreal.

The Brooks Woolen Co., Simcoe, Ont., are to put in their mill three looms to replace old ones. This is a 3-set mill, running on tweeds, blankets, etc.

Mr. R. Schofield, Guelph, Ont., is contemplating buying the old Lowrie flour mill at Port Dalhousie, Ont., and converting it into a knitting factory.

A portable saw mill, from the Waterous Engine works, has been set to work on John C. Fraser's claim in the edge of the Beaver hills, near Edmonton, Alberta.

Prescott, Ont., town council has decided that a new fire engine be bought, together with a hook and ladder truck and a patent heater, the whole at an expenditure of \$4,500.

Winnipeg City Council are discussing the advisability of selling out their Water Works system to an English syndicate who would also develop the Assiniboine water power.

Great smelting works at Sudbury are projected. The Dominion Coal Company of Nova Scotia and the Canadian Pacific railroad, it is rumored, are identified with the enterprise.

The village Council of Portsmouth, Ont., has granted a franchise for forty years to the Kingston, Portsmouth & Catarqui Company, for the construction of an electric railway on the streets of the said village.

A carload of machinery has arrived at Rat Portage, Ont., for the Sultana mine. It comprised a boiler, steam hoist and air compressor, being a complete outfit for deep mining, which will be put in position as speedily as possible.

The city taxpayers of Vernon, B.C. will shortly be asked to vote on a by-law, authorizing payment of a bonus of \$5,000 in respect of the establishment of a local flour mill and conferring a two years' exclusive right of the supply of electric lighting to the city, in connection with the running of the mill.

The Shownigan Lake Lumber Co., succeeds the unincorporated company of that name. Their yards are at Victoria and at Wellington. Wm. Munsie, T. Elford, John W. Coburn, Andrew Haslem and Lewis Mounts are the directors, and the saw mills of the company, whose capital stock is \$100,000, are at Shownigan lake.

A franchise has been granted to Mr. W. R. Hitchcock to build and operate an electric railway at Cornwall, Ont. The franchise provides for the construction of the road, to carry both passengers and freight, to the canal, and the entire length of Second street, with spur lines to the cotton and paper mills, a total distance of about four miles. It is the intention to utilize the water power at Sheik's Island Dam. The Westinghouse system will be employed. The town council have agreed to exempt from taxation for a period of ten years, the plant and income of the company.

Messrs. John Starr, Son & Co., Halifax, N.S., have sent us an illustrated circular having reference to their "Starr" incandescent electric lamps, regarding which they say:—"The "Starr" lamps are made of any candle-power and voltage, and with basis to suit the different sockets in use. The quality of these lamps is unsurpassed and users of lamps will find it greatly to their interest to give them a trial. They have a long life, give out full-rate candle-power, and do not blacken. We have recently gotten up new bases which are very superior. These lamps are packed in an improved manner, each lamp being done up in a separate package with particulars stamped on outside. This renders them most convenient to handle, and avoids breakage; they can also be packed in smaller compass. Quotations given on application, stating candle-power, voltage, base and quantity wanted.

\$5,000 will be spent in fire appliances in Prescott, Ont.

Joseph Bean has started a foundry at Calgary, N.W.T.

A brewery has been started at Nelson, B.C., by Alexander Wills. Work has been commenced on the Lacey asbestos mine near Kazubazua, Que.

Capt. Williams has purchased the Melbourne (Que.) state quarry and will work it.

Horn & Sons, Lindsay, Ont., are making improvements and repairs in their woolen mill.

Mr. John Goldie, of Ayr, Ont., has purchased the flour mill at Highgate, Ont., for \$11,000.

Fawcett's sash and door factory at Strathroy, Ont., was destroyed by fire, April 29, loss about \$3,000.

A steel bridge is to be built over the river at Mimico, Ont., J. D. Evans, Islington, Ont., is asking for tenders.

The stock of the Bishop Furniture Company at Winnipeg, Man., was damaged by fire April 29 to the extent of \$4,000.

The lumber yards of the Ontario and Western Lumber Company, at Rat Portage, Man., were totally destroyed by fire on April 28. Loss \$125,000.

The Wilson Fire Extinguisher Company, of Toronto, are applying for incorporation with a capital stock of \$24,000 to manufacture fire extinguishers, etc.

Tenders will be received until May 27th for iron and wood superstructure for the Maryland Sheet Bridge, Winnipeg. H. N. Rutan, city engineer, will furnish information.

The Crown Pressed Brick Company is seeking incorporation with a capital stock of \$100,000 with head offices at Ottawa to manufacture brick, drain tiles, terra cotta ware, etc.

The Ontario Pure Food Company, of St. Catharines, Ont., are applying for incorporation with a capital stock of \$25,000 to preserve fruits, vegetables, meats, etc., by canning, etc.

It is reported that Mr. Hector Cameron was successful in England, in arranging for the building of the Cobourg, Northumberland and Pacific Ry., and work upon it will be commenced at an early date.

The Napanee Paper and Pulp Co., with headquarters at Napanee, Ont., is being incorporated with a capital stock of \$90,000 to manufacture paper, pulp, lumber, etc. A. W. Dingman, Wm. Burgoyne and Thomas E. Anderson are to be the first directors.

Mr. T. A. Code, manufacturer of socks, mitts, etc., at Perth, Ont., is making a large addition to his factory. It will be 50x40 feet, three stories high, the foundations of which are already laid. Considerable new machinery will be introduced, which, we learn, has not yet been purchased.

The Marmora Mining and Milling Co., with chief place of business at Toronto, is being incorporated with a capital stock of \$24,000 to take over and operate the reduction mill plant and machinery of the Hastings Mining and Reduction Company at Marmora, Ont., and for other similar purposes.

The Niagara River Tramway Co., Niagara Falls, Ont., are applying for incorporation with a capital stock of \$40,000. Joseph Fitt, John Flett, both of Toronto, L. C. Raymond, of Welland, R. N. Campbell, Niagara Falls, N.Y., and George W. Pound, of Lockport, N.Y., are the promoters.

The Imperial Writing Machine Company, of Montreal, are applying for incorporation with a capital stock of \$400,000. The applicants who are to be the provisional directors are Hon. Geo. A. Drummond, senator; Sir Donald Alexander Smith, K.C.M.G.; James Ross, High McLennan, all of Montreal; Hon. Charles C. Colby, Boston, Mass., and Clement B. Smyth, Wilmington, Del.

It is reported that C. F. Law, who was commissioner at the World's Fair from British Columbia, has discovered somewhere in the interior of the province an extensive bed of kainite. When in Victoria Mr. Law told several persons about his find, but declined to say where it was located. This is considered a very valuable find, the only other place where it exists in abundance being in the neighborhood of the Strasbourg, Germany, salt mines. The crude kainite is used largely for fertilizing, and it is also used extensively in the manufacture of other acids and drugs. Several million dollars worth of it is annually exported from Strasbourg.—Winnipeg Free Press.

The Mission City, B.C., News, in a recent issue has the following to say regarding the nickel properties in that vicinity:—"Once more the nickel mines within two miles of Mission City, B. C., have begun to be operated. So much work must be done every year. Last year much more work was done than the law required. The owners paid no attention to the limited demand of the law, but worked on until they had used all the money in their possession, and now they have started operations again just as soon as the weather has been in any way favorable. The shaft is now down fifty feet, and within the last few days it has gone through some material changes. The ore is now of a much finer grade than heretofore. There is some silver and quartz appearing in larger quantities in the present depth than was seen before. The assay of nickel last summer amounted to forty-five and add to that the strong indications of increased gold quartz and cobalt, and you have something worth working for."

W.H. Casement, Lakesfield, Ont., will sell out his woolen mill.
Messrs. Hodgins & Co., London, Ont., will build a creamery at Bothwell, Ont.

An iron girder bridge is to be built over the Bonnehere river in the village of Renfrew, Ont.

The capital stock of the Otterville Mfg. Co., Otterville, Ont., is to be increased from \$3,000 to \$10,000.

The Deloraine Dairy Company, Deloraine, Man., are applying for incorporation with a stock capital of \$1,000.

T. Humphrey's, Allandale, flour and oatmeal mill, near Keene, Ont., was destroyed by fire April 23, loss about \$5,000.

Richardson & Son's lumber mills at Bedford, N. S., near Halifax, were destroyed by fire April 21, loss about \$10,000.

Two saw milling outfits for Newfoundland have recently been ordered from the Robb Engineering Co., of Amherst N.S.

E. B. Doliffe's sash and door factory at Fitch Bay, near Georgeville, Que., was destroyed by fire April 24, loss about \$7,000.

The Palmer Pneumatic Tire Co., of Toronto, has been incorporated with a capital stock of \$10,000 to manufacture bicycle tires, etc.

The Toronto Upholstering Co., has been incorporated with a capital stock of \$24,000 to manufacture furniture and upholsterers' goods, etc.

Work has been commenced on a large addition to the stove fitting department of the James Smart Manufacturing Co.'s works, at Brockville, Ont.

The J.C. McLaren Belting Co. have moved their Toronto office to 22 Front St. east. Messrs. Craig and MacArthur are their representatives.

The Ontario Sewer Pipe Company have been incorporated to take over the plant and property of the sewer pipe and brick works at Mimico, Ont.

The Fenelon Falls, Ont., Electric Light Co., has been incorporated with a capital stock of \$3,000 to supply electric current for commercial purposes.

The Northwestern Cordage Company, of St. Paul, Minn., are said to be making arrangements to start a binder twine and rope factory at Winnipeg, Man.

Wellington Coal Company, Nanaimo, B. C., have given an order to the Royal Electric Company, Montreal, for an electric mining locomotive to be used in their mines.

Cook Brothers, Hensall, Ont., will install a 350 light alternating dynamo for lighting the town. The contract for electric apparatus has been placed with the Royal Electric Co., Montreal.

The Haworth Belting Co., Toronto, have recently supplied their excellent oak-tanned leather belting to the Winnipeg, Man., Electric Railway Co., as follows:—One 42 inch belt, two 24 inch, two 16 inch and two 20 inch.

The town council of Collingwood, Ont., have voted to have an electric fire alarm placed throughout the whole town, and power was at once given to the council to close the contract with a Toronto firm for putting in the service.

E. Methot, Cap St. Ignace, Que., has enlarged his woolen mill and added one set cards, five looms, one self operator, one Hardy's grinder and other machinery, all of which were supplied by the Paul Frind Woolen Machinery Co., Toronto.

The Robb Engineering Co., Amherst, N. S., recently installed one of their 250 h.p. Robb-Armstrong steam engines in the power house of the Sandwich, Windsor & Amherstburg Railway Co., at Windsor, Ont., which is giving excellent satisfaction. It supplies power for both the railway and electric lighting plants.

