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Vol. 22.

TORONTO, FEBRUARY 19, 1892.

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**HOME MARKETS vs. FOREIGN TRADE.**

In a recent issue of this journal we produced figures showing that the foreign trade of Canada, per capita, was greater than the foreign trade of the United States. The figures applied to the year 1890, and were as follows:

	Imports.	Exports.	Total Trade.
Canada.....	\$23 50	\$18 66	\$42 16
United States.....	12 63	13 73	26 36

That is to say, the total foreign trade of Canada per capita amounts to 62.5 per cent. more than that of the United States.

Regarding this question of the foreign trade of a country, quoting our facts, the *American Economist* says:

If, then, any reliance can be placed in the theories of the Manchester school of political economy, the people of the Dominion should be at least a half more wealthy and prosperous than we. The fact, however, is that we are more prosperous than the Canadians. But any theoretical economist will prove to you that the amount of foreign trade is the most trustworthy gauge of the prosperity of a country.

It is always well to examine theories to see, not so much if they are based on substantial ground, as to see if all the circumstances governing their adaptability have been given due consideration. Such an examination would show in this case that the Canadians doing more foreign trade than the Americans, contribute much more to the profits of transporters and middlemen than their neighbors, and by this extra contribution to the prosperity of middlemen is this net income less than the net income of persons in the United States.

The effects of this continuous drain (the increased cost of distribution necessitated by free trade), on the net profits of the countries interested is always sedulously overlooked by the disciples of the Manchester school. But, like the immense standing armies of Europe, the men engaged in distributing products through great distances, which could be produced in juxtaposition, are withdrawn from productive industry and their services lost to the world as a whole. The country, however, supporting the forwarders, like the country supporting the army, incurs the greater part of this loss, but in spite of this, both the producer and consumer have less by the amount of the middleman's gains.

Nothing can justify one in being a theoretical free trader except a disregard of the cost of transportation. The term "theoretical" is used to distinguish those who think free trade would give them cheaper products from those who know they would make more money through the higher cost of finished products; which is the intention of practical free trade.

It was this spirit of free trade which a few days ago impelled the agents of certain steamships trading between Canadian and British ports to appeal to the Dominion Government to reduce the duty on manufactured iron to the end that they would have increased freights for their steamers. The unreasonableness of this request is seen in the fact that while the yearly consumption of iron in Canada amounts to probably 300,000 tons, the domestic production amounts to only about 40,000 tons. The difference between these two amounts indicates our importations of iron; but the secret of this request on the part of the transporters is that at present a large proportion of the iron used in Canada is manufactured from imported scrap, the freight charges upon which are lower than upon finished iron, while if Canadian rolling mills and puddling furnaces could be crushed out of existence, while there might not be any more finished iron consumed in Canada, that which was used would be taxed with much higher freight charges than what are now paid.

What these generous steamship men really desire is that, the Canadian iron manufacturing industry having been crushed out of existence, the labor which had been employed in it would be diverted to agricultural pursuits and the growing of wheat for the British market, giving them increased freights in that direction; while on the other hand the production of iron in Canada having been abandoned, there would of course be increased freights of that character in this direction.

And this explains the difference between the value of a home market and a foreign market.

**AS TO THE SUGAR DUTIES.**

A CORRESPONDENT points us to the fact that the opposition orators and papers use the arguments which the CANADIAN MANUFACTURER has advanced against the existing sugar situation as a club with which to destroy our policy of protection to Canadian manufacturing industries. We can well appreciate the difficulties which environed the Government at the time the duty was taken off of some grades of raw sugar. It was a bold stroke of policy which was expected to relieve the people of a heavy burden, and it would have been very acceptable indeed, if it had fully effected that result. The Government in putting this sugar on the free list were following the example set by the American Government—with a differ-

enco. This difference consisted in this, that the McKinley tariff removed the duty from all raw sugars up to number sixteen Dutch standard, and imposed a duty of \$10 per ton upon all sugars above that standard, while the Canadian tariff removed the duty only up to number fourteen Dutch standard, and imposed a duty of \$16 per ton on all above that standard. Raw sugar no higher in quality than number fourteen, is absolutely unfit for food in that condition, while number sixteen sugar is of a character which is quite acceptable for many domestic uses. Therefore, in our opinion the Government erred in not placing number sixteen sugar on the free list. If this was a mistake it could readily have been corrected, by an Order in Council, and if this had been done one great cause of complaint would have ceased to exist. If it was desirable to follow the example of the American Government, it was certainly desirable to follow the best features of it, and not to have subjected the people to a condition which deprived them in large measure of the benefit which they were told would follow the removal of the sugar duty. They should have been allowed to use cheap, light, wholesome unrefined sugars if they desired to do so; and they should not have been forced to use refined sugars if they did not desire to do so. If Mr. Foster had followed the McKinley example closely, probably twenty-five per cent. of the sugar consumed in Canada, would be of number sixteen standard, and this means that the consumers would have saved at least a cent per pound, or about 20 per cent. of the present cost of their sugar. Further, we are constantly informed that the McKinley tariff represents the acme of protection. We accept the assertion. If the American tariff is high enough, why should the Canadian tariff on sugar be sixty per cent higher? Considering the average consumption of sugar in Canada, this difference represents more than \$700,000 taken from the people unnecessarily each year. Mr. Stairs, M.P., stated from his place in the House of Commons last Session, that Canadian refiners could manufacture granulated sugar as cheaply as it could be done in the United States, and he ought to know, for he is largely interested in the Canadian industry. Then why should Mr. Stairs and the others of the sugar syndicate, be empowered to squeeze \$6 per ton more out of Canadian consumers than necessary? It is to these things this journal objects. There is no stronger advocate of protection in Canada than the CANADIAN MANUFACTURER, but in the advocacy of protection we draw a line when the protection is excessive and unnecessary, as we believe it is in this instance. The ethics of protection is that the duty should be only the measure of the difference of the cost of production in Canada and any other country. Mr. Stairs, who is a sugar refiner, states that sugar can be refined at no greater cost in Canada than in the United States, then why should he have greater protection than the American refiners have? We do not wish to see the Government of Canada turned over to the opposition for the sake of correcting the incongruities of the tariff. The friends of the N.P. should do that, not its enemies, and it is as a friend of the N.P. and of the Government, that we take the stand we have assumed in this question.

ADVERTISE in the "CANADIAN MANUFACTURER."

### IN FREE TRADE BRITAIN.

AN account of a year's working of General Booth's plan for helping the English poor is given by a writer in *The Forum*. The £100,000 which the General asked for was speedily raised. Factories have been established in which the rescued are set to work—at match making, bookbinding, knitting, laundry, etc. At the shelters and food depots night lodging and board are furnished for the merest trifle. Parts of the farm are used for dairy, parts for market gardens, and parts for poultry. Brickyards are soon to be put in operation. Shops for carpentry, painting, brush-making, mattress-making, etc., have commenced work, all the work being done by men and women, boys and girls, who had previously been degraded denizens of the slums and gutters of the great city. More than 2,900,000 meals have been supplied by the cheap food depots. Nearly 100,000 breakfasts, at a farthing each, have been served to poor children. Half penny meals have been sold to the number of perhaps 1,200,000, and meals at one penny or more, up to four pence, have aggregated nearly a million and a half. About 4,000 persons can be sheltered every night. The factories employ about 4,000 men and women. Employment has been found for 5,000 men by the labor bureau. Two hundred ex-convicts have been received in the first of the prisoners' homes, with a view to protecting them and giving them work till permanent places are found for them.—*Toronto Globe*.

The *Globe* is constantly advising Canada to abandon its policy of protection to home industries and adopt the free trade policy of Great Britain, a staple argument being that by doing so the cost of production would be lowered at home, and that we would have the full advantage of the cheaper production of other countries. Britain represents the acme of the free trade idea—let us see how it operates there.

"The English poor" spoken of by the *Globe*, who were rescued by General Booth and set to work at various occupations were not paupers because they desired to be such, but because they couldn't help it. They were able to work and willing too, else they would not have been put at the employment appointed to them by General Booth. The occupations at which General Booth employed these people were neither new nor novel. They exist in all directions in Britain, and thousands of people there find their employment in them. In fact they are overcrowded with employees, else these paupers would not have been paupers—they would have been employees in these establishments, obtaining some small remuneration for their services. General Booth's plan may be a good one—for the paupers—but beyond question it is not a good one for the poor people who are not paupers. His proteges were put at work in a great variety of occupations, but it is not recorded that they received any money remuneration for their services. "At the shelter and food depots night lodgings and board were furnished for the merest trifle," and nearly 3,000,000 meals were supplied by the cheap food depots. Think of the meals which were supplied at one cent and two cents each. Of course the products of this pauper labor—this labor employed at making matches, bookbinding, knitting, laundry work, brush making, painting, carpentry, mattress making, etc., must be sold, and that, too, in the open market in competition with the products of the other poor people who were not yet paupers. Consider what this means. Depriving honest, self-supporting labor of its means of livelihood to the end that General Booth's army of paupers might be given employment.

Of course this competition meant decreased production in the regular trades, and a still greater depression of wages. It also means that the paupers supplanted the other labor, and that this other labor became an abundant source of supply of paupers for General Booth's army of paupers. But not only the "degraded denizens of the slums and gutters of the great city" were brought into active competition with honest labor, but hundreds of discharged convicts from the jails and work-houses also.

This is a sad, mournful picture of life among the lowly in Britain, but, according to General Booth, ten per cent. of the population there are in this deplorable condition. Hundreds of thousands of acres of the best farming lands in the Kingdom are being abandoned every year simply because farming products can be produced much cheaper elsewhere than there. The poor people thus driven from the country seek occupation and refuge in the manufacturing towns and cities, and, as we have shown, soon become recruits for General Booth's army of paupers. If it is not this, it is emigration, and hundreds of thousands of the best British yeomanry are forced to expatriation every year. The free traders, however, declare that this evil is less than what it would be under a change of policy. It is better that British farms be abandoned and the people become paupers than to interfere in any manner with British maritime trade. The poor people may starve and die, but British ships must traverse the ocean, bringing in the cheaper food products of foreign lands.

The picture is fraught with much interest to Canada. Under protection we have no such situation confronting us—it would be impossible. Canada wants no situation where Canadians would become paupers and go in swarms and thousands to beg for meals costing a cent and giving a day's labor to obtain enough to fill the stomach and a shelter for the night among ex-convicts.

But this is what the *Globe* proposes for Canada.

#### AMERICANS ON GUARD.

In speaking of the "value of organization" in a recent issue of this journal, allusion was made to the American Protective Tariff League and the efficient work it was doing in the cause of protection in the United States. Since then the regular annual meeting of the League has occurred, and from a report of it in the *American Economist* we gather the following interesting and instructive facts.

The financial statement showed that the total receipts of the organization for the past year were \$39,689 and the total disbursements \$38,637, the League being absolutely free from debt.