There is something very peculiar in connection with the surface gas wells in Ridgetown, Ont. The supply is said to be affected by the wind. When the wind is strong from the north, the supply is in part or wholly cut off, but when from the south, the flow is full and strong. It is a phenomenon hitherto unheard of in gas regions.

Thos. Down & Co., Toronto, report sales of the Rehem duplex steam trap to the following firms: Worstend and Braid Co., Toronto Junction; Gooderham & Worts, Toronto; Hiram Walker & Co., Walkerville, Ont.; R. Parker & Co., Toronto; Breithaupt & Co., Penetanguishene, Ont.; Toronto Street Ry.; Montreal Cotton Co., Valleyfield, Que.

The Royal Oil Co., of Canada, are sending out a handsome circular to the leather manufacturers, of Canada, in which they announce that they have been appointed agents for the Tanners and Dryers' Extract Co., of Charleston, West Virginia, U. S., who, they assert, are the only manufacturers of Refined Extracts free from all gummy and resinous matter. They mention the following specialties:—Chestnut Oak Bark Extract, Chestnut Wood Extract and Sumac Extract. These extracts are used by the leading manufacturers in the United States, as well as by many of the large tanners in Canada. The Royal Oil Co. carry a full line of these goods in Toronto, and will be pleased to receive sample orders as they are confident tanners will continue to use them after a trial. A hemlock tanned leather can be finished with oak bark extract giving it an oak tan finish, thus rendering it much brighter and more marketable. A formula used in tanning sole leather will be sent to those desiring it.

Montreal Water Works are about to put in new turbine and pumps. Dyson & Webb have started a woolen factory at Smith's Falls, Ont.

Yarmouth, N.S., will expend \$60,000 in extending their water works system.

Messrs. Clendinning & Sons new works at St. Henri, Montreal, are nearly completed.

Mr. Routh's new woolen mill at Campbellford, Ont., is nearly ready for the machinery.

R. J. Graham, of Belleville, Ont., is starting a fruit evaporating plant at Stirling, Ont.

G. S. McFarlane, Ottawa, intends opening up some new mining property at an early date.

The Dominion Gas and Electric Company, of Winnipeg, Man., are about to apply for incorporation.

The corporation of Norwich, Ont., will call for tenders for the construction of an iron bridge in that town.

It is estimated that the beet sugar factories of Germany will consume 10,450,000 tons of sugar beets this year.

The Northwestern Cordage Company, St. Paul, Minn., are thinking of starting a binder twine and rope factory at Winnipeg, Man.

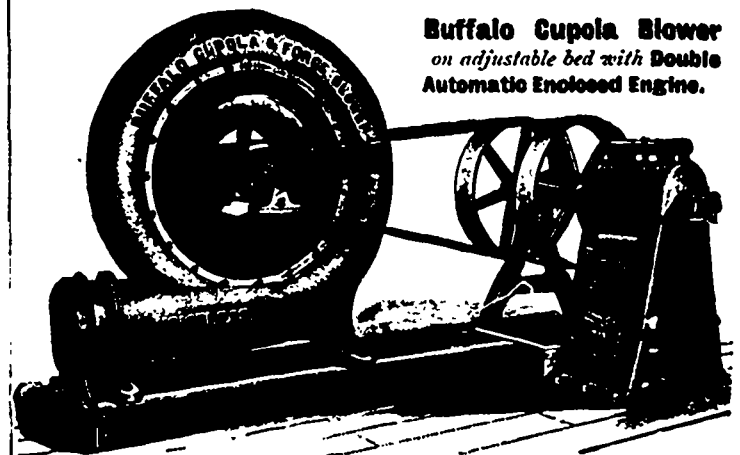
Mr. R. S. Fraser, Montreal, has just supplied a new Platt mule, 260 spindles to the woolen mill of Messrs. R. Gemmill & Son, Perth, Ont.

The Otterville, Ont. Brick and Tile Mfg. Co., has been incorporated with a capital stock of \$5,000 to manufacture bricks, tiles, terra cotta ware, etc.

Northey, Limited, Toronto, manufacturer of pumping machinery, etc., will establish a branch house in Montreal for the sale of their products and for the greater accommodation of their customers and friends.

The Citizens' Gas Control Co., Montreal, is being incorporated with a capital stock of \$62,500, to manufacture governors and other appliances for regulating the pressure of gas, etc. Messrs. F. C. Henshaw, F. E. Nelson, J. A. Taylor, J. T. Hagar and William Stracian are the promoters.

The Colonial Telegraph and Telephone Co., of Niagara Falls, Ont., is being incorporated with a capital stock of \$25,000 to conduct a business indicated by its name. Messrs. Jacob Dicher, of Buffalo, N. Y., James Bampfield, of Niagara Falls, Ont. and James F. Cleary, of Troy, N. Y., are incorporators.



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on adjustable bed with Double
Automatic Enclosed Engine.

**Buffalo Dry-Kilns, Shaving Fans, Forges,
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smith Drills, Etc.**

Are described in Sectional Catalogue FREE on application.

**Their Efficiency, Smooth Running, and
Durability are Unsurpassed**

BUFFALO FORGE CO., Buffalo, N. Y., U.S.A.

The Robb Engineering Co., of Amherst, N.S., have been awarded a contract by the Dominion Government for two steel bell buoys to be placed on the Atlantic coast.

A new flume is being put in the Harrison woolen mill at Owen Sound, Ont. Other alterations and improvements are being made and some new looms and cards are being added.

There is a well authenticated rumor going the rounds of the grain dealers' circle to the effect that a 2,000-barrel flour mill will shortly be erected in the city, and that a local miller will have complete control.—Winnipeg Free Press.

The Wood Vulcanizing Company, Montreal, Que., are applying for incorporation with a capital stock of \$75,000. The provisional directors are Henry L. Rutherford, Wm. J. White, and Arthur W.P. Buchanan, all of Montreal, Que.

The Crown Pressed Brick Co., of Ottawa, Ont., are applying for incorporation; capital stock, \$100,000. G. W. McCullough, H. L. Corbell, J. G. B. Butterworth, all of Ottawa, and Henry Mills, of Ormstown, Que., are the provisional directors.

The Robb Engineering Co. of Amherst, N.S., are building a number of large Lancashire boilers for the Canada Coal and Railway Co. These boilers are constructed according to the latest English specification with galloway tubes.

Messrs. David Goldie, John Goldie, George E. Goldie and Robert Neilson, of Ayr, Ont., and Hugh McCulloch, sr., of Galt, Ont., are applying for incorporation as the Goldie Milling Company with a capital stock of \$180,000 to take over and continue the Milling business now being conducted by David Goldie at Ayr.

W. B. Southgate & Co., have opened an office at 146 Franklin street, Boston, and will act as general manufacturers' agents and dealers in electrical specialties. Mr. Southgate was for years with the Gould & Watson Co., and later with the Whitney Electrical Instrument Co., and has many friends in the electrical business.

Mr. Robert S. Fraser, Montreal, supplied all the Tetlow card clothing required in re-clothing the cards in the mills of the Yarmouth, N.S., Woolen Co. This company have recently made considerable improvement in their plant in the way of rebuilding their dye house and washing and fulling mills, and the addition of new machinery.

The Baltimore Coal Mining and Railway Co., are seeking incorporation in Nova Scotia with a capital stock of \$300,000 with head office at Hillsborough, N.S. Among the incorporators are Charles Archibald, Blowers Archibald, William F. Wortman, Frederic Steeves, Warren Taylor and Francis Ritchie. Power is asked to construct and operate a railway from near Baltimore mines to some point of shipment on the Petitcodiac river. It is asked to exempt the property from taxation for 10 years, and power is asked to issue bonds to the extent of \$10,000 per mile of the railway. The object of the company is to develop the coal mines at Baltimore.

Munro Bros., wire workers, New Glasgow, N. S., have received the contract for cushioning St. James' Church, Dartmouth, N.S., with their patent church seat cushions. They have also about completed their contract with the I.C.R for 750 railway poles.

Messrs. Darling Bros., Montreal, inform us that they are now supplying power elevators to the warehouses of the following parties: Messrs. George May & Son, Ottawa, and F.C. Denesha, Morrisburg, Ont.; a Webster oil extractor to Connell Bros., Woodstock, N. B., and Morse valve reseating machines to Price Bros. & Co., city of Quebec, and J. Harrison & Co., St. John, N.B.

The Windsor, Sandwich and Amherstburg Railway is one of the best equipped and conducted electric railways in Canada. The policy of the company apparently has been to procure the best cars and equipment that it was possible to get. Among other recent additions to the plant they have purchased from the Robb Engineering Co., of Amherst, N.S. two of the Robb-Armstrong special railway engines—200 to 250 H.P. each—one of which has been installed and is driving the railway dynamo and a new 2,000 light alternating machine recently supplied by the Canadian General Electric Co. The regulation of this engine is so perfect that there is no perceptible variation in the incandescent lights although the variations of the railway load are sudden and heavy, and a considerable saving in fuel is being made compared with the engines previously used.

Norton Emery and Corundum Wheels.



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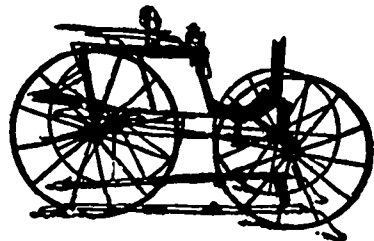
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Roomy and Stylish. Finished in Oak Grain. Natural Wood or Painted.

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J. B. Armstrong Manufacturing Co., Ltd.
Guelph, Canada.

The Pearce Co.'s woolen mill, at Marmora, Ont., which has been idle for some time, has been taken over by Mr. D. Mitchell, who will operate it.

T. Partelow Mott, who owns a knitting factory in St. John, N. B., has purchased the entire plant of the Moncton Knitting factory, and will remove it to St. John, N. B.

The Robb Engineering Co., Amherst, N. S., are building a complete outfit for David Wheaton's new saw mill, at Midgie, N. S., including a Robb-Armstrong engine, Monarch boiler, Perfection rotary mill, etc.

At the request of the City Council, the City Engineer of Toronto has handed in a report on the cost of a single track electric railway from Hurlan's to Ward's on Toronto Island. It is estimated that to construct a single track on the west and south shores of the Island and equip the same with four motor cars and four trailers would cost \$50,000, and the cost of operation would be \$50 per day.

The incandescent electric lighting plant installed by The Royal Electric Co., for W.D. Murray, at Aurora, Ont., was started up April 10. The equipment consists of a 35 h.p. high speed Automatic Leonard Ball engine and a 40 h.p. return tubular steel boiler with the necessary pump injectors, etc., a "Royal" 24 k. w. alternator with exciter, etc., complete. The electric portion is peculiar, as, from the one dynamo, the incandescent light for stores etc., are run, also a series circuit of 23-32 c. p. lamps on the streets, and two alternating arc lamps for street lighting. This is a new departure in electric lighting practice and the flexibility of the system should commend itself to every central station or to those who contemplate putting in electric lighting plants. The engine used is one of the prize winners of E. Leonard & Sons at the World's Fair and is a beauty. The station is 30x40 solid brick and specially fitted up for electric lighting purposes and reflects great credit on the Royal Electric Co. and their expert, H. Harper, who had charge of the work.

The saw mill of Messrs. R. Grant and L. Mounce, at Wellington, B. C., has passed into the control of the Shawingau Lake Lumber Co., that province.

The authorities of St. Catharines, Ont., will grant a bonus to Messrs. Gates & Co., who propose removing their carpet factory to that place from Woodstock, Ont.

Charles Raymond is letting the contract for a large addition to his already extensive works. His present accommodation is not sufficient for his largely increasing business. This will make room for further employment of labor and facilitate the output of the factories. This is the third addition Mr. Raymond has found necessary during the last two years, and speaks well for the success of the business.—
Guelph Mercury.

**GAUTIER STEEL DEPARTMENT OF CAMBRIA IRON CO.
JOHNSTOWN, PA.**

Manufacturers of

MERCHANT BAR STEEL . . .

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, Etc.

AGRICULTURAL STEEL AND SHAPES . . .

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, Etc.

PLOW STEEL . . .

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, Etc.

COLD ROLLED STEEL SHAFTING.

STEEL HARROW DISCS.

: : Cambria Link Barb Wire. : :

New York Office,
102 Chambers St.

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Chicago Office,
209 Phenix Building.

Southern Office,
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E. LEONARD & SONS

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MANUFACTURERS OF

ENGINES AND BOILERS

(NEW DESIGNS)

STEAM PLANTS EQUIPPED FOR ALL PURPOSES

Highest Economy, Regulation Perfect. Send for Circular. Interviews Desired.

THOS NOPPER, - - - Sales Agent

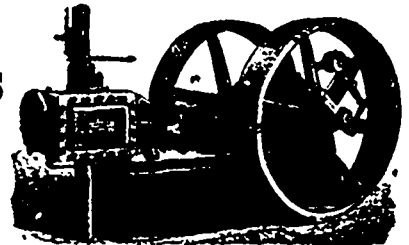
79 YORK STREET, TORONTO, ONT.

High Grade Power Plants

Robb-Armstrong
Automatic Engines

Simple and Compound

Built on the American
Interchangeable System.



Robb Engineering Co., Ltd., Amherst, N. S.

Armington & Sims

AUTOMATIC HIGH SPEED ENGINES

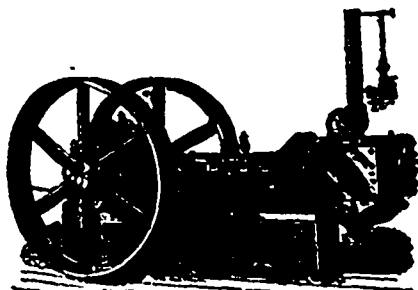
—FOR—
ELECTRIC LIGHTING

—AND—
GENERAL FACTORY
PURPOSES

Perfect Regulation and
Highest Economy.

Steam Pumps
SHAFTING, PULLEYS

—AND—
General Machinery



Nie & Whitfield - HAMILTON, ONT.

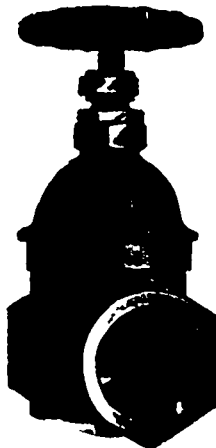
THE WEBBER PATENT

Straitway Valve

FOR

STEAM, WATER OR GAS

EVERY VALVE TESTED



THE KERR ENGINE CO. (LTD.)

WALKERVILLE, ONT.

Solo Manufacturers for Canada

Send for Price List

Kemptville, Ont., is to have a new bridge.

A new grain elevator is to be built at Little York, Ont.

The city council of Guelph, Ont., have recommended the building of a \$3,000 bridge.

The Lutheran Church, at Tavistock, Ont., will purchase a pipe organ to cost about \$1,400.

The London Lumber Co., London, Ont., are applying for incorporation with a capital of \$20,000.

The SS. Cambria has been thoroughly overhauled at Owen Sound, and will leave for Sault Ste. Marie.

The Middleton Creamery Co., Middleton, N. S., are applying for incorporation with a capital stock of \$3,000.

A new Presbyterian church is to be built at Stouffville, Ont. The architects are Gregg & Gregg, Toronto, Ont.

The Ontario Pure Food Co., St. Catharines, Ont., are applying for incorporation with a capital stock of \$25,000, and intend canning and preserving fruits, etc.

The Tandem Car Brake Co., Toronto, will apply for incorporation with capital at \$90,000. John Gray and George Hastings, both of Toronto, are among the directors.

The Ontario Engine & Machine Co., Toronto, Ont., are applying for incorporation. The amount of capital stock is to be \$12,000. The provisional directors are Andrew J. Somerville, Thomas R. Wood and James George, all of Toronto.

The Wilson Fire Extinguisher Co., of Toronto, are applying for incorporation, with \$24,000 capital stock. C. C. Foster, Lewis H. Moffatt, Charles J. Agar, Charles E. Goad and K. O. Moffatt, all of Toronto, are to be the first directors.

A new grist mill will be started at Magog, Que., by Mason & Borinth.

The tannery owned by George Kastner at Sebringville, Ont., was destroyed by fire last week.

The iron bridge spanning the Nation river at Casselman, Ont., which was recently swept away by flood, will be rebuilt.

The Saskatchewan is proposed to be bridged at Edmonton, Alberta, at a cost of \$75,000 and the Dominion is asked for assistance.

H. E. Gross & Co., Moncton, N.B., have sold their entire knitting plant to J. P. Mott, St. John, N.B. The machinery will be removed to St. John, N.B.

The Powers Asbestos Felting Co., Sherbrooke, Que., has placed one of its separating machines at Thetford, Que., and is meeting with encouraging results.

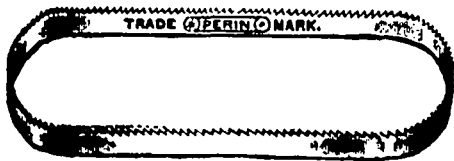
J. and R. Kidd, Tilbury Centre, Ont., have dissolved partnership, Mr. R. Kidd taking over the whole business. Mr. Joseph Kidd intends to start a flour mill at Prince Albert, Sask.

The contract for the steel bridge between St. Stephen, N.B., and Calais will be awarded soon, the government having accepted, and Calais authorities also agreeing with the engineer's plans.

Robin & Sadler, leather belting manufacturers, Montreal and Toronto, have put in two 50-inch belts for the Montreal Electric Power Co., and have shipped a 48-inch belt to Thos. McAvity & Sons, St. John.

While boring at Messrs. Syer & Mayhew's flouring mill at Thamesville, Ont., the other day, a strong flow of gas was struck at a depth of 150 feet. When capped and tested with a steam gauge it registered 30 lbs. The proprietors have piped it into their mill and are using it for fuel. —Guelph Herald.

PERIN'S FRENCH BAND SAW BLADES



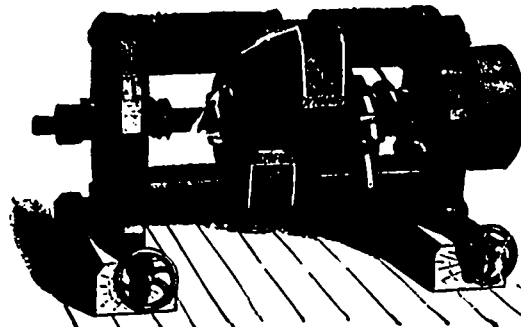
These blades are joined, set and filed, ready for use, and stamped with M. Perin's name and Trade Mark. They are highly finished, even in temper, and the backs rounded and polished.

All widths from 1 to 1 1/2 inches X 17ft., 17ft. 10in., 18ft. 8in., and 20ft. 6in., always kept in stock.

RICE LEWIS & SON, Ltd.

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THE
RELIANCE
ELECTRIC
MANFC.,
CO. Ltd.

Manufacturers of The Reliance System of Arc and Incandescent Lighting

and Power Apparatus. The Rae System of Electric Railway.

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The Greatest Invention in Cotton Spinning Since Arkwright's Time ...

This claim is made advisedly for our PATENT METALLIC ROLL. Its truth is frankly admitted by the great majority of mill men at home and abroad who have had practical experience with the Patent Metallic Roll in their own mills. We take pleasure in giving full particulars to all mill men who write us for the same. Correspondence solicited. Let us refer you to mills North and South, perhaps in your vicinity, where you can

SEE OUR PATENT METALLIC ROLLS RUNNING

On Railway Heads, Silver Lap Frames, Drawing Frames, Comber Draw Box, Slubbers and Speeders, Intermediate and Roving Frames, Jack Frames or Fly Frames.

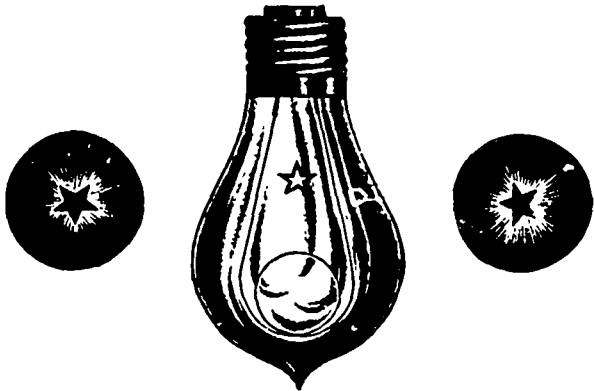
The PATENT METALLIC ROLL is furnished for any make of these machines now in use. For new machinery the Metallic Roll is usually ordered through the builders of such machinery. All the leading builders and importers of the classes of machines named are agents for the Patent Metallic Roll, and we have furnished and are furnishing them with Metallic Rolls for many of their frames. For any desired information please address

THE METALLIC DRAWING ROLL CO.

.. Indian Orchard, Mass. .

Exclusive Owners and Sole Patentees for the United States and Canada.