The members of the League are known as "Defenders of American Industries and Labor," and there are now 1,045 members. These members are distributed, as to residence, in forty of the states of the American Union.

The distribution of the literary publications of the League last year was the largest in its history, except in the last Presidential campaign. Fifty two different documents are now being distributed, embracing discussions of all phases of the tariff question. The actual distribution of all publica-

tions of the League, published by it, amounted to 21,672,028 pages of tariff literature.

During 1891 the League received the most cordial co-operation of the newspaper press throughout the United States, some 1,900 publishers who were enthusiastic in their support of the policy of protection having filed their declaration with the League to that effect. All these publishers were supplied with League publications and were assisted in various ways in the dissemination of the principles of protection.

The report of the Committee on Literature, which was read by Mr. F. B. D. Curtis, editor of the *American Economist*, who gave some very interesting facts regarding the management of that journal. We reproduce the following:—During 1891 there were printed 452,350 copies of the *Economist*, containing 5,197,000 pages, exclusive of advertisements, and equivalent to 15,591,000 pages of the League's standard literature. Regarding the distribution of the *Economist* to regular subscribers and to certain members of the Government, it is sent to hundreds of colleges and Young Men's Christian Association libraries and reading rooms; to clubs, shops, fire departments, and to many other important persons and places; and to over 3,000 exchanges. A most important field of work in which Editor Curtis labors is in answering all pertinent questions regarding the tariff and watching his political opponents and promptly correcting their misstatements.

For some time the work of the League has been retarded for want of room in which to carry on its work. In fact it had outgrown its old quarters, and recently more commodious accommodations have been provided for it. Its new home embraced a floor space of 4,000 square feet. There are accommodations for fifty stenographers, typewriters and general clerical force. In the offices assigned the *Economist* is a library of about 3,000 volumes containing the best sources of information on the tariff and kindred questions, complete census reports, all the Consular reports from the first cyclopedias, reports of National and State Labor bureau, etc. The wrapping and mailing facilities are such that 100,000 documents may be placed in the mail daily if necessary. All the carpets, curtains, fixtures, furniture, etc., are of the finest description and of American manufacture.

It is quite evident that American manufacturers are not only very much in earnest in defending and upholding the cause of tariff protection in their country, but that, appreciating the fact that this defence and upholding cost money, cheerfully put up whatever may be necessary of it and disburse it in a most liberal and systematic manner. It is this sort of well-directed energy and enterprise which ensures success.

#### A RECORD AND A COMPARISON.

The Bradstreet Company, whose head offices are at New York, and who have branches in almost every important city in the world, have sent us a brochure entitled "1891—A Record, not a Prospectus." It has reference to the mercantile failures which occurred in the United States and Canada during 1891, classified according to credit ratings, to liabilities and to capital employed. A tabular view is given of the leading causes of business failures, which is classified (a) causes due to faults of those failing, and (b) causes not due to such

faults. In the first are included incompetency, inexperience, lack of capital, and unwise granting of credits, neglect of business, speculations, bad habits and personal extravagance, and fraudulent disposition of property. Under the other head are included disaster by fire, flood, crop failure, etc., failure of others, and failure by special or undue competition.

A summary of the number of business failures occurring in the United States and in Canada (including Newfoundland), during 1891, is classified as follows:—

Failures due to	United States.	Canada.
Incompetence .....	2,021	203
Inexperience .....	592	44
Lack of Capital .....	4,869	1,240
Unwise Credits .....	509	32
Failures of Others .....	279	57
Extravagance .....	251	5
Neglect .....	383	26
Competition .....	189	15
Disaster .....	2,075	142
Speculation .....	341	18
Fraud .....	875	74
<b>Totals .....</b>	<b>12,394</b>	<b>1,816</b>

The percentages of number of business failures in the United States and Canada during 1891, is as follows:—

Failures due to	United States. Per Cent.	Canada. Per Cent.
Incompetence .....	16.3	16.9
Inexperience .....	4.7	2.3
Lack of Capital .....	39.2	66.6
Unwise Credits .....	4.1	1.7
Speculations .....	2.7	0.9
Neglect of Business .....	3.0	1.4
Extravagance .....	2.0	0.2
Fraudulent Disposition .....	7.0	4.0
Disaster .....	16.5	7.6
Failure of Others .....	2.2	3.0
Undue Competition .....	1.6	0.8

In comparing these percentages it will be noted that commercial disasters in Canada are to a much larger degree due to lack of capital than in the United States, but in all other respects the showing is much more favorable as regards the Dominion. There is far less incompetence and inexperience shown in Canada, fewer unwise credits, vastly less speculation, neglect of business and extravagance, less fraudulent disposition of property, less loss from disaster and from undue competition.

In conclusion this *Record* says:—

It only remains to be pointed out that the source of all the foregoing information is the business community itself—obtained by and given out through the Bradstreet Company—that the credit of solvent merchants and institutions may not only be made known, but defended throughout the world. Knowledge of the financial standing, and other elements entering into the consideration of the credit of each producer or distributor, may be obtained either in whole or in part from members of the business world. But whether sought for from merchants, industrial workers, financiers, or from those in other walks of life, the results attained represent the degree of co-operation existing between the business community and the Bradstreet Company, and reflect the confidence of the community in the integrity of purpose and the character of the Company's administration.

#### AMERICAN PIG-IRON AND STEEL PRODUCTION IN 1891.

A RECENT issue of the *Bulletin* of the American Iron and Steel Association publishes the following facts concerning the

production of pig-iron and Bessemer Steel in the United States in 1891:—

The American Iron and Steel Association has received from the manufacturers complete returns of the production of pig-iron in the United States in 1891, and also complete returns of the stocks of unsold pig-iron in the hands of pig iron manufacturers or their agents at the close of the year. The total production of pig-iron in 1891 was 9,273,455 net tons of 2,000 pounds, or 8,279,870 gross tons of 2,240 pounds, against 9,202,703 gross tons in 1890—a decrease of 922,833 gross tons, or over 10 per cent. The decreased production may be said to have all occurred in the first half of 1891, as the production in the second half of 1891 was larger than in either half of 1890. Our production of pig iron in the second half of 1891 was at the rate of 9,823,526 gross tons per annum. It was larger than in any full year in our history down to and including 1888, and larger than Great Britain's production in any whole year down to and including 1867. Our production of pig-iron in 1891 was about 1,000,000 gross tons larger than that of Great Britain in the same year. The stocks of pig-iron which were unsold in the hands of the manufacturers or their agents on Dec. 31, 1891, and which were not intended to be used by the manufacturers, amounted to 596,333 gross tons, against 442,055 gross tons June 30, 1891, and 608,921 tons on December 31, 1890. The above figures include a part of the stocks of pig-iron held at the periods named in storage warrant yards, and which was under the control of the makers, the part not under their control Dec. 31st last amounting to 30,900 gross tons, which, added to the 596,333 tons above mentioned, makes a total of 627,233 gross tons which were on the market at that date. Dec. 31, 1890, the storage warrant yards held 25,900 gross tons of pig-iron which were not under the control of the makers, making a total of 661,821 gross tons which were then on the market. The difference between the aggregate of unsold stocks at the close of 1890 and 1891 was only 31,588 gross tons.

Through the courtesy of the Bessemer steel manufacturers we are able to present the statistics of the production of Bessemer steel rails of all weights and sections, in the United States in 1891, exclusive of the comparatively small quantity made by other manufacturers from purchased blooms. The total production in 1891 was 1,366,259 net tons, or 1,219,874 gross tons, a decrease of 577,615 gross tons from the production in 1890.

#### EDITORIAL NOTES.

"I wish to congratulate the CANADIAN MANUFACTURER upon the grand fight it is making for protective principles in Canada."—*F. B. D. Curtis, editor "American Economist," New York.*

THERE are four large establishments in the United States devoted to the manufacture of foot-balls. In the aggregate what we usually call "small industries" give large employment to both capital and labor.

"I SINCERELY hope that the efforts of the Canadian Manufacturers' Association to build up the manufacturing industries of Canada will be abundantly successful. All good men in the

United States wish to see Canadian industries as prosperous as our own have long been."—*James M. Swank, General Manager American Iron and Steel Association, Philadelphia.*

THE Welsh tin plate manufacturers can export none of their products to the United States unless they consent to pay the McKinley duty, and the large number of tinplate mills being erected in the United States, (some of them are now in actual operation) indicate that our American friends will hereafter supply all their wants for this article from their own factories.

THREE best sugar factories in California last season produced more than 8,000,000 pounds of beet sugar, upon which the United States Government paid a bounty of \$165,000. Several new factories will be established next season, and the acreage devoted to the production of the sugar beet greatly enlarged. The farmers find that the cultivation of beets pays much better than wheat or other root crops.

A DEPUTATION of brewers waited upon Premier Abbott at Ottawa, a few days ago, and represented to him the necessity of altering the excise duty on malt, which was increased a cent a pound last session. They demonstrated the impossibility of so increasing the price of beer to meet this extra duty and that it was therefore urgent to either abolish the excise duty altogether or to materially reduce it, as the present rate was injuring the trade.

THE Customs Smelting Company of Sudbury, Ont., recently presented a petition to the Ontario Government, requesting the Government to give them money and money's worth to enable them to go into business. The company propose to build and operate a customs smelter at Sudbury, for smelting nickel ore. "Canada is full of just such modest people. If this company haven't the money with which to embark in business they had better keep out of it."

WIDE-AWAKE fruit growers in the United States now sell their finest apples wrapped in tissue paper and packed carefully in baskets or boxes similar in manner to the methods which prevail in the sale of Florida and California fruit. This is considered a great convenience to those who may not care to purchase in larger quantity; the cleanliness and attractiveness of a box or basket of apples which may be carried in the hand guaranteeing a sale which would otherwise not be made.

A YEAR ago, when the tin plate market of the United States was in a condition of excitement in anticipation of the coming into effect of the clause of the McKinley tariff doubling the duty upon tin plates, Mr. F. C. Davenport, of Boston, Mass., a large importer of such goods, imported a large quantity of tin plates, expecting a speedy and considerable rise in prices. This rise did not occur, but the market went the other way and values receded; and now Mr. Davenport has assigned.

MR. JAMES M. SWANK, general manager of the American Iron and Steel Association, Philadelphia, informs the CANADIAN MANUFACTURER, that in the forthcoming directory to be issued this month by his Association, a complete list of the iron and steel works of Canada will be given. This list will be of great value to whoever may be concerned, and no doubt many

Canadian manufacturers will obtain copies of Mr. Swank's Directory. This list will be reproduced in these pages as soon as opportunity offers.

THE United States made more pig iron in the single month of October, 1891, under the McKinley Tariff, than they made in the whole of 1860, that culminating year of the "growing prosperity" of the "golden era" of low revenue tariff. The United States shipped more broadstuffs, principally wheat, to foreign countries in the single month of September, 1891, under the McKinley Tariff, than they sent during the whole of the fiscal year 1860, the last of the prosperous period of our last Free-Trade Tariff.—*American Economist.*

ABOUT a year ago the steam boilers in a large factory in the city of Quebec exploded with disastrous consequences, more than twenty persons having lost their lives by it. We notice that the widow of one of the men who were killed has brought a suit for damages against the proprietors of the mill, and one of the men who was injured there is also suing for damages. These incidents accentuate the importance of proprietors of factories and works, where labor is employed, protecting their interests by patronizing reliable accident insurance companies.

THE CANADIAN MANUFACTURER has, we notice, made a new departure in paying special attention to the interests of inventors and patentees of inventions. Canada is well to the front in the number of patents which are issued yearly, and in the intrinsic value of them; and in addition to the patents granted to Canadian inventors large numbers of them are being taken out in the United States, Great Britain, France, Germany and other countries. It is this fact, coupled with the further fact that the foreign article upon which a patent is taken out in Canada must be manufactured in this country and made available to the public within a limited time, that makes this present business of especial interest to Canadian manufacturers.—*Victoria, B.C., Commercial Journal.*

FOUR Canadian broom factories have failed in a month because their proprietors were unable to pay the high price for broom corn, and make anything out of their goods.—*Brockville Recorder.*

Arrant nonsense. Why not charge it to the N. P., where all such failures are usually charged. The reason why these four broom factories failed was probably because there was no earthly necessity for their continued existence. The high price of broom corn had nothing whatever to do with it. More brooms are being used in Canada this year than last year, and live Canadian manufacturers are making them.

A BILL has been introduced into the American House of Representatives providing that any person who has invented or discovered any new and useful plant, fruit or flower, may obtain a patent for his invention or discovery upon compliance with the requirements of the patent laws. It was Thomas Ruffin, of Virginia, we believe, who spoke of the great benefit bestowed upon mankind by any one who would make two blades of grass grow where but one grew before; and this bill is in the direction of rewarding the person who accomplishes such an object. If it becomes law, the American agriculturist and amateur cultivator of the soil will just hump himself.



THE N. & G. Taylor Company, of Philadelphia, in a recent letter to the press say: It is a mistaken idea that the block tin used in the manufacture of tin plate is mined in Wales. There is no tin mined in Wales, and that which is mined in England is not used in making tin plates. The block tin used in making tin plate comes principally from the East Indies, and London is the largest market. When we tell you that the freight on block tin from London to Philadelphia is but 13 cents per 100 pounds, you can readily see that we can land the article here at a less cost than the manufacturer in Wales, who pays more than 13 cents per 100 pounds railroad freight from London.

THE following decisions, giving the proper rates of duty to be collected on articles not specified in the tariff have been rendered by the Board of Customs during the month of January: Capsules, for bottles, plain, 30 per cent; capsules, for bottles, stamped or lettered, 15c. lb., and 25 per cent; cases (buggy) for physician's use, 35 per cent; carpet binding cotton, 25 per cent; emery knife sharpeners, 25 per cent; fishing fly books, 35 per cent; horse nets, made of twine, 35 per cent; imitation porcelain electric light shades, 20 per cent; microscopes, 25 per cent; pressed cork matting, 20 per cent; unvulcanized soft sheet rubber, 25 per cent; vulcanized fibre in sheets, etc., 30 per cent

THESE was an interesting test of armor plate at the Indian Head proving-ground on January 13th, when the first trial of American-made armor may be said to have been completed. The results sustained the conclusions of the Ordnance authorities drawn from the tests heretofore held. They again demonstrated that high carbon nickel-steel, Harvey treated, is the most successful grade of armor, and that this variety, under the usual conditions of trial, will repel the most efficient projectile yet presented. There were two plates fired at, both from the Carnegie works, one a low carbon all-steel plate, and the other a high carbon nickel-steel plate, each being treated by the Harvey process of face hardening.—*Iron and Steel Bulletin.*

FREE traders are constantly directing the attention of the farmers to the benefits which they would derive by accepting their theory. The only free trade nation on earth, pretending to any degree of civilization, is Great Britain, and if the free trade theory works to the advantage of farmers we might reasonably expect to find British farmers enjoying the height of prosperity. But do they? British farmers are leaving that country by thousands every year. Arable land to the extent of 133,718 acres went out of cultivation last year; and in the twenty years from 1868 to 1888, British-grown wheat declined from 4.09 bushels per capita to 1.78 bushels. But then British shipping interests must be fostered even if the British farmer starves.

DURING the Industrial Exhibition in Toronto last September, one of the amusement features was a cat show in an annex to Machinery Hall. An opinion was expressed in these pages at that time to the effect that an equal amount of expense and energy directed in a different direction would probably have created a greater interest in the exhibits of machinery in the

building. Since then we have been shown a paper addressed to the proprietor of the cat show, in which the exhibitors in Machinery Hall tendered their thanks, in that the show had been the means of attracting larger gatherings of visitors to that department than before. An inspection of the list of signatures to this testimonial suggests the fact that some of the largest and best known manufacturers in Canada, and some Americans also, are exceedingly fond of cat music.

THE Annual Meeting of the Canadian Press Association will be held in the Railway Committee Room, Ottawa, March 3rd and 4th. Return tickets at single fares will be issued to members and their ladies accompanying them, good from March 1st to 15th. The meeting promises to be one of the largest and most interesting in the history of the Association. An excellent programme is being prepared. The Ottawa journalists are sparing no pains to make the visit of their confreres to the Capital a pleasant one. They have arranged for a banquet Friday night, and a visit to the points of interest about Ottawa. The Governor-General will give an "At Home" Thursday. Members who have not yet received their railway privilege certificate for 1892, and newspaper men wishing to join should write at once to the Secretary, J. B. McLean, 6 Wellington St. West, Toronto.

IN reference to the statement of the condition of the Manufacturers' Life Insurance Company, which is published elsewhere in this issue, it is interesting to show the substantial progress made by the company during the past year. The facts are these:

Income .....	\$207,486 49
Increase over previous year .....	36,069 06
Gross Assets .....	437,059 11
Increase over previous year .....	86,219 16
Re-insurance reserve for the protection of policy holders .....	280,045 00
Increase over previous year .....	71,795 00
Surplus on policy holder's account .....	\$135,307 63
Uncalled capital stock .....	493,680 00
Total surplus on policy holders' account .....	628,987 63
New business written 1891 .....	2,111,100 00
Insurance in force December 31, 1891 .....	7,414,761 00

These figures argue solid and substantial progress and should strongly commend the company to the confidence of the insuring public.

CHANGES are now being made in one of the largest flour mills in St. Paul, Minn., by which the machinery of the mill will be operated entirely by electricity. It is claimed that this will be as great an improvement in flour making as was the introduction of the gradual reduction system ten years ago. As was the case then, the improvement will now be brought about by fire. Where the great Minneapolis mill explosion occurred, practically wiping out the milling system of that city, every mill was using the old millstone process, which so heated the flour as to destroy its color. In rebuilding the mills the world was ransacked for improved methods, and the result was the introduction of the Hungarian roller or gradual-reduction system. About a year ago the St. Paul roller mill was destroyed by fire and rebuilt on a larger scale. It will now be operated by electricity, without fire or steam about

the plant. Electrical experts from all over the country have been engaged upon the plant for months and have at last perfected it. The owners claim they will revolutionize flour making and reduce the cost to one third.

THE *London Advertiser* thinks there is too great a tendency to grant holidays in the public schools, and that the recesses at Christmas, Easter and midsummer could well be cut down instead of extended. Not to speak of the comparatively short period that the average child can attend school before he is compelled to go to work, it says, that extended holidays are in few, if any, respects beneficial to the child, while imposing unnecessary trouble upon mothers. A holiday now and again is a good thing, it says, but long periods of idleness are demoralizing to youngsters as well as to the grown-up. Parents look to the school trustees to countenance nothing that will have a tendency to promote idling habits. We wonder if the *Advertiser* man was ever a school-boy, and if he was injured by any holidays he may have then enjoyed. The general impression is that children are worked hard enough at school, and that frequent recesses are very essential to their progress and health. And the same rule applies to those who perform manual labor for their living. Certainly long periods of idleness are demoralizing, but the advanced thinkers of the age observe that the shortening of the hours of labor and occasional holidays are indicative of prosperity and happiness.

THE recent Dominion census reveals the fact that the capital invested in the manufacturing interests of Canada has increased from \$165,302,622 in 1881, to \$360,181,466 in 1891. The increase is largely accounted for by the operations of the N.P. which have given a fictitious value to manufacturing enterprise, and have largely increased the values of land in the cities at the expense of the agricultural districts. Comparing the vast increase of wealth with the very, very small increase in population one is tempted to quote the lines:

Evil tares the land, to hasten ill a prey,  
Where wealth accumulates and men decay.

*Montreal Herald.*

The ignorant negroes of the south entertain the idea that at some time or other, and with greater or less frequency, a Fool Killer will perambulate the land and destroy the fools. If that mythical personage should visit Montreal he might find his first victim in the *Herald* office. In its hatred of Canadian manufacturing industries and of the N.P., which makes their success possible, in the face of the fact that the capital invested in them has increased nearly \$200,000,000 in ten years, it tells us that the land fares evilly, that it is a prey to hastening ill, and that the men are decaying. How long, oh Fool Killer, how long will you defer your visit to Montreal?

OUR esteemed Toronto *Empire* of February 10th discussing the then pending parliamentary election in East Middlesex, says:—

The only difference of opinion apparently between Mr. Marshall and Mr. Taylor on public matters is as to the duty on binder twine, which after all is not such a vital matter as it may seem. The policy of the Government with regard to all manufactures is to afford a reasonable protection to the industries of the country. If such protection is taken advantage of for the purpose of monopoly or to aid oppressive exaction in prices, the Government has already shown its willingness to

afford relief by the measures it adopted last session to destroy the monopoly in salt, and doubtless would take similar action if it became necessary to put a stop to any attempt at monopoly or undue exaction by the manufacturers of binder twine.

In our opinion the farmers of Canada will not be made to suffer to the extent of one cent because of the binder twine situation, and the result in East Middlesex demonstrates that the farmers there so view the question. But the *Empire* in speaking of the willingness of the Government to afford relief to the people against monopoly, forgets that the sugar monopoly are squeezing more than \$700,000 a year out of the people more than any fair construction of the principles of protection countenances.

CANADA petitioned two months ago to be relieved from the effect of the most favored nation clause in treaties between England, Belgium and Germany. This means simply that the Dominion wishes to come into our little reciprocity mutual benefit association, and she wants England's permission to be rude for the nonce to Germany and Belgium. We are sure there are benefits to be reaped from closer relations to Canada, and the only thing is to make them "mutual" enough to satisfy both parties.—*St. Louis Farm Machinery.*

Canada does not desire to be rude to any nation, and she does not see just where or how she can derive any profit in the "reciprocity mutual benefit association" our neighbor speaks of. The American idea of reciprocity as applied to Canada means the sending of the natural products of Canada to the United States to be manufactured into merchandise for the Canadian market, upon which no duty is to be paid; and the death of Canadian manufacturing industries. This is not the sort of closer trade relations Canada desires. Five cents per dozen on Canadian eggs, thirty cents per bushel on Canadian barley, and \$200 per ton upon Canadian refined nickel indicates the quality of the friendship the United States entertains towards Canada. If the Canadian Government are wise they will soon inaugurate a little reciprocity mutual benefit association for Canada which would call for some letting down of the bars or a payment of a heavy export duty upon nickel and pine logs. A good rule works two ways.