"STARR" Incandescent Lamps ..



Full Candle Power. Long Life. Low Price.

Made of any Candle-Power and Voltage, and with bases to suit the different sockets in use.

Unrivalled Quality. High Efficiency.

Write for Quotations, stating Voltage and Base used.

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(LIMITED)

... Halifax, N. S. ...

Illustrated Catalogue of Electrical Supplies on Application.

Second-Hand Engines and Boilers for Sale by the

GOLDIE & McCULLOCH CO., Ltd.

GALT, ONT.

- 125-h.p. Brown Engine.
- 90-h.p. Wheelock Engine.
- 75-h.p. Slide Valve Engine.
- 60-h.p. Buckeye Engine.
- 50-h.p. Slide Valve Engine.
- 40-h.p. Slide Valve Engine.

- 35-h.p. Slide Valve Engine.
- 30-h.p. Slide Valve Engine.
- 15-h.p. Slide Valve Engine.
- 100-h.p. Return Tubular Boiler.
- 90-h.p. Return Tubular Boiler.

- 80-h.p. Return Tubular Boiler.
- 70-h.p. Return Tubular Boiler.
- 55-h.p. Return Tubular Boiler.
- 18-h.p. Return Tubular Boiler.

The above Engines and Boilers have been replaced by Wheelock Engines and New Boilers of greater power, and will be rebuilt and sold at very reasonable figures.

For Particulars Apply to

The Goldie & McCulloch Co., Ltd. - Galt, Ont.

- - The - -

PACKARD LAMP CO.
(Limited)

: : Of Montreal : :

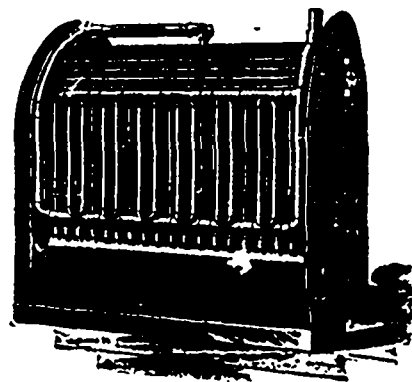
manufacture an Incandescent Lamp, guaranteed to be equal to anything in the market. It is strictly

.. HIGH GRADE ..

very efficient, and maintains its rated candle power.

Give them a trial and be convinced that, though higher priced,

They are much cheaper in the End . .



... THE ...
FINLAYSON WATER TUBE MARINE BOILER

::: FOR :::

YACHTS, LAUNCHES and OTHER STEAMERS

The most efficient and Reliable Water Tube Boiler in the market. Has entirely new features and improvements.
Send for Illustrated Catalogue of Boilers and Engines.

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DOTY BROS. & Co., Proprietors.

5 YORK STREET, Opposite Union Station, : : TORONTO, ONT.

**Emery
Wheels**

AND

MACHINERY

Standard Emery Wheel Co., Albany, N.Y.

W. S. HILL ELECTRIC COMPANY

Manufacturers of High Grade

SWITCHES

For Power and Light Stations.

Switch Boards

For Arc, Power and Incandescent Circuits.

..A NEW..

Lightning Arrester

-- FOR ALL CIRCUITS --

Price \$15.00.

Discounts on Application.



In the Doane Arrester the short circuit is made through a non-inductive resistance sufficient to limit the current that will follow the lightning discharge to an amount that cannot do any injury.

In a 500 Volt Circuit

With a non-inductive resistance of 100 ohms in series with the arc, only five amperes can follow the discharge; this can do no possible harm, and the arc formed by the passage between the carbons is easily extinguished and without injury to any portion of the circuit.

No current passes through any of the movable parts of this Arrester, and with only a limited current through the carbons, they are practically indestructible.

133 Oliver St., BOSTON, MASS.

Represented in New York City by

The Elson & Brewster Eng'g Co., 141 Liberty St

The Carleton Place council are discussing the propriety of having an electric fire alarm system.

The Muslin Underwear Co., of Buffalo, N.Y., express an intention of starting a branch factory in Canada, but have not yet decided upon a location.

"The British Columbia Tug Company, Limited Liability," Victoria, B.C., are applying for incorporation. The capital stock is \$15,000 with power to increase to \$100,000.

Messrs. Scott & Son, proprietors of the Victoria Wheel Works, Galt, Ont., are building a large warehouse in connection with their factory. The building will be 172x30 feet, two stories high.

Messrs. Thomas W. Ness, Peter H. Davidson, James L. Rankin, John E. Adams and Norman W. McLaren, all of Montreal, are being incorporated under the name of the T. W. Ness Electrical Co. with a capital stock of \$150,000 with headquarters at Montreal, to manufacture electrical apparatus and appliances, etc.

Messrs. William D. Packard, John H. Howry, Charles C. Paige, Alexander Mackenzie and Thomas C. Sims, who are to be the first directors, and others are applying for incorporation as The Packard Lamp Co. with a capital stock of \$300,000 and chief place of business at Montreal, to manufacture electrical and other machinery, etc.

The Collingwood Meat Co. is being incorporated at Collingwood, Ont., with a capital stock of \$200,000 to carry on a general slaughtering, curing and packing business of cattle, swine and other animals, etc. Messrs. Thomas Long, of Toronto, and Frank F. Telfer, Robert T. Stephens and others, of Collingwood, are the incorporators.

W. E. Ellis, of Fenelon Falls, Ont., will build a 50-barrel flour mill at Vernon, B.C., and also supply electric light to the town.

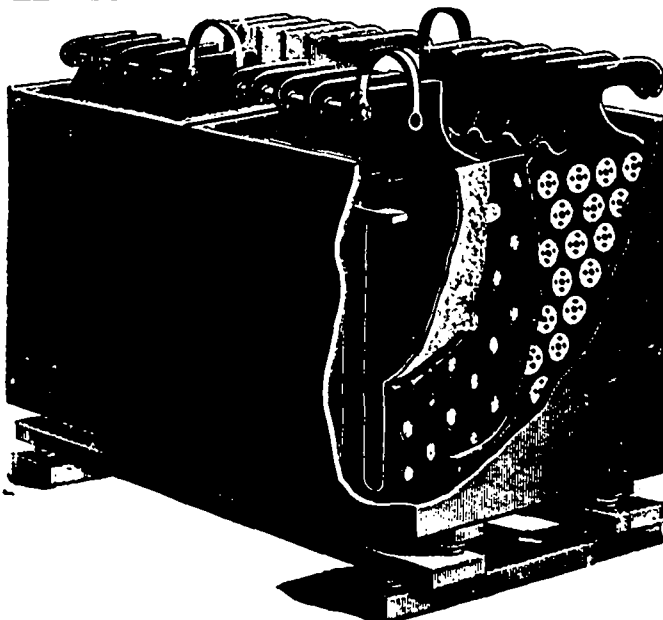
The council of Wawanese, Man., are offering a \$5,000 bonus and free site to any good miller who will build a roller mill in their town.

Mr. George Gooderham's new yacht, built by Fife, the famous yacht-builder, in Glasgow, Scotland, is expected at Toronto in a few days. It has been separated into sections to facilitate transit, and will be put together here under the supervision of Capt. Melancthon Simpson.

A. H. B. Macgowan, of Vancouver, has formed a company, with \$50,000 capital, to take hold of the offal of the salmon canneries of the Fraser river and turn it into oil and guano. The process is a new patent by Prof. Schweizer now of Montreal, and who is one of the company, which is named the B.C. Oil & Guano Co.

The old and well-known piano manufacturing concern of Heintzman & Co., Toronto, whose factory is at Toronto Junction, are forming themselves into an incorporated joint stock company with a capital stock of \$205,000, the better to enable them to carry on and extend their business of manufacturers of pianos and other musical instruments.

John Johnson, a farmer and prospector of Stave Valley, has closed the sale of a silver and gold mine, located four miles northwest of Mission City, Athabaska. The purchase price was \$4,000, and the purchaser the Tacoma Smelting Co. The lode bears silver and gold, is wide and easily workable. The assay of the quartz by the smelter company shows \$49 in silver and \$49 in gold to the ton.



THE CHLORIDE ACCUMULATOR

The Electric Storage Battery Co.

Sole AMERICAN MANUFACTURERS OF

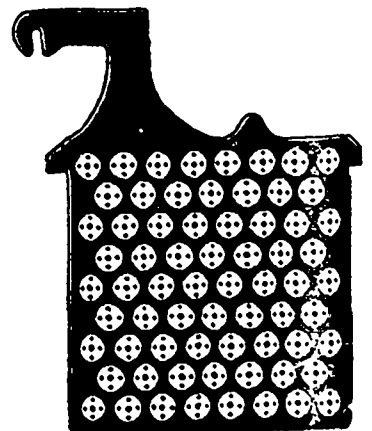
The Chloride Accumulator

Elements of all sizes, from 100 to 10,000 Watts-hours capacity each.

Traction Cells a Specialty

Electric Launch Equipment, Telegraph Phonograph, Surgical and all Special Cells.

Drexel Building - Philadelphia



FAC-SIMILE OF ONE OF THE
42 INCH 3-PLY BELTS, 118 FEET LONG,
MADE FOR THE
Winnipeg Electric Street Railway Co.



.. BY THE ..
HAWORTH BELTING CO., TORONTO.

Westport, Ont., is to have electric lights and wants a system of water works.—Almonte Gazette.

The Stevenson Gold & Platinum Hydraulic Mining Co., Vancouver, B.C. has applied for incorporation. Capital \$1,000,000. The applicants are Robert Stevenson, Jos. H. Thain and W. L. Hogg.

"In the whole of Jamaica," said a resident of that island now visiting Canada, "we have only two bicycles. The highways are as hard and as smooth as an asphalt roadway, the people are enthusiastic and generous supporters of all athletic sports, money is plentiful, and the first cycling agent that lands on the field will find his wheels go."

The total number of pounds of lead and ounces of silver shipped from West Kootenay during the year 1893, basing the same upon the custom house returns was: Silver, 240,161 ounces; lead, 1,775,917 pounds. Since January 1, 1894, and up to March 13, the custom house reports shipments as follows: Silver, 246,869 ounces; lead, 2,072,370 pounds.

The Electric Lighting plant installed by the Royal Electric Co. at Fenelon Falls, Ont., has been sold to the Fenelon Falls Electric Light Co., who have just put up five alternating arc lamps on the streets which are giving excellent satisfaction. The town is as well lighted as any city in Canada, both the incandescent and arc lamps being run from one of the Royal Co.'s late type alternators.