In another page will be found an article taken from the *London Lancet*, which makes allusion to the great number of uses to which electricity is being put in the practice of medicine and kindred sciences, and the opportunities which are open to the investigator and inventor in this new and rapidly widening field. No day passes which does not record discoveries in this direction, and inventions by which electricity may be put to the uses of every-day life. When it was demonstrated that electricity could be utilized for lighting purposes many thought that the acme had been reached; and when plants had been established for the production of electric light for commercial purposes, the managers of many of them seemed to think that the great object to be attained was to extend their systems and increase the number of lights upon their circuits. But more than light is now demanded; and there is scarcely a user of the electric light who does not discover that there are a hundred other uses to which the energy might be put in his business or for his comfort or convenience. When the wires are introduced into a building for the production of light, it is soon found that the electricity can be used for many other

purposes. Thus heat may be produced more economically under some circumstances, than in any other way, and power may be used for driving machinery, where the use of any other power would be practically impossible. Electric burglar alarms are a greater security against unwarranted intrusion than bolts and bars and strong doors. Electric communication is more swift and reliable than fleet-footed boys; and as Dr. Hedley shows, there is an immense and undeveloped field in the adaptation of electricity for surgical and medical purposes. Truly the wide-awake inventor of to-day is on the threshold of a golden era.

MENTION has been made in these pages from time to time of the fact that a sugar refinery had been established at Vancouver, B.C., and that it was in a fair way to do a lucrative business, refining raw Chinese sugar and supplying the demand of the Pacific coast. Since this refinery went into operation, it has been seeking to sell its refined sugar as far east as Manitoba, but in doing this it has encountered and antagonized the sugar syndicate, with the result that the British Columbia concern has been unceremoniously driven out of the Manitoba market. The freight rates on sugar, from Vancouver to Manitoba points, are very much higher than to the same points from Montreal or even Moncton, although the distance is very much greater on this latter haul; and it is because of this railroad discrimination in their favor that the syndicate can sell sugar in Manitoba at 35 cents the hundred pounds less than the Vancouver refinery can. In fact it is charged that the syndicate have actually been selling sugar in Manitoba cheaper than they will sell it for in Montreal or Moncton. Of course this will not continue when the Vancouver refinery is driven completely out of the Manitoba market, and the consumers there will soon discover that they will soon have to recoup the syndicate for whatever they may have sacrificed in this sweet game. The great distance from the Pacific coast prevents the appearance of Vancouver sugar in Ontario markets, and an unnecessarily high duty upon American and European sugar, forces Ontario to consume syndicate sugar, the country at large being forced to pay the syndicate more than \$700,000 a year more than what they would be paid for their services if the Canadian duty was no higher than that imposed by the McKinley tariff.

SPEAKING of the Toronto College of Pharmacy, the *Toronto Globe* says:—

One of the great objects of the college is to turn out young men who will be fully competent to manufacture their own pharmaceuticals, and thus save the profit that would go to the manufacturer, as well as secure results more desirable because in every way more reliable. It has been stated on good authority that with the requisite knowledge a retail druggist could prepare many of the pharmaceuticals now put up by wholesale firms, save half the price, and at the same time both the public and the medical profession would be better served.

The *Globe* never misses the opportunity to belittle and depreciate Canadian manufacturers, although it makes itself extremely silly in doing so. No doubt it is desirable that the College of Pharmacy should turn out graduates who would be competent to manufacture all their medicinal preparations, or even all such as they might have occasion in subsequent life

and business to handle and sell; but it is ridiculous to suppose that one per cent. of the graduates would ever be required to exercise such knowledge. If the *Globe* knows anything of the profession of which it speaks, it should know that there are a great many medicinal preparations which are valuable only when used perfectly fresh, and also the minimum of cost can only be obtained when the preparations are made in large quantities. In other words, a regular manufacturer of such preparations with a large and well equipped factory, can produce goods equal to or better than the best that could be produced by pharmacy graduates engaged in filling prescriptions over the counter of a drug store, delivering them at lower prices and in fresher condition. The common sense that should impel all men would dictate that the pharmacist who handled only the best preparations of the best and most reliable manufacturers, and who did not pretend to manufacture the preparations which he dispensed, should receive the patronage of the public in preference to the pharmacist who adopted the other plan. The *Globe* shows its ignorance when it suggests that the products of amateur pharmacists are "more desirable because in every way more reliable" than the products of long established and entirely reliable manufacturers.

THE *Cleveland O., Iron Trade Review* is one of the most acceptable and instructive journals that comes to our editorial table. The conditions of prosperity which it enjoys have made some changes in its management quite necessary, and it is with feelings similar to those in parting with "old friends that we observe that Mr. W. M. Day, who has been editor ever since 1882, now retires. As a director in the concern, however, he will still maintain a lively interest in the enlargement and development of the paper. His successor as editor will be Mr. A. I. Findley, of Akron, O., a journalist of varied and extended experience and a gentleman of the highest character.

The eighth number (February) of *The Illustrated World's Fair* contains a page article and portrait of Dr. Lester E. Keeley, of Dwight; a page article and portrait of Rev. Dr. Radford, of Denver; poems and sketches by Madison J. Cawein, Anna Oldfield Wiggs, Rev. Marcus Lane, Dr. Carey, of Spokane, Prof. Griffen, Rev. Frank Crane, Frank B. Welch, Will Hubbard Kernan, Gertrude E. Wall and other authors. Important rules are printed. The illustrations sustain the high reputation of this magazine for enterprise, and include a panoramic scene of Jackson Park; a page view of the largest floor that ever was laid; interiors of the Art Palace, the Horticultural, the Transportation, the Mines, the Agricultural; magnificent views of the upper work of the Administration, and the dome of the Horticultural; a humorous cartoon, and many life-like portraits. \$2.50 a year; single copies twenty-five cents. J. N. Halligan, McVicker's Building, Chicago, Ill.

ENCOURAGED by the praise bestowed on the *Illustrated American* by the press, and the popularity it has achieved with the public, that excellent paper still continues to present to its readers a most interesting weekly budget of news. In the number for the week ending February 20, 1892, the following well written and delightfully told stories will be found: A sketch of the Tennessee mining troubles, illustrated with photographs of miners, the village of Buccerville and mountain guards; an interesting account of the Mahdi, illustrated with Egyptian scenes; an admirable story of the late Charles Spurgeon, the eminent English divine, and an interesting sketch of the famous court intrigue in which the late Sir Morell Mackenzie and the Empress Frederick of Germany played each an important part. Michael Kutusoff, Prince of Smolensk, forms the sixth article of the series "Napoleon's Adversaries." The short story for this number is entitled "A Game with Davy Jones"; a portrait of Helen Dauvray is presented in the gallery of players, and a pretty picture of Lady Sarah Wilson looks upon you as the frontispiece.

A PROMINENT feature of *Good Housekeeping* is the publication of series of articles relating to diverse interests of the household, each article complete in itself, yet combined in the series to secure thoroughness of treatment. The February number gives in this

department the following titles, each of which is treated by a writer thoroughly competent to deal with the subject matter: "Many Meals for Many Millions," by Miss Parloa; "The Expert Waitress," by Frances Spalding; "The Household Mending Basket," by Ada Mario Peck; "The Food of the People," "The Household Laundry," "Family Fashions and Fancies," etc. The magazine is always freighted with instructions and suggestions of value to the mistress of the home, and has attractive departments for the young people. It believes also in entertainment as well as instruction, and gets so far from the merely technical matters of the family circle as to treat of St. Valentine's Day, Duplicate Whist, Church Going, and a wholly new literary entertainment. The illustrated frontispiece is of "The Old Oven." The stories, poetry, selections and compilations are of the usual high order of merit. Clark W. Bryan & Co. Springfield, Mass.

DR. ANDREW D. WHITE will open the March *Popular Science Monthly* with a chapter on Astronomy in his "Warfare of Science" series. The strenuous exertions made by both the Catholic and the Protestant clergy to suppress the teachings of Copernicus and Galileo are set forth in this article with such strong evidence as to admit of no denial or shifting of responsibility. "The Organ" will be the subject of an article in the "American Industries" series. The author, Mr. Daniel Spillane, describes some of the noted instruments in the United States, and shows that American organ-builders have made good use of the scope for individuality which their art allows. The article is fully illustrated. Under the title "Social Statistics of Cities," there will be a paper by Carroll D. Wright, comparing the area and population, and the cost of each department of public works, in fifty cities of the United States. The comparison contradicts some prevailing opinions as to what cities have the most expensive governments. "The Cotton Industry of Brazil" will be described by John C. Branner, formerly assistant geologist of the Brazilian Geological Survey. Mr. Branner believes that the production and manufacture of cotton in Brazil is destined to increase, but that the country will not become a competitor of the United States in this industry.

#### TRADE PAPERS AND BUSINESS MEN.

THERE is no fact in modern civilization more generally endorsed than the necessity of advertising. It is as universal as the need of pantaloons, and the demand for tea pots and plates. It subsists on printers' ink, double head lines and condensed brains, and has developed a science of manipulation as indispensable to success as the handling of leather is to the manufacture of harness, satchels and shoes. This is beyond question by any man not living in the backwoods or a hermitage; but with this admitted it is still a fact that the average mind fails to grasp the situation, and men are still placing "ads" where they do as little good as a spool of thread in a bale of hay. There is a right place for everything, even with an "ad," and when not put there is as innocent of use as a base ball is of whiskers. In this very important phase of advertising, we note the difference between the newspaper and the trade journal. Each has its own special work, and on these definite lines each has its distinguishing vocation. One, of course, has the most readers, but as these are like the creatures in Noah's Ark—of every diversified kind, and mostly given to the every-day revelations of politicians and the devil—it is manifestly impossible to expect a sale of business hay to kittens and ladies. We may add to this what everybody already knows—that newspaper veracity is not always of the George Washington type, nor is its conscience always so strict that a fraudulent camel cannot crowd its hump through the needle's eye.

In this matter the trade journal dare not do very much of the Ammanias business, nor is it likely to make the mistakes of the promiscuous reporter who dabbles in suicides and statistics, and has to serve up a free lunch every day of crime and chemistry, the need of a hired girl and the decisions of the patent office. The trade journal is hardly so miscellaneous. It has specific lines, and the editorial shoe has to toe the mark. It has to be accurate as well as specific. Two and two must always be four. With this indispensable morality in its arithmetic and make up, it is, as a rule, a reliable trustee of the advertiser's money and his "ad." He puts the pumpkin seed in the right hill. What it says the right man reads. It takes the fodder direct to the stable, and never, unless in want of an early death, cares to peddle silk where pig-iron is wanted, or carry cotton to coal mines. Knitting needles are no use to men who never wear socks, nor door locks to men who never get into trousers or houses. In the trade journal all this foolery is severely left alone. Hence its value. It carries the match to the candle, and never is guilty of taking toothpicks to babies. All this

acknowledged, it is with some men in reading as with a blind man in the street—He passes everything and sees nothing. An advertisement can become both monotonous and invisible. An alarm clock in time fails to attract attention, or wake even a cat, and an "ad" without a change in its make up is equally destined to obscurity and no service. Here the science of advertising demands skilful manipulation, and an occasional new arrangement of head lines and matter to attract attention. In this department, the business man had better leave the matter to those who are professionally expert in these details. The field in this line is practically innocent of fence rails, and capable of indefinite extension. As the fact stands to-day, the matter of advertising is of vital importance both in how to do it and where to do it, and that being wisely utilized, the trade journal is the institution equal to the occasion and the duty.—*Age of Steel.*

#### RULES AND REGULATIONS.

The following rules and regulations have just been issued by Director General Davis for the government of exhibitors at the World's Columbian Exposition, at Chicago.

Rule 1. Exhibitors will not be charged for space. A limited amount of power will be supplied gratuitously. This amount will be settled definitely at the same space is allotted. Power in excess of that allowed will be furnished by the exposition at a fixed price. Demands for such excess must be made before the allotment of space.

Rule 2. Any single piece, or section, of any exhibit of greater weight than 30,000 pounds will not be accepted if machinery is required for its installation.

Rule 3. Exhibitors must provide, at their own expense, all show-cases, cabinets, shelving, counters, fittings, etc., which they may require, and all countershafts, pulleys, belting, etc., for the transmission of power from the main shafts.

Rule 4. Exhibitors will be confined to such exhibits as are specified in their application. When the allotment of space is definitely made, exhibitors will be notified of their allotment of space and its location, and will be furnished with a permit to occupy such space, subject to the general rules and regulations adopted for the government of the exposition and the special rules governing the department in which their exhibit will be made.

Rule 5. Special rules will be issued governing each department and the sale of articles within the buildings or on the grounds.

Rule 6. Decorations, signs, dimensions of cabinets, shelving, counters, etc., and the arrangement of exhibits must conform to the general plan adopted by the Director-General.

Rule 7. Reasonable precautions will be taken for the preservation of exhibits, but the World's Columbian Exposition will not be responsible for any damage to, or for the loss or destruction of any exhibit, resulting from any cause.

Rule 8. All packages containing exhibits intended for the several departments must be addressed to the "Director-General, World's Columbian Exposition, Chicago, Illinois, U.S.A." In addition the following information must be written on the outside of each package.

- (a) Department in which exhibit is to be installed.
- (b) The State and Territory from which the package comes.
- (c) Name and address of the exhibitor.
- (d) The number of the permit for space.
- (e) Total number of packages sent by the same exhibitor.

The serial number must be marked on each package, and a list of the contents inclosed in each package. Freight must be prepaid.

Rule 9. Favorable terms will be arranged by which exhibitors may insure their own goods. Exhibitors may employ watchmen of their own choice to guard their goods during the hours the exposition is open to the public. Such watchmen will be subject to the rules and regulations governing employees of the exposition.

Rule 10. The expense of transporting, receiving, unpacking, and arranging exhibits, as well as their removal at the close of the exposition, shall be paid by the exhibitor.

Rule 11. If no authorized person is at hand to take charge of exhibits within a reasonable time after arrival at the exposition buildings, they will be removed and stored at the cost and risk of whomsoever it may concern.

Rule 12. The installation of heavy articles requiring foundations should by special arrangement begin as soon as the progress of the work on the buildings will permit. The general reception of articles at the exposition buildings will commence November 1, 1892, and no article will be admitted after April 10, 1893. Space not taken possession of April 1, 1893, will revert to the Director-General for reassignment.

Rule 13. If exhibits are intended for competition it must be so stated by the exhibitor or they will be excluded from examination for award.

Rule 14. The chief of each department will provide cards of uniform size and character, which may be affixed to exhibits, and on which will be stated only the exhibitor's name and address, the name of the object or article exhibited and its catalogue number.

Rule 15. Articles that are in any way dangerous or offensive, also patent medicines, nostrums and empirical preparations whose ingredients are concealed, will not be admitted to the exposition.

Rule 16. Exhibitors' business cards and brief descriptive circulars only may be placed within such exhibitors' space for distribution. The right is reserved by the Director-General to restrict or discontinue this privilege whenever in his judgment, it is carried to excess or becomes an annoyance to visitors.

Rule 17. The chief of each department, with the approval of the Director-General, has the power to order the removal of any article he may consider dangerous, detrimental to or incompatible with the object or decorum of the exposition or the comfort and safety of the public.

Rule 18. Exhibitors will be held responsible for the cleanliness of their exhibits and the space surrounding the same. All exhibits must be in complete order each day at least thirty minutes before the hour of opening. No work of this character will be permitted during the hours the building is open to the public. In case of failure on the part of any exhibitor to observe this rule the chief of the department may adopt such means to enforce the same as circumstances may suggest.

Rule 19. The removal of exhibits will not be permitted prior to the close of the exposition.

Rule 20. Sketches, drawings, photographs, and other productions of articles exhibited, will only be allowed upon the joint assent of the exhibitor and the Director-General; but general views of portions of the interiors of the buildings may be made by the approval of the Director-General.

Rule 21. Immediately after the close of the exposition, exhibitors must remove their effects, and complete such removal before January 1, 1894. Goods then remaining will be removed and disposed of under the direction of the World's Columbian Exposition.

Rule 22. An official catalogue will be published in English, French, German and Spanish. The sale of catalogues is reserved exclusively by the Exposition Company.

Rule 23. Each person who becomes an exhibitor thereby agrees to conform strictly to the rules and regulations established for the government of the exposition.

Rule 24. Communications concerning the exposition, applications for space, and negotiations relative thereto, should be addressed to the "Director-General, World's Columbian Exposition, Chicago, Illinois U.S.A."

Rule 25. The management reserves the right to construe, amend, or add to, all rules and regulations, whenever it may be deemed necessary for the interest of the exposition.

#### TEST OF THE J. B. HASTINGS' STEEL.

The test of converting Virginia pig or scrap iron into steel, according to the J. B. Hastings' process, came off at the South Side foundry to-day to the entire satisfaction of all who were present. The test lasted about two hours, and was personally supervised by Mr. Hastings, who has in the past few months conducted similar tests from Alabama to Canada, all of which were highly satisfactory. That made to-day, however, was more rigid than any previously made, and in the opinion of the experts present fully established the fact that the new process is a complete success. By it steel of the best quality is made from the lowest grade of ores, which is something that cannot be done by the old process, and that the Bessemer people have never attempted. The test was witnessed by a large number of prominent people. A cold chisel was applied to a specimen of the steel made by the new process, but it not only failed to make an impression on the steel, but retired from the tight considerably battered about the edge. Much interest is felt by persons interested in the iron and steel business all over the country in the new process, and the patentee and those interested with him already have received overtures from persons prominently connected with the iron ores of Virginia, to build a preliminary plant at once. The value of the new discovery can hardly be over estimated, as will readily be seen by all who are familiar with the details of the manufacture of iron and steel. —Charleston (W. Va.) Tribune.

Among the prominent iron men present was our townman, E. J.

Bird, Jr., who tells us that the test was successful in every way. He says Mr. Hastings has a really valuable discovery. An excellent steel is made by the dropping of a little powder in the ladle in which the metal is received from the cupola. There is no doubt but the pig metal is changed into a strong steel. Mr. Bird thinks that Mr. Hastings will yet realize on his discovery. There is talk of starting an establishment at Buchanan, for the purpose of making Hastings steel. —Ironton (O.) Register.

#### PETROLEUM AS FUEL.

The Tremont and Suffolk mills, Lowell, Mass., have, after a series of experiments, adopted petroleum as a fuel. It is used in the form of gas. Two tanks are buried in the ground, about thirty feet from the furnaces, thus insuring safety from fire. A smaller tank is located above the larger ones, the contents of the latter being pumped into it. This tank contains the supply for immediate consumption, and is connected with a series of pipes running to the boilers, which are situated on a lower level. The oil is consumed in the form of spray mixed with steam under the boilers. The fire is regulated by simply turning a valve. This is under control of the fireman, and the work of keeping the steam at a uniform point is made perfectly easy. The mills used eight boilers under the old system, which they have now reduced to six, the speed of the engines being the same with the usual amount of work to perform. The oil is brought to the mills in tank cars, containing from 3,500 to 6,000 gallons each. The increased neatness of the fire room is also one of the results of using petroleum instead of coal. The difference in cost of oil and coal is not yet accurately determined, but is estimated to be but small.

The prevention of incrustation in boilers by means of electricity is brought forward at intervals, and usually all that is necessary is a small battery and a few wires. An engineer who was troubled with electricity from his belts suspends from a bar a large number of copper wires that collect the electricity, and he grounds it through his boilers, and to this he attributes the freedom of his boiler from much scale. —American Miller.

On the North of France railway an important experiment is about to be tried on a large scale. All carriages, even on short distance trains, are to be warmed, and the warmth is to be produced by means of boxes of acetate of soda. The chemical is put in a solid state into the boxes, and these are then plunged into hot water of about 100 degrees. The effect is that the soda becomes liquid. On being taken out of the water the boxes are wiped dry and put in carriages. By degrees the soda solidifies, and as long as that operation lasts—that is, for about five or six hours—it gradually gives off the heat it has absorbed in the melting process.

A discovery of natural coke, a very close resemblance to the manufactured article, has been discovered at the Brelli Pass Mines, New South Wales. The seam, which occurs in a coal measure covering 550 acres, is composed partly of a coal of about the same description as ordinary Australian coal and this coke. The junction of the two is clearly defined, and can be traced through the entire workings. In comparison with the manufactured article, the natural coke is a little heavier, contains less fixed carbon and a much smaller percentage of ash and sulphur. It is said that it burns without smoke, and can be mined much cheaper than the cost of manufactured coke.

The total number of locomotives in the United States, as shown by the annual report of Henry C. Adams, statistician to the Interstate Commerce Commission, is 29,928, of which 8,384 are passenger locomotives and 16,140 are freight locomotives. This shows ten freight locomotives and five passenger locomotives for each 100 miles of operated line. The number of cars used on the railways of the United States is 1,164,188, of which 26,511 are in the passenger service. The number of cars per 100 miles of line is 744. The number of tons of freight carried one mile per freight engine is 4,721,627, and the number of passengers carried one mile per passenger engine is 1,413,142. Figures of this sort measure the economy of transportation by rail. The larger portion of equipment is found on railways in the Eastern and Middle States. Thus, in the New England States there are 28 locomotives per 100 miles of line; in the Middle States, 46 locomotives per 100 miles of line; while in the states west of the Mississippi the number does not exceed 15 locomotives per 100 miles of line. The number of locomotives fitted with train brake is 20,162, and the number fitted with automatic coupler, 955. The number of cars fitted with automatic coupler is 144,364. —Illustrated American.