Messrs. Joseph Taylor, and M. J. Dee, of Sandwich, Ont., G. M. Hendrie, of Hamilton, Ont., F. S. Evans, of Windsor, Ont., and Geo. H. Scripps, of Detroit, Mich., are applying for incorporation as the Canadian Typograph Co., with a capital stock of \$250,000 to acquire the right and manufacture in Canada of the Rogers typograph machine, the chief place of business to be at Windsor, Ont.

Mr. Robert S. Fraser, Montreal whose attractive business card appears elsewhere, announces that he contracts to fit out mills in every class of machinery; and that he is sole agent in Canada for Preston's patent felling mills and stocks, which, he informs us, have superceded others for furnishing goods. He is also agent for Hughes patent hopper feeds, carding engines, mules and twin ers, he having sold eight of these engines in Canada during the past year. Mr. Fraser, through Mr. Tetlow, in England, pays special attention to the purchase of second hand machinery.

CANADIAN PATENTS.

The following patents have been issued from the Canadian Patent Office, from February 14 to February 28, 1894, inclusive.

Information regarding any of these patents may be had on application as follows:—

- Fetherstonlaugh & Co., Bank of Commerce Building, Toronto.
- Ridout & Maybee, 103 Bay street, Toronto.
- A. Harvey, Central Chambers, Ottawa.
- J. A. Grenier, Imperial Building, Montreal.

Copies of American patents corresponding to Canadian patents can be procured from these attorneys for the sum of twenty-five cents each.

- 45,325 Thill coupler, Daniel Murray, Salem, and Oron G. Cilley, Boston, Mass., February 14.
- 45,326 Off-setting device for saw mill carriages, James McAllister and A. C. Hubbell, South Manistique, Mich., February 14.
- 45,327 Suspension rod for swinging sieves, Carl Haggennmacher, assignee of Jacob Worner, Budapest, Kingdom of Hungary, February 14.
- 45,328 Bob sleigh, The Bain Wagon Co., assignee of James Anderson, Woodstock, Ont., February 14.
- 45,329 Saw templet, Benjamin F. Spooner, Orange, Texas, February 14.
- 45,330 Harrow, Martin Bruner Buckland, Ohio, February 14.
- 45,331 Combined table and writing cabinet, John Danner, Canton, Ohio, February 14.
- 45,332 Smoke consuming furnace, Granville White, Moreland, Victoria, Australia, February 14.
- 45,333 Excelsior manufacturing machine, James A. Manning, Toronto, February 14.

Our Motto on EMERY WHEELS

"LARGE CONTRACTS, QUICK SALES and SMALL PROFITS"

For an A NO. 1 Wheel

ALSO THE LARGEST and BEST LINE OF EMERY WHEEL MACHINERY in the U.S.
Catalogue furnished upon application.

The Springfield Emery Wheel Co. - - - Bridgeport, Conn.

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CARBON & PORCELAIN CO.
LIMITED

MANUFACTURERS OF

Carbon Points for All
Systems of Arc Lights

BATTERY PLATES, CARBON BRUSHES, and all kinds of PORCELAIN
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All goods guaranteed equal in quality to the best manufacturers
in the world.

PETERBOROUGH, - - ONTARIO

Kay Electric Co'y

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DYNAMOS

FOR

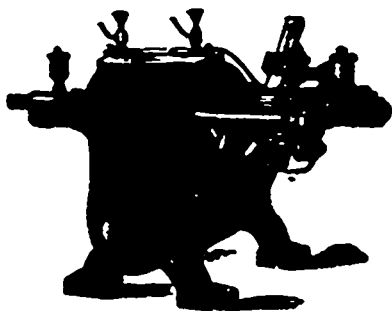
ARC AND INCANDESCENT
LIGHTING,

Plating Machines,

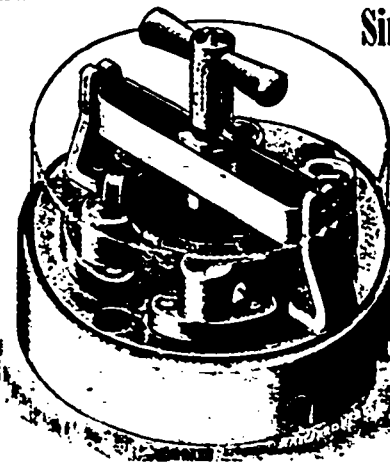
Medical Batteries

AND ALL KINDS OF

ELECTRIC APPLIANCES



HAMILTON, ONTARIO



Single and Double
Pole Switches

From 5 to 150 Amperes

BOVETAL ROSETTES

LAMP SOCKETS

All of Superior
Workman-ship and
Design

Manufactured
by the

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Switch Mfg. Co.

Hartford, - - Conn

For Sale by The Canadian General Electric Co., Toronto.

Ingot Copper and Tin

Zinc and Brass Spelter

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ENGLISH HOUSE:
SAMUEL, SONS & BENJAMIN
104 FENCHURCH ST., LONDON. E.C.

SHIPPING OFFICE
RUMFORD PLACE, LIVERPOOL

**SECOND-HAND LIST
Electrical Apparatus
ALL IN GOOD ORDER**

1	Edison	200 K.W.,	500 V.	Generator	\$3,517	F.O.B. Toronto.
2	T. & H.,	M.P.,	90	500 V.	2,860 each,	" "
6	T. & H.,	W.P.,	50	Ry Motor Equipments	450	" "
4	Edison,	No. 14,	"	"	150	" "
4	"	No. 16,	"	"	200	" "
4	"	No. 6,	"	"	135	" "
4	"	No. 6,	"	Armatures	125	" "
4	"	No. 6,	K.W.	Dynamo, 110 Volts	200	" "

We offer this Machinery subject to its being unsold upon receipt of order.

M. D. BARR & CO.,
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F. B. Polson.

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POLSON IRON WORKS
Manufacturers of all descriptions of
BOILER AND TANK WORK
.. Marine Engines ..

THE BROWN AUTOMATIC ENGINE,
HOISTING and VERTICAL ENGINES.

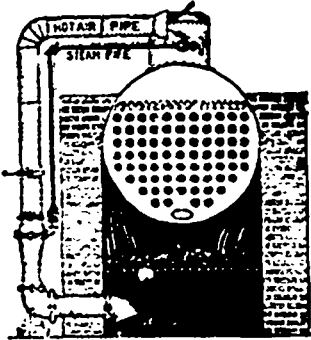
SECOND-HAND MACHINERY

- 6 Large Punching and Shearing Machines, heavy, powerful machines, at about half-price.
 - 1 Horizontal Beam Bending Machine, and Horizontal Punch.
 - 1 Large Plate Planing Machine.
 - 1 Knowles Duplex Pump 6x17".
 - 1 Brown & Barnes Screw Cutter, capacity 3 to 11".
 - 1 Large Angle Shearing Machine, with self contained engine.
 - 1 Steel Tank, 6 feet diameter, 29 feet long.
- Also a Quantity of Wood Working Machinery.

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**STEAM and AIR
INJECTORS, ..
EXHAUSTERS, ETC.:::**



For burning hard and soft coal screening, run mine and lump coal under steam boilers, exhausting air, and vapors from buildings, ventilating ships, mines, etc.

Highest Medal and Diplomas given at the World's Columbian Exposition, Chicago, 1893.

The Best Blower in the market Steam Boilers.

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S. R. EARLE
BELLEVILLE, : : ONT.

The Galt Bros. Co., of Galt, Ltd.

...Manufacturers of...

Wood Working Machinery

Principal Gold Medal Toronto Exhibition, 1893

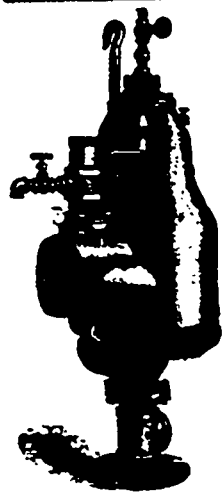
The GODERICH ORGAN CO., Goderich, write:—

" We have tried the CARVING MACHINE bought from you on the trusser of our Piano Case Organ, and find it works very satisfactory. We are enabled to do more elaborate carving at half the cost of former work, and we will save the cost of the machine in one year. We are well pleased with the solid and neat manner in which the machine is constructed, and think it should fill a long-felt want among furniture and kindred manufacturers, who could not afford to buy the higher priced machines, there being no limit to the scope of your machine."

Exhaust Fans, Single and Double.

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GALT : : : ONT.



**THE PULSOMETER
STEAM PUMP**

Often Imitated, but Never Equalled

—O—

The handiest, simplest, and most efficient steam pump for general Mining, Quarrying, and Contractors' purposes.

—O—

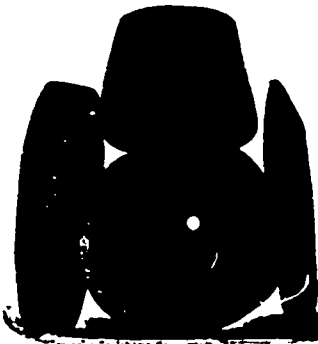
**MUDDY OR GREY LIQUIDS
HANDLED WITHOUT WEAR**

Descriptive Catalogue, with Prices, Furnished on Application.

Pulsometer Steam Pump Co.
NEW YORK, U.S.A.

Michigan Emery Wheel Co.