## 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.

The grist mill of Mr. W. L. Hicks, at Selkirk, Ont., was destroyed by fire February 12th. Loss about \$3,000.

MESSRS. DOERING & MARSTRAND, Vancouver, B.C., are about erecting a brewery with capacity of 25,000 barrels a year.

MR. J. W. F. HAYWARD has secured a suitable factory in Winnipeg, Man., and will begin the manufacture of pianos and organs.

The furniture factory of Messrs. J. Gibbard & Sons, at Nanapan, Ont., was destroyed by fire February 11th. Loss about \$15,000.

MESSRS. INGLIS & HUNTER, Toronto, are building new feathering paddle wheels for the well known passenger steamer *Empress of India*.

MESSRS. J. L. GRANT & Co. pork packers, Ingersoll, Ont., have recently enlarged their works, their capacity now being to handle 800 hogs per day.

The Canada Paint Company has been incorporated at Montreal with a capital stock of \$25,000, to manufacture paints, colors, varnishes, oils, etc.

MR. F. CURRIE, Toronto, has taken over the plant and business of the Barnum Wire and Iron Works Company, Toronto Junction, and will conduct the same.

• The Albion Iron Works Company, Victoria, B.C., have secured a suitable water front property in that city and will build works for the construction of iron vessels.

MESSRS. J. C. HEGLER, J. P. Dunn and J. N. Dunn, of Ingersoll, have received a bonus of \$10,000 from the town of Strathroy to establish a canning factory there.

The Lake of the Woods Milling Company, of Keewatin, Ont., is erecting a new elevator at Portage la Prairie, Man., which will be one of the largest in the Dominion.

MR. JOHN ABELL, manufacturer of flour mill and farm machinery, etc., Toronto, have secured the exclusive right to manufacture the Barnard & Lea's Manufacturing Company's air belt purifier.

MESSRS. R. E. MENZIE & Co. will build and operate salt evaporating works at Point Edward, Ont., giving employment to thirty-five people, if that municipality will grant them a bonus of \$5,000.

MR. ALFRED BOYD, Toronto, announces to the trade his readiness to supply all demands for borax, boracic acid, salammoniac gambier, alkali, nitrate of soda, sulphate of ammonia, potash salts, muriate of potash, etc.

MESSRS. MCKEUGH & TROTTER, foundrymen of Chatham, Ont., have amalgamated their business with that of the Vancouver Foundry and Machine Works, Vancouver, B.C., and will be the controlling spirits of the business.

MR. N. N. BENTLEY, of Five Islands, has exchanged the boiler and engine formerly used in his rotary mill for a new Monarch boiler and Hercules engine, manufactured by the Robb Engineering Co., Ankerst.—Cumberland, N.S., *Leader*.

THE E. & C. GURNEY COMPANY, Toronto, are putting in the heating apparatus of the City Hall and City Hospital at Brandon, Man. In one of these buildings one boiler supplies the hot water required in 20,000 feet of radiating piping.

The Vancouver Candy Company, and the firm of Ramsay Bros. of Victoria, B.C., have been amalgamated, and the business of the two concerns consolidated under the title of Ramsay Bros. & Co. The head place of business of the company will be in Vancouver, B.C.

The Toronto Type Founding Company has been incorporated at Toronto, with a capital of \$150,000, to take over the business in type founding and printers' supplies now carried on by J. T. Johnston at Toronto, under the style and name of the Toronto Type Foundry.

MESSRS. HENRY BARBER & Co., Toronto, request the attention of those who may be interested to the valuable one-set knitting mill which they have for sale. It is situated on Lock 9, of the

Welland Canal, at Merritton, and is very complete in its equipment and furnishings.

THE Howarth Belting Company, Toronto, have opened an office in Montreal for the sale of their goods. They will carry a full stock there and compete for the trade in that city. They have just manufactured a double thickness leather belt for the electric light station in Kingston, Ont., 140 feet long by 36 inches wide.

THE Torbrook iron mines are being vigorously worked. The new railway from Wilmot to the mine affords splendid facilities for shipments, and an immense quantity of the crude ore is shipped over the Windsor and Annapolis railway to the smelt works at London-derry. About eighty men are employed at the mines now.—*St. Johns, N.B., Gazette*.

THE output of the Cumberland Coal Company at Springhill, N.S.: last year was 457,000 tons, being an increase of 40,000 tons over that of the preceding year. The company employs 1,500 men and boys, and some 300,000 tons of coal was sent away from the mines via Springhill Junction and the Intercolonial railway, while 100,000 tons went over the company's railway to Parrsboro' and was shipped at that port.

SOME time ago a large deposit of marble was discovered on the land of the San Juan Lime Company, on Texada Island, B.C. The marble is of two shades, one white and the other grey, and is of excellent quality. Messrs. P. Wade & Co., have leased the quarry and have a number of men employed opening it up. If the demand increases, the firm will put up special machinery for sawing the marble for tiling and paving.

A FEW days ago an iron pulley on one of the dynamos in the new electric light station at Toronto Junction burst while running at full speed. The fragments flew in all directions, but fortunately none of the attendants were injured. The demolished pulley was immediately replaced by a Dodge wood split pulley obtained from the stock of the Dodge Wood Split Pulley Company's factory in that place, which is doing the service required of it with the utmost satisfaction.

TWO wooden clipper ships, the *Trojan* of Windsor, N.S., and the *Vandua* of Yarmouth, N.S., are now engaged in an ocean race from Calcutta around the Cape of Good Hope to Boston. Both ships have cargoes of jute. The *Trojan* is a ship of 1,595 tons, is commanded by Capt. Armstrong, and sailed from Calcutta on December 4th. The *Vandua* got away on December 7th. She is 1,368 tons register, and is commanded by Capt. Allan. Both vessels have a good reputation for speed.

MR. JAMES LESLIE, Montreal, occupies a prominent space on our outside back cover, in announcing to our readers, that he is a manufacturer of machine card clothing, loom reeds, and cotton and woolen mill supplies, and of English oak tanned leather belting. This is an old and well established concern, to whom our readers need no new introduction. We are informed, that during March, Mr. Leslie will remove his factory and office from their present location to larger and more commodious quarters at No. 428 St. Paul street, corner of St. Francois Xavier street.

IT is understood that the Gananoque Carriage Company, Gananoque, Ont., have accepted the \$50,000 bonus offered them to remove their works to Brockville, Ont. The company have recently purchased six acres of land at the junction of the Canadian Pacific and Grand Trunk railways, at Brockville, and are preparing to erect extensive factory thereon for manufacturing the more expensive and elaborate of their carriages, while they will retain their present works at Gananoque for the production of other grades. It will be probably a year before the Brockville factory will be ready for occupation.

IN the course of a couple of months Ottawa will probably possess one of the finest electrical generating stations in the Dominion of Canada. It will be the magnificent new mill built for Pierce & Co., and which was purchased a few days ago by the Chaudiere Electrical Light Company. The work is expected to be commenced shortly of removing the electric plant into the new premises. The mill is in a most conspicuous and central locality, and when equipped with dynamos and generators and brilliantly lighted up, will form quite an attraction on Victoria Island. This spot seems to have been destined to be notable for electric innovations, as it was in the old sawmill of Capt. Young on the same site, that the electric light was first seen in this city, nearly fifteen years ago, when a trial was made of the light which is now in such general use throughout the whole city.—*Ottawa Citizen*.

THE British Columbia Timber and Trading Company, have recently sent from their sawmills at Hastings, B.C., a large and important shipment of timber, intended for the harbor improva-

ment works at Montreal. It was loaded on three pairs of cars and was of the following dimensions: 3 pieces, 36x36, 60 feet; 1 piece, 36x36, 68 feet; 2 pieces, 21x21, 66 feet; 1 piece, 24x24, 60 feet; 3 pieces, 21x21, 62 feet; 3 pieces, 21x21, 60 feet; 3 pieces, 21x21, 64 feet; 5 pieces, 14x16, 80 feet. These pieces of timber, which are faultless for their full length, are intended for heavy dredge work, the largest being spuds, and the smaller for cranes, etc. This practically opens up a new field for our British Columbia timber, inasmuch as the possibility of shipment affords an opportunity for its utilization in many ways in connection with large public works and other such enterprises. To add to the significance of the shipment is the fact that the C.P.R. Co. has undertaken to ship it through to Montreal in twelve days, a most remarkable feat considering the weight and length of the timbers.

The Dodge Wood Split Pulley Company, Toronto, report having recently supplied the following systems of their patent Rope Transmissions through their agents in Montreal, Messrs. Miller Bros. & Toms Canadian Rubber Company, one 6 h.p. drive, 100 feet between centres; Lake St. John Railway Company, one 20 h.p. drive; Consumers' Cordage Company, one 50 h.p. drive, Montreal Provincial Exhibition Company, one 40 h.p. drive; Intercolonial Railway Company, one 20 h.p. drive; Merchants' Manufacturing Company, one 75 h.p. drive; Messrs. M. Lang & Sons, one 13 h.p. drive; Mr. A. Bourgeau, one 20 h.p. drive; Messrs. Jas. Robertson & Co., one 75 h.p. drive; Messrs. Beauprie & Rheame, one 10 h.p. drive; Messrs. A. H. Sims & Co., one 20 h.p. drive and one 10 h.p. drive; Messrs. J. C. Wilson & Co., one 40 h.p. drive; Messrs. G. F. Slater & Sons, one 20 h.p. drive. All these drives are in daily operation and can be seen by those interested. Messrs. Miller Bros. & Toms are general agents in Montreal and vicinity for the manufacture of these drives, and report increasing demands for the Wood Split Belt Pulley, and Rope Transmissions.

The Cant Bros. Co., Galt, Ont., have just brought out a new automatic hollow square chisel morticing machine, which, we believe, is the first of the kind ever manufactured in Canada. The novelty of this machine consists in the peculiar formation of the chisel, which is square, and is fitted with an auger made to revolve inside it. The end of the auger projects slightly beyond the edges of the chisel, and when brought up to the timber it bores a round hole—the chisel following it, and simultaneously squaring out the four corners and sides, and with no furring to the machine. A finished mortice, free from chips is thus made. The depth of the mortice is regulated by the adjustments of the table or the adjustments of the stroke. The movement of the chisel is governed by a treadle placed at the side of the machine, which gives it a continuous reciprocating motion. The stroke is variable by changing the position of the crank pin on the reciprocating frame. The table is counterbalanced, and is adjusted vertically by a lever provided with stops by which one or more mortices can be made as in double morticing. It has an adjustment endwise for regulating the length of the mortice by a hand-wheel operating a rack and pinion.

#### A CANADIAN CHARCOAL FURNACE.

MR. WILLIAM CLEARY, of this city, has just returned from Radnor Forges, Chaplain county, Quebec, Can., where he has been for some time past engaged in building a new charcoal furnace to take the place of an old one at that point which ranked as one of the oldest furnaces in America, it having gone into operation about the same year the Principio furnace in Maryland did, back in the time of the old French regime in Quebec.

The new furnace has been built by the Canada Iron Furnace Co. (Ltd.), whose works are at Radnor Forges, with headquarters at Montreal, a concern that has a paid-up capital of \$200,000 and does an extensive business. It is situated on the line of the Canadian Pacific Railway, and in the centre of what is said to be the largest deposit of bog ore in the world, that of the Three Rivers district, Quebec. The company owns and controls 60,000 acres of iron ore rights in addition, including Lac-a-Tortue, where there is an immense deposit of ore. The company also owns and controls extensive timber lands on the St. Maurice river, whence the wood can be either carted to its charcoal kilns at Grand Piles, close to the furnace, or floated to that place by river. At this point the company owns an undeveloped water power estimated at 35,000 horse-power. At Three Rivers it also owns a very valuable property, among its possessions there being a car wheel foundry and docks. From the latter, situated on the River St. Lawrence, shipment can be made to England by ocean steamer direct, and ore

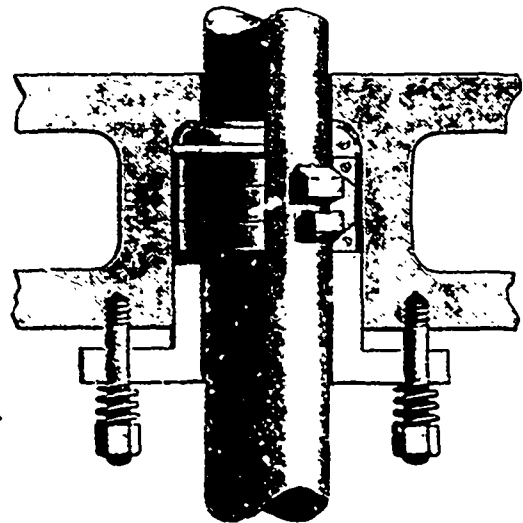
can be received from all the great iron fields, including the Lake Superior districts.

The new furnace plant consists of a single stack, nine feet high, five feet at bottom and six at top, and forty feet from the bottom to the boll-top. It is entirely completed, and will go into operation on the first of next month, or with the beginning of the new year. The iron produced will be largely consumed in car wheel works in which the leading stockholders in the company are interested, among these being those of the Montreal Car Wheel Co. and the St. Thomas Car Wheel Co. The iron produced in the old furnace had gained a high reputation for excellence, and was sought particularly for the manufacture of car wheels, for which use it was found equal in every respect to the high grade Salisbury irons. The demand for the iron for this purpose is what decided the company to enlarge its facilities, and the capacity of the plant will be further increased as demand indicates the desirability of this.

The officers of the company are P. H. Griffin, President (that gentleman being also president of the New York Car Wheel Co., whose works are at Buffalo, N.Y., and of the St. Thomas Car Wheel Works, at St. Thomas, Ont.); Geo. E. Drummond, Managing Director, and Thomas A. Drummond, Secretary. The former is president of the Montreal Car Wheel Co., Montreal, and also a member of the firm of Drummond, Call & Co., of the same city, and the latter is general manager of the Montreal Car Wheel Co., as well as being connected with the powerful firm named above. These gentlemen, with Jas. T. McCall, of the Montreal firm in which his name appears, and Robert Schott, a steel manufacturer of Sheffield, Eng., constitute the directory of the company. Mr. Cleary says the company's new furnace is a modern one in every respect, and equipped with every improvement—*Marquette (Mich.) Mining Journal.*

#### SILVER BRONZE PACKING.

The accompanying illustration has reference to the "Silver Bronze" packing manufactured by the Forrest Silver Bronze Packing Company, 115 Liberty Street, New York, and to the method of using it. The packing forms a valve at the bottom of the stuffing box, preventing the steam or water from escaping around the outside of the packing, and closes around the rod, preventing leakage from the inside of the packing, the whole packing being held intact on the rod and kept seated by the gland, which is actuated by springs placed on the studs outside of the gland, maintaining a uniform pressure and following up the wear automatically.



In former years, when steam was carried at much lower pressure and temperature, almost any sort of soft or fibrous packing answered the purpose fairly well, although such packing has always tended to flatten, cut, flute or wear the rods unevenly.

Modern engines, however, particularly those designed for marine use, require more substantial packing to endure the high pressure and temperature of the steam now used, and to stand the wear and tear due to the great velocity at which they are driven. To this end various metallic packings have been used with indifferent success, but have generally required one or more turns of "Tuck's" or other soft packing on the outside or also around the

metal to make them tight, which soon burns out and requires constant renewing.

Modern practice has demonstrated that the best efficiency and economy of the steam engine is reached by the highest steam pressure, and as there is practically no limit to the pressure that may be carried except "the means to the end," i.e., boilers capable of maintaining the desired pressure, and lubricants to stave the consequent rise in temperature, we may reasonably expect to see the standard raised much higher in the near future.

We are informed by the company that they lately filled orders and have other orders on file for their packing from a large number of well known concerns, including among whom are Westinghouse Air Brake Company; Cows' Engineering Company; A. F. Bartlett & Co., Saginaw, Mich.; N.Y., N.H. & H.R.R. Co.; New York & Brooklyn Bridge Company; Brooklyn Brass & Copper Company; Frontier Iron Works, Detroit; Lehigh Valley R.R. Company, etc.

This packing is patented in Canada, United States, United Kingdom and other countries, and we understand the proprietors wish to sell the exclusive right to manufacture it in Canada.

The chief engineer of the steamer *Monmouth*, writing to the Forrest Silver Bronze Packing Company, says: "In reply to yours requesting me to inform you how your silver bronze packing has been working in the engine of the Sandy Hook steamer *Monmouth*, I take pleasure in stating that, notwithstanding the severe test to which it has been subjected, it has done the work perfectly, without using any fibrous packing whatever. Before applying the silver bronze packing, we were using the latest and most approved metallic packing, put in by the builders, Messrs. Cramp & Sons, but although this packing was supplemented with soft packing, which was removed almost daily, we were unable to stand on the working platform or feel of the journals below, without being scalded with steam or water. Since you put in the silver bronze packing, two years ago, we have had no trouble, and the boxes have been steam and water tight. I was favorably impressed with your packing when I first saw it, but it has exceeded in excellence my most sanguine expectations. In my opinion, it is not only the best, but the most economical packing for high steam and piston velocity in the world, and I shall be pleased at any time to afford any one interested an opportunity to examine my rods and packing for themselves. The *Monmouth* has two triple expansion engines, carries a steam pressure of 160 lbs and makes 160 revolutions per minute. The pistons are connected by main and tail rods, and owing to the constructional freedom at the crossheads, are very hard on packing."

#### THE CHATHAM MANUFACTURING COMPANY.

During the Toronto Industrial Exhibition last September a representative of a mercantile house in Kingston, Jamaica, inspected the different lines of wheel vehicles displayed there, and selected a number of those made by the Chatham Manufacturing Company, and these were accordingly sent to their destination in the West Indies. These wagons were of such excellent quality, and have answered the purposes for which they were intended so admirably, that other orders for them have been placed, and a very gratifying trade is growing up in them in that direction.

This is one of the largest, best organized and most important wagon manufacturing establishments in Canada, the output being about 3,000 vehicles a year. The factory proper is a two-story brick building, 27x40 feet, with annexes of corresponding dimensions for foundry, machine shop, paint shop, storerooms, etc., the total floor space aggregating an area of over two acres. Besides these there are two steam sawmills of the company in which the stock for the wagon work is cut, as well as the immense quantities of ship planks and similar stuff, for which the company enjoy a large trade. The grounds around these many buildings are many acres in extent, and are used not only as depositing grounds for the logs and timber brought to the mills to be sawed, but also as drying yards in which the sawed lumber is stacked so as to become air-seasoned preparatory to consumption. The steam engine which drives the machinery of the wagon factory is a magnificent Corliss of 75 horsepower, built by Messrs. Kerr Bros., of Walkerville, Ont., and which, we are informed, has not cost a dollar for repairs since it was set up where it is eight years ago. All the machinery in the establishment is of the very best and most modern construction, and some of it has no duplicate in Canada. Mr. D. R. Van Allen, the president and manager of the works is an inventive genius, and the results of his ingenuity are to be seen in many of the products of the concern. One of the most important of these is what Mr. Van Allen calls the "giant" axle, recently patented in Canada

at the United States. In this axle the arms or thimble skeins are cast with a flat-topped stool on the upper side of shoulder, that the ends of sandboard and bolster are formed to rest upon and are firmly clipped to, by which the front axle and sandboard and rear axle and bolster form each a complete and solid truss, thus entirely transferring the pressure of the load from the axle to the very shoulder of the wheel, completely abolishing the old time breaking point of an axle, which all sorts of truss rods and hard running and costly steel skeins have been devised to reinforce, rendering these unnecessary and securing to farmers and teamsters the great boon of a marvellously strong and much lighter wagon, and the great ease of running of the properly set cast thimble skeins without much additional cost.

This company are very large manufacturers of hardwood lumber and ship plank, having a band saw mill for sawing short logs and a gang saw mill for sawing long timber into ship plank. The mills annually cut from two to four million feet each. The kinds of wood indigenous to this locality and which they make into lumber, are: white and red oak, white and black ash, hard and soft maple, sycamore, hickory, rock and soft elm, whitewood, basswood, balm, butternut, cherry, chestnut, and black walnut. The quality of the white oak, white ash, hickory and rock elm is unsurpassed, and affords very great advantages in the manufacturing of wagons. The company keep in stock at all times for the construction of 2,000 wagons, every piece of wood shaped and turned required, and they use no piece that is not bone dry and of the best quality.

In 1882, after the adoption by Canada of the National Policy, which he had for years advocated, Mr. Van Allen conceived the idea of forming a joint stock company for the purpose of manufacturing farm wagons by machinery, after the style of some of the great wagon building concerns in the United States. In carrying out this idea he was eminent—Mr. Van Allen, and the Chatham Manufacturing Company of to-day, of which he is the head and moving spirit, is the result of his ambitious efforts. The enterprise has passed through some severe struggles, however, such as are incident to such undertakings, and now it is one of the most important and prosperous industrial works in the Dominion.