194 Catherine St., Detroit, Mich.



**Solid Emery
AND
Corundum
Wheels..**

To run wet or dry, special shapes

**Perfection
Saw Grinders**

Send for Price List

REDDAWAY'S PATENT



W. A. FLEMING

- 45.334 Table sauce, Sophia McLaren, assignee of Anne Lister, Perth, Ont., February 15.
- 45.335 Machine for making cakes and confections, Richard Megson, Cambridge, Mass., February 15.
- 45.336 Ventilator and check for furnaces, John B. Watson, Toronto, and Joseph R. Douglas, Ottawa, Ont., February 15.
- 45.337 Method of preparing warps for looms, James Lister and Richard Lister, Aireworth, Keighley, County of York, England, February 15.
- 45.338 Sand sprinkler for electric cars, John Beaumont Hopkins, Montreal, Que., February 15.
- 45.339 Mop, Florentine K. Bradman, Boston, Mass., February 15.
- 45.340 Jacquard card punching machine, Valentine Lacasse, Chemnitz, Kingdom of Saxony, Germany, February 15.
- 45.341 Process of treating ores, etc., William Rattray, Richmond, Que., February 15.
- 45.342 Medical electric instrument, Dr. Benjamin Y. Boyd, Wichita, Kansas, February 15.
- 45.343 Incandescent lamp, Charles A. Hussey, New York City, N.Y., February 15.
- 45.344 Fanning mill, Levi Staley, Alcony, Ohio, February 15.
- 45.345 Wagon brake, William Hannon Brand, Winona, Ont., February 15.
- 45.346 Earth excavator, William Henry Finlayson, Sydney, New South Wales, Australia, February 16.
- 45.347 Wheel tire, Hippolyte J. La Force, Toronto, Ont., February 16.
- 45.348 Sulphite fibre separator, Edward Ferris Millard, Jackson, Mich., February 16.
- 45.349 Process of roasting ores, Charles W. Stickney, Ketchum, Idaho, February 16.
- 45.350 Button attaching machine, William E. Elliott, Grand Rapids, Mich., February 16.
- 45.351 Brush, Ephraim Huber, Berlin, Ont., February 16.
- 45.352 Whip, Leonard W. Steimer and George T. Moore, Westfield, Mass., February 16.
- 45.353 Sash lock, Samuel E. St. Onge Chapleau, Ottawa, Ont., February 16.
- 45.354 Dresser, Axel Kundsén, Halleberg, Mashfield, Wisconsin, February 16.
- 45.355 Metal studs for boots and shoes, Hugh Thomson, Studley Park, Kew, in the colony of Victoria, Australia, February 16.
- 45.356 Folding gate, William Rafford Pitt, New Rochelle, N.Y., February 16.
- 45.357 Device for closing bottles, etc., Albin Lasch, Pezig, Silesia, Germany, February 16.
- 45.358 Sickle grinder, Thomas Gordon, South Bend, Wyoming, February 16.
- 45.359 Pneumatic tire, William Richard Barrett, Passaic, N.J., February 17.
- 45.360 Manufacture of artificial stone, Alexander McLean and Christopher W. Wilson, London, England, February 17.
- 45.361 Check hook, Wesley Eckert and Charles Howard Freeman, Elk Point, South Dakota, February 17.
- 45.362 Propeller Charles Page and Leonard Fortier, Montreal, Que., February 17.
- 45.363 Combustion Chamber and oil supplying apparatus for liquid fuel engines, John Richardson and William Norris, Lincoln, Lincoln County, England, February 17.
- 45.364 Car mover, William L. Carr, Blanchard, Iowa, February 17.
- 45.365 Neck yoke, William Hardy, Dundas, Ont., February 17.
- 45.366 Top props for carriages, Hattie L. Philips, Quanicasse, Mich., February 17.



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- 45.367 Stove pipe, Robert Hargrave Martin, Brooklyn, N.Y., February 17.
- 45.368 Wire fabric machine, Kitzelman Brothers, Ridgeville, Indiana, assignee of John C. Pope, Fox, Ill., February 17.
- 45.369 Self-binder, Joseph M. Lawrence, Los Angeles, Cal., and Adolph Eggarth, New Whatcomb, Wash., February 19.
- 45.370 Movable scaffold, Karl Albert Frosell and Frederick J. Lancaster, New York, N.Y., February 19.
- 45.371 Air cushion for riding saddle, Robert Latta, Cattnis River, New Zealand, February 19.
- 45.372 Arch support, water purifier and heater, George Wolverton Collin and John Walter Bullar, Atlanta, Georgia, February 19.
- 45.373 Clutch pulley, Herman Bunker, Barrie, and Walter P. Chapman, Hamilton, Ont., February 19.
- 45.374 Rail joint, Robert Bloom Muehlfeith and Charles John Ibel, Fort Wayne, Ind., February 19.
- 45.375 Wheel, The Pope Manufacturing Co., Portland, Maine, assignee of Sterling Elliott, Newton, Mass., February 19.
- 45.376 Wheel, The Pope Manufacturing Co., Portland, Me., assignee of James E. Copeland, Hartford, Conn., February 19.
- 45.377 Artificial fuel, Jean D. Oigny, St. Henri, and C. F. Beauchemin & Cie, Montreal, Que., February 19.
- 45.378 Piano, Roland Montague Squire, Montreal, Que., February 19.
- 45.379 Rotary engine, Thomas Harding, San Jose, Cal., February 19.
- 45.380 Steam boiler, David Risley, Colfax, Wash., February 20.
- 45.381 Check rein support, Joseph Carter, Blyth, Ont., February 20.
- 45.382 Generator for cars, Abner C. Erskine, Bowling Green, Ohio, February 20.
- 45.383 Rack, Ambro, J. Northraft, St. Louis, Mo., February 20.
- 45.384 Chain, D. M. Williams, Edwardsdale, Pa., February 20.
- 45.385 Brick, John Mohlberg, New York, N.Y., February 20.
- 45.386 Illusion apparatus, Amariah Lake, Pleasantville, N.J., February 20.
- 45.387 Wrench, Paris Tool Mfg. Company, Paris, Ont., February 20.
- 45.388 Separating machine, Noah W. Holt, Manchester, Mich., February 20.
- 45.389 Shoe fastener, Henry Vachon, Golden, B.C., February 20.
- 45.390 Heater, Frederick K. Carswell, Hartford, Conn., February 20.

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- 45.392 Cow milking machine, Wm. B. Bland, Maquon, Ill., February 20.
- 45.393 Detonator holder, John G. Dixon, York, England, February 21.
- 45.394 Fly screen, John West, Barnard, Mo., February 21.
- 45.395 Button, Joseph F. Platt, Waterbury, Conn., February 21.
- 45.396 Sheet metal covered wall, Phillippe A. Deslauriers, and Clarence D. Pruden, both of St. Paul, Minn., February 21.
- 45.397 Sheet metal covered wall, P.A. Deslauriers and C.D. Pruden, both of St. Paul, Minn., February 21.
- 45.398 Wash board, George W. Mickle, Cincinnati, Ohio, February 21.
- 45.399 Heater for water, Job Thorp, Westerly, R.I., February 21.
- 45.400 Ice velocipede, Wm. G. Bouse, Loraine, Ohio, February 21.
- 45.401 Breaching boot, Henry McGuire and Gustavus Barton, both of Memphis, Mich., February 21.
- 45.402 Vacuum pump, Lyman A. Cheney, New York, N. Y., February 21.
- 45.403 Button fastener, The Columbia Button Fastener Co., New York, N.Y., February 21.
- 45.404 Hand rake, The Crank Hanger Co., Elmira, N.Y., February 21.
- 45.405 Disinfectant, Patrick Molyneux, Bruce Rd. Bow, Middlesex, England, February 22.
- 45.406 Method of and apparatus for concentrating sulphuric acid, Frederic J. Falding, Cleveland, Ohio.
- 45.407 Automatic railway pumping mechanism, Hiram D. Layman, Little Rock, Arkansas, February 22.
- 45.408 Threshing machine, Moise Potoin, Angers, Que., February 22.

- 45.409 Milk Cooler, David Bell, Toronto, Ont., February 22.
- 45.410 Windows, Carl Summermann, Munster, Kingdom of Prussia, February 23.
- 45.411 Electrolytic decomposition, Henry Blackman, New York, N. Y., February 23.
- 45.412 Electrical tramway, Alard E. du Bois Reymond, Berlin, Germany, February 23.
- 45.413 Dynamo electric machine, David Henry Wilson, Chicago, Ill., February 23.
- 45.414 Truck, Henry Oris Thomas, Kimball, Nebraska, February 23.
- 45.415 Distributer for paris green, etc., Francis Lousaw, and Thomas E. Clark, Bothwell, Ont., February 23.
- 45.416 Awning, Edward Fanteux, Montreal, Que., February 24.
- 45.417 Nail or spike, William Shedlock, London, England, February 24.
- 45.418 Sewing machine, Augustin Avrial, Paris, France, February 24.
- 45.419 Carpet stretcher and tacker, Edward Lincoln McDivitt, Belvidere, Ill., February 24.
- 45.420 Cash indicator and register, John Sharpe, Toronto, and Charles Raymond, Guelph Ont., February 24.
- 45.421 Window screen, Charles C. Wheeler, Marysville, Kansas, February 24.
- 45.422 Folding door, Vickers H. Peart and William Tuck, Burlington, Ont., Feb. 24.
- 45.423 Draw-gear for cars, Andrew J. Shaw, Connellsville, Pa., February 24.

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- 45,424 Cutter bar for mowing machine, Joseph W. Vermilion, Frank A. and Perry P. Vermilion, Newark, Ohio., Feb. 24.
- 45,425 Centrifugal pump, Edward Seitz and Richard Pickup Park, Blackburn, Victoria.
- 45,426 Envelope, Percy John Ogle, London, England, Feb. 26.
- 45,427 Lumber meter, William H. Emerson, Chatham, Ont., Feb. 26.
- 45,428 Ventilating fan, John Duncan Gray Thompson, London, Eng., Feb. 26.
- 45,429 Indicator for detecting and registering the opening of car doors, James R. Layton, Ottawa, Ont., Feb. 26.
- 45,430 Machine for sharpening clippers, David S. Henderson, Brantford, Ont., Feb. 26.
- 45,431 Process, apparatus and compound for disinfecting sewers, William Martin, Chicago, Ill., Feb. 26.

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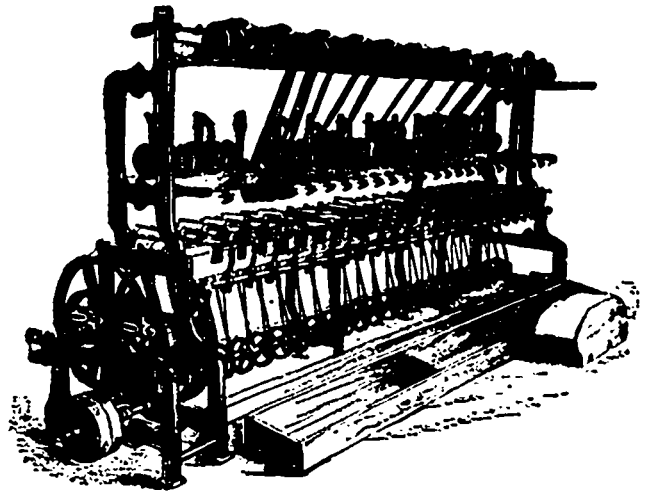
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- 45.432 Lamp Chimney and support thereof, Thomas Hitchcock, Ambrose, London, Eng., Feb. 26.
- 45.433 Electric car, Ernest Egger, New York, Ferdinand August Wessel, Yonkers and Aaron Naumburg, New York, N. Y. Feb. 27.
- 45.434 Godfrey Julien Robinson, Alfred Victor Ainsworth, Albert Arthur Ainsworth, John Harry Ainsworth, Chester, and John Hilton, Lancaster, Eng., Feb. 27.
- 45.435 Lobster trap, Edwin Duncan Rankin and William Henry Dane, Yarmouth, N.S. Feb. 27.
- 45.436 Milk coagulating ferments, the Nutriment Company, assignee of Clarence Preston Eyre, Chicago, Ill., Feb. 27.
- 45.437 Hoisting apparatus, Lorenzo M. Smith, Asbestos, and Allen P. Morrill, Nicolet Falls, Que., Feb. 27.
- 45.438 Bucket hoisting and tripping apparatus, William E. Ludlow, Cleveland, Ohio, Feb. 27.
- 45.439 Ball bearing, Henry La Casse, Rochester, N.Y., Feb. 27.
- 45.440 Churn, John Henry Hill Duncan, 39 Coleman St., London, Eng. Feb. 27.
- 45.441 Aerial railway, Hosea W. Libbey, Boston, Mass., Feb. 27.
- 45.442 Chair, Catharine Schulte, Port Huron, Mich., Feb. 27.
- 45.443 Hand truck, Harlow E. Spaulding, Saratoga, N.Y., Feb. 27.
- 45.444 Excrement catcher for cow stalls, Joseph Ardron, Mandan, North Dakota, Feb. 28.
- 45.445 Car coupler, Denis A. Mullane, New Orleans, Louisiana, Feb. 28.
- 45.446 Hame-tug, Julius C. Clausen, Hensall, Ont., Feb. 28.
- 45.447 Moulding boxes for the manufacture of artificial sandstone, Ernest A. R. Avenarius, Gauegshiem, Rheinland, Germany, Feb. 28.
- 45.448 Car wheel, Henry Xenocles Zimmerman, La Salle, Ill., Feb. 28.
- 45.449 Pneumatic tire, Francis George Gray, Ottawa, Ont., Feb. 28.

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William A. Clark, Toronto, machine for bottling milk.

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Louis Jobin, Quebec, blind stop.

James R. McLeod, Calgary, bridle.

Lizzie Pickard, Toronto, design for sink strainer.

Benjamin A. Burgess, Hamilton, lubricator.

Arthur K. Evans, Toronto, rope grip.

Frederick W. Harris, Woodstock, sock.

Cyrus E. Harvey, Waterloo, fire-escape.

Ernest Le Sueur, Ottawa, diaphragm for electric cells.

Alphonse C. McKecher, assignor to A. Gauthier, Montreal, candle-abrum.

Adoniram J. Nickerson, Argyle, boat knee.

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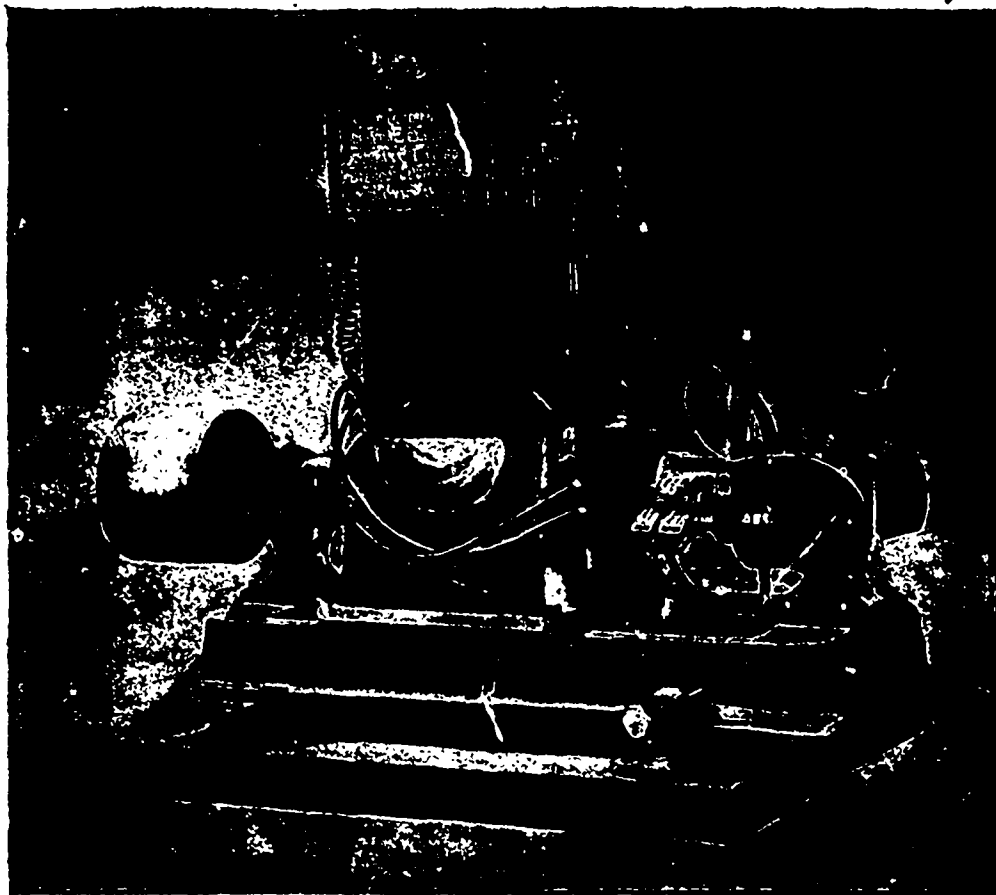
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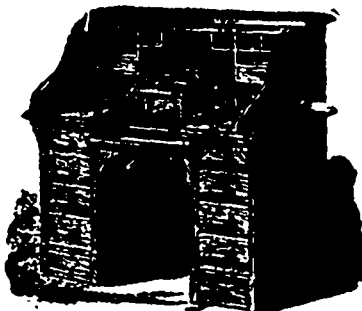
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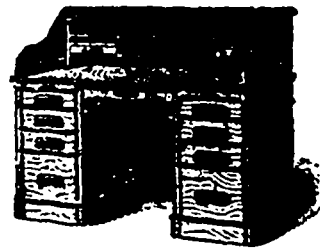
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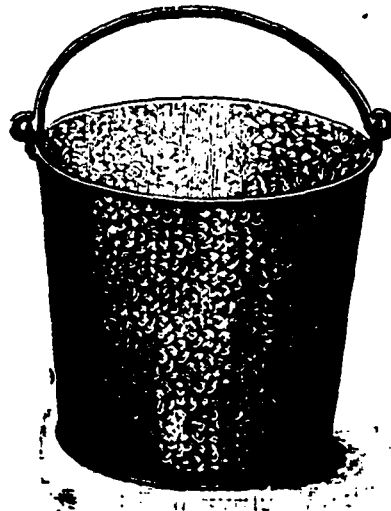
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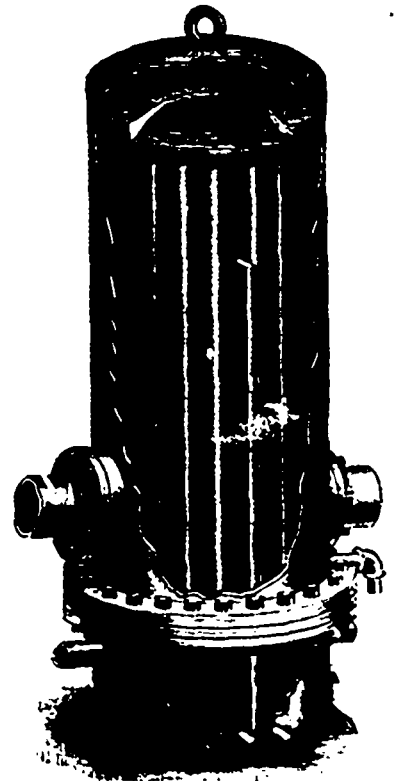
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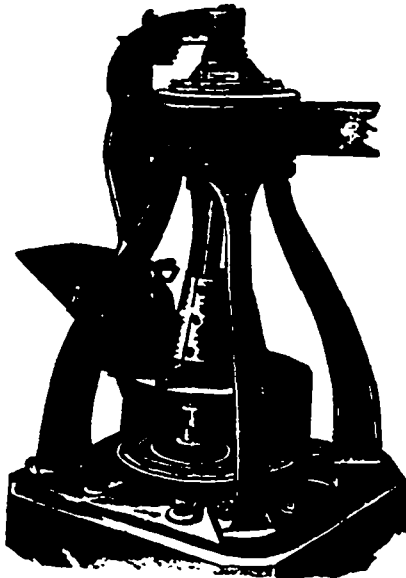
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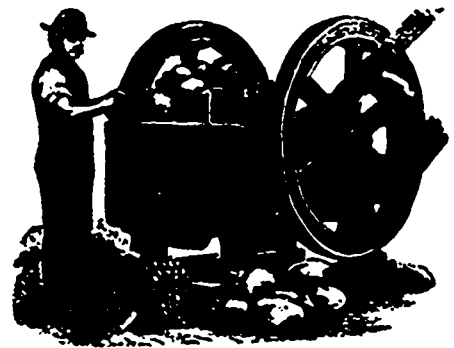
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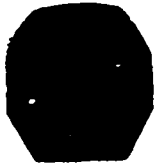
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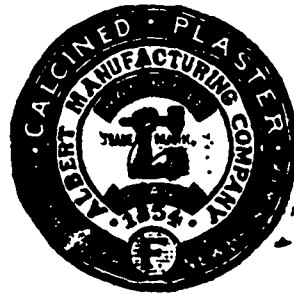
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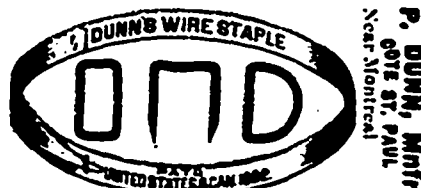
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Always fresh
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"The Reeves" is the
Lightest and Strongest Wood
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If you use Pulleys and want the
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OAKEY'S Flexible Twilled Emery Cloth.
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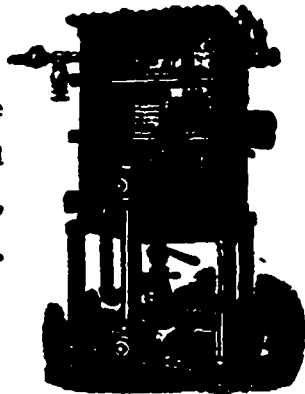
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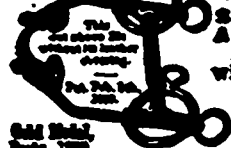
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This Bit, by an automatic device, closes the horse's nostrils.
HE CANNOT BREATHE, AND MUST STOP.



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Any horse is liable to run, and should be driven
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By Covering your Steam Pipes and Boilers
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Preventing Condensation and Loss of Steam.
Others have done it, why not you.

FULL LINE OF ASBESTOS GOODS ON HAND

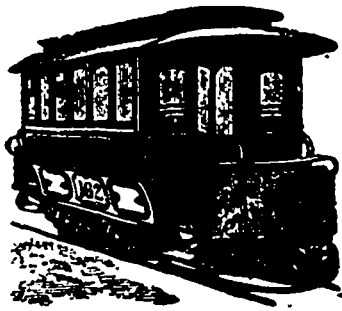
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OUR SPECIALTY

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Every Description

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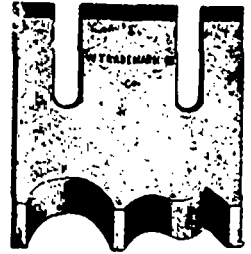
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Knives for Mowers, Reapers, Binders, Root Pulpers
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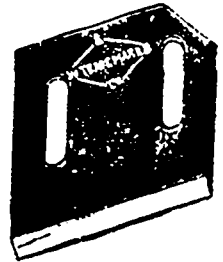
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Radial Drills.

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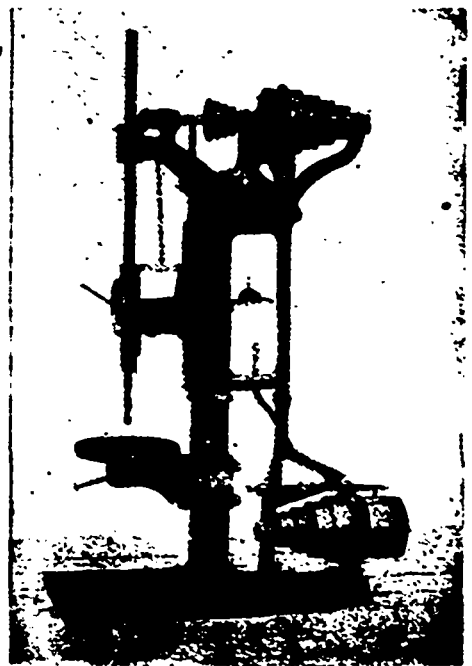
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20 Inch Drilling Machine.

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Capital and Funds over \$13,000,000

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NEW FEATURE...

...JOINT INSURANCE FOR PARTNERSHIPS
Important to Manufacturing Firms

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Of the :::

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... IS THE MOST SATISFACTORY POLICY ISSUED ...

This policy will cover Employees wherever engaged in the business of their employer, the Employer being at liberty to change his workmen or their number, or their wages, without notice to the Company.

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Telegraph and Electrical Instruments

Electro-Medical Apparatus, Fire Alarm Apparatus,
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for Mills, Burglar Alarms, Hotel and
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FOR FURTHER PARTICULARS APPLY TO

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Manufacturers of Salt Glazed Vitrified Sewer Pipes, Double Strength Railway
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DENNIS' Tubular Steel Barrows

COAL
DIRT
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ROLLING MILL
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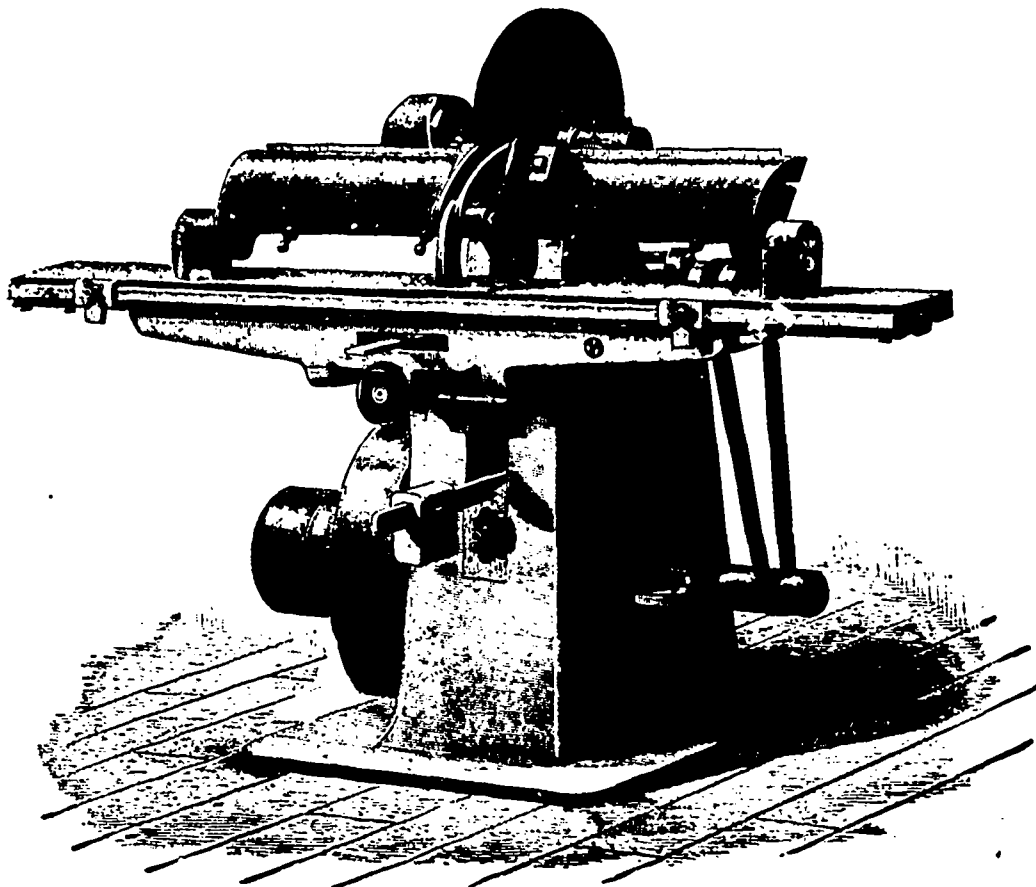
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Though "Extra Strong" they are not heavy to handle.

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Improved Automatic

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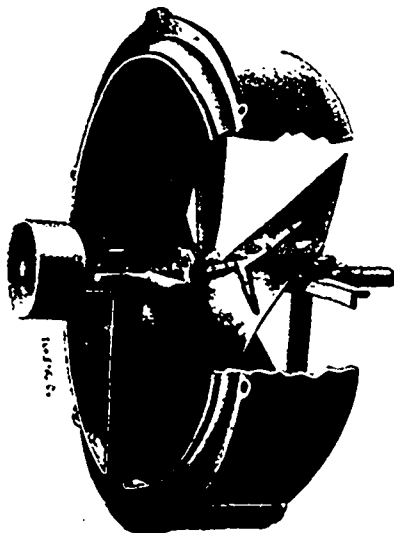
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GALT, ONTARIO.

McEachren's Improved Fan

PATENTED 1893

For Ventilating, Heating, Drying, Etc.



Specially adapted to
HEAVY WORK

Will handle more air
at a *GIVEN PRESSURE* with a *GIVEN POWER* than any
other Fan in the
market.

For particulars address

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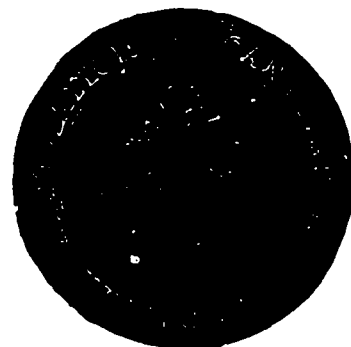
Mr. J. D. McEachren, Galt.

Dear Sir, In reference to the Drying and Ventilating Fans that you put in last fall they are working well, keeping the rooms dry and comfortable. The wool dries with cold water coil; is drying 500 to 600 lbs. of wool per day WITHOUT HYDRO EXTRACTOR, on 6 x 12 feet of netting. If the room was larger we are sure that the capacity would be much increased. The Fan in end of dye house keeps the steam well drawn off, and the alterations on cloth drier have enabled us to dry more than double the goods than we could formerly. We would make special note of the small amount of power required.

Yours truly, HARRIS & Co.

Rockwood, March 16th, 1893.

**The CANADIAN
MANUFACTURERS'
ASSOCIATION**



W. H. LAW, President.

J. J. CASSIDY, Secretary.

GEORGE BOOTH, Treasurer.

Office, Room 66 Canada Life Building

110 KING STREET WEST, TORONTO

TELEPHONE 1274

THE OBJECTS OF THIS ASSOCIATION ARE:

- To secure by all legitimate means the aid of both Public Opinion and Governmental Policy in favor of the development of home industry and the promotion of Canadian manufacturing enterprises.
- To enable those in all branches of manufacturing enterprises to act in concert as a united body whenever action in behalf of any particular industry, or of the whole body, is necessary.
- To maintain Canada for Canadians.
- Any person directly interested in any Canadian manufacturing industry is eligible for membership.
- Manufacturers desiring to hold meetings for the promotion of their business, are invited to avail themselves of the Board Room of the Association for the purpose, which is offered to them free of charge.

J. J. CASSIDY, Secretary.

ANDREW ALLAN, *President.*

J. O. GRAVEL, *Secretary-Treasurer.*

F. SCHOLES, *Managing Director.*

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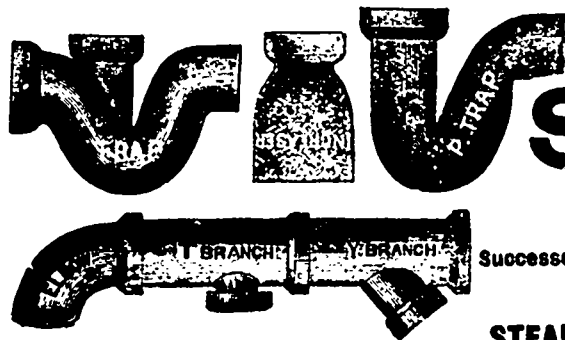
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HAMILTON, - - - CANADA.

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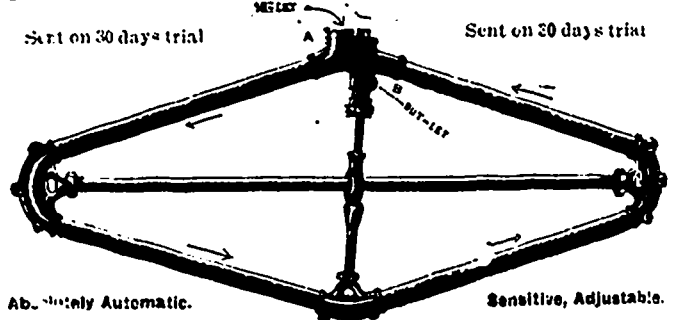
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Sent on 30 days trial

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