In 1862, Mr. Van Allen, at his own personal expense, exhibited at the great World's Fair, in London, England, a lot of planks of timber, which were each twelve feet long, four feet wide, and four inches thick, the varieties consisting of butternut, whitewood, sycamore, cherry, hard maple, black walnut, white ash, and white oak; a lot of logs from four to five feet in diameter, of sycamore, white ash, black walnut, and white oak; and a large number of sections, with the bark on, of smaller trees, the whole being specimens of the principal valuable timbers found growing in Ontario, in the vicinity of Chatham. The highest prize awarded at that exhibition—a bronze medal—was bestowed upon Mr. Van Allen for this remarkable display. Mr. Van Allen afterwards presented these specimens of Canadian woods to the Canadian Commissioners, who caused them to be cut into suitable sizes and distributed among museums of Europe.

A NEW application of natural gas is to the manufacture of ice, which is formed by the intense cold created by the expansion of the gas when liberated from the high pressure at which it issues from the wells. It is claimed that the ice-making industry by this process may be very economically conducted upon an extensive scale.

SOME twenty-five years ago attention was first called to the existence of copper ore on the McKinley grant, near Alma. A party of St. John gentlemen numbering four, of whom Mr. James L. Fellows was one, visited the premises. The exhibit then consisted of specimens that had been turned over by Mr. McKinley when plowing in his field. No vein had then been discovered. Some years later Mr. Fellows found on this farm a small cross vein of three or four inches, and removed several tons of ore of a very fine quality, but, owing to the narrowness of the vein, it could not be profitably worked, and was abandoned. Of later date still, a boulder of about three hundred pounds, carrying about eighty per cent. of copper, was uncovered in a road ditch not many yards from the cross vein, and gave rise to numerous cuttings and tunnelling, without finding the parent vein, search for which was again abandoned. During the past autumn the Mineral Developing Company of this city instituted a further search by an expert of wide experience in copper and silver mining, with the result that discovery has been made of a very broad and lengthy fissure vein of copper-bearing quartz, extending for a mile or more, across and beyond the McKinley, Boyle and other grants, and supposed to carry the parent vein from which the cross vein is an off-shoot.—*St. John Gazette*.





# INVENTIONS.



This department of THE CANADIAN MANUFACTURER is devoted to the interests of inventor, of patentees of inventions, and of manufacturers of patented articles. Patents are granted in Canada for fifteen years, the Government fee for which may be paid by instalments. Arrangements have been made by which the issue of all patents by the Canadian Patent Office and all renewals and extensions thereof will be promptly notified in this department, and a brief description thereof given. Enquiries on these subjects are invited and will receive prompt attention. No charge will be made for answers by mail when return postage is sent. Information given free regarding patent laws and the obtaining of patents in Canada, United States, Great Britain and all foreign countries. Claims for inventions, as embodied in Letters Patent, also the illustrations of them, will be inserted in this journal at moderate charges. The attention of manufacturers is specially directed to the opportunities for lucrative business which may be acquired by close observation of whatever may appear in this department.

## CANADIAN PATENTS.

The following patents have been issued from the Canadian Patent Office from February 1 to 3, 1892.

Information in regard to any of these patents may be had free on application to THE CANADIAN MANUFACTURER, or copies of American patents corresponding to these, where the American patent has been previously granted, can be procured through us for the sum of twenty-five cents.

### MECHANICAL PATENTS.

- 38,174 Hand rake, Orville M. Knox, February 1st.
- 38,175 Whiffletree and neck-yoke, John Connolly, February 1st.
- 38,176 Combined parlor and sleeping car, Montgomery H. Throop and Edward Heath, jr., February 1st.
- 38,177 Propelling power, Joseph Tait, February 1st.
- 38,179 Siphon discharge flush tank and analogous apparatus, Sidney W. Miller *et al.*, February 1st.
- 38,180 Toilet paper fixture, E. B. Eddy Company (Ltd.), February 1st.
- 38,181 Wrapping or toilet paper rolls, E. B. Eddy Company (Ltd.), February 1st.
- 38,182 Gopher traps, Gordon Gilchrist, February 1st.
- 38,183 Combined counter and display rack for wearing apparel, John W. Morrison, February 1st.
- 38,184 Portable force pump, Mott B. Brooks, February 1st.
- 38,185 Fence post, etc., Hiram A. Fenner, February 1st.
- 38,186 Car brake, Charles W. Duncan, February 1st.
- 38,187 Furniture castor, Ernest G. Hoffmann, February 1st.
- 38,188 Gas regulator or governor, Lewis Boore *et al.*, February 2nd.
- 38,189 Safety catch for hammer and hammerless guns, Jenkins' Safety Catch Gun Company, February 2nd.
- 38,190 Distinctive paper, James Macdonough, February 2nd.
- 38,191 Moulding machine, Ellis Keenan, February 2nd.
- 38,192 Envelope, P. H. Flynn, February 2nd.
- 38,193 Hydraulic motor, Pierre O. Gosselin, February 2nd.
- 38,195 Washing machine, John Dowling and Addison C. Church, February 3rd.
- 38,196 Preventing horses from cribbing, Charles W. Nulter, February 3rd.
- 38,197 Inking attachment for job printing presses, The Thompson Manufacturing Company, February 3rd.
- 38,198 Mitring machine, Peter Phillips, February 3rd.
- 38,199 Autographic register, The Dayton Autographic Register Company, February 3rd.
- 38,200 Vice, The Armstrong Manufacturing Company, February 3rd.
- 38,201 Breast-collar, Thomas N. Fisher & Jacob J. Leiser, February 3rd.
- 38,202 Roller bearing, Charles D. Meneely, February 3rd.
- 38,203 Mechanism for forming wire strand, George P. Rishel, February 3rd.
- 38,204 Rotary harrow, Robert King, February 3rd.
- 38,205 Tobacco drier, William B. Marks, February 3rd.
- 38,206 Water jet condenser, Ernest Korting, February 3rd.
- 38,207 Watering of cattle and stock, John Allis, February 3rd.

- 38,208 Car seal, Benjamin J. Sturtevant, February 3rd.
- 38,210 Rolls for making table cutlery, Isaac Hirsch, February 3rd.
- 38,211 Dumping cart, Timothy Flanigan, February 3rd.
- 38,212 Holding device for spring actuated shades, Horace L. Hall, February 3rd.

### SCIENTIFIC PROCESSES.

- 38,178 Treatment of waste tinned steel or iron, William L. Brockway, February 1st.
- 38,194 Cutting cloth or wearing apparel, Morris Grossman, February 2nd.
- 38,209 Condensing or liquefying vapor or gases, John Gamyer, February 3rd.

## A WORD TO INVENTORS.

We have frequently been asked by inventors who have succeeded in producing small articles of more or less merit, and for which there appears to be a demand, what is the best method to pursue in order to put them on the market.

This is a question which has puzzled a great many, and especially those who with small means are unable to go into the manufacturing of their specialty on a large scale, without parting with a controlling interest in their patent to another party in order to raise the necessary capital with which to push the business, a transaction which many object to on account of the possible and probable consequences which often follow, viz., the loss not only of the patent right, but of all share in future business.

In nine cases out of ten it is far better for the inventor, and he will realize more from his invention to sell out entirely, and turn his attention to some other business, or the production of a new patentable article. That is, in case he has no money with which to develop and place his invention in the market.

The only difficulty in this is that a majority of inventors set too high a value upon their invention. They think they have the world in their hands, and are disposed to hold on to it, unless some one comes along who is foolish enough to pay an unreasonable price for the patent. This is where they are often mistaken, and it would be far better for them to accept a bona fide offer, even though it is but a fraction of their ideal value of the article.

The fact is that no invention, however valuable at the time it is produced or perfected, is sure of a monopoly, or even a fair competing chance for a great while, and the sooner the inventor disposes of it the better off he is. Thousands of inventions have been dead failures, and never returned to the inventor one dollar, simply because, thinking that he had a monopoly, and that the world was bound to him, he has held on to it, unable himself to put it upon the market, and alike unwilling to allow any one else to do so for a reasonable consideration, until some one else has come out with something equally good, and possibly an improvement, and he finds himself without a bidder, and another man making money which he might have had, had he used better judgment and good sense.

Another way in which a mistake is made is in starting out on too large a scale. If you have a really valuable patented article, there is very little difficulty about finding a market for it, if you are not too hasty. It is better to begin in a small way and gradually increase than to begin by forming a large stock company and beginning too large. We are speaking in reference to the inventor's interests. If he can get his goods manufactured so that he can handle them himself, even though in a small way at the start, if his invention is worth anything he will soon be able to increase his business and

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then he can hold control of it himself. As a rule we are of opinion that it is better to contract with some reliable firm for the manufacture of the article than to go to the expense of putting in the necessary machinery, etc., to do it for yourself. This is especially true in relation to the smaller articles.

By doing it in this way, you are saved the care and management of a shop, and have more time to devote to pushing the sales of the article, and the difference in the cost is very little, hardly sufficient to compensate for the possible saving.

It also gives you the use of the capital which would be required to fit up and maintain a shop, with which to push the business, and at a time when it is needed, too.

After the business has grown sufficiently large to warrant it, then there is time enough to put in a plant, and you will be better able to do so, and you will be in a position to know what is required.—*Manufacturers' Gazette.*

### CURRENT "FROM THE MAIN."

With the electric light circuit at our doors, the question of utilizing it as a source of supply for electro-therapeutic work is literally brought home to us. I propose at present merely to point to some methods by which this can be done with comparative ease and safety. The advisability of so using it is another and larger question, which it is not intended to enter into now.

We have, first of all, to face the fact that the light current is generally supplied to houses at not less than 100 volts, and that the quantity used for even a single incandescent lamp is much in excess of that ordinarily required for medical purposes. It is manifest, therefore, that some modifying arrangement must be adopted before the current from the ordinary light circuit can be used with safety. Let us take an instance—a house containing incandescent lamps requiring fifty watts to properly light them. The E.M.F. of the supply is 100 volts, so the current must be half an ampere or 500 milliamperes. Many lamps now take only thirty watts, making the current 300 milliamperes. We may therefore assume that the safety-fuse of such a lamp (and every lamp ought to be so protected) would act if more than 500 milliamperes passed, and automatically break the circuit, so that no harm could be done to the lamp. Here, then, we have the maximum current obtainable from a single lamp lead of an ordinary light circuit—viz., 500 milliamperes. This maximum for medical and surgical purposes of course leaves an excessive margin, and could doubtless be reduced if desired by using a safety-fuse adjusted to break the circuit with a smaller current; but considering the power that must be available for, say, the di-polar bath, and the current strengths that have been talked of in connection with the electrolysis of fibroids, there does not appear to be any real reason for fixing our limit of safety at less than 500 milliamperes.

The next question is how best to modify this maximum so that we may use little or much of it at will. For this purpose, if the current supplied be the continuous one, an adjustable rheostat is all we require, provided we keep a milliamperometer, or at least some current-measurer, in circuit. Such rheostat ought to possess quite 50,000 ohms resistance, working down by steps not exceeding 1,000 at a time to zero. The objection to such an arrangement is that in the event of the E.M.F. in the mains rising suddenly from some disturbing cause, the safety-fuse may act (and automatically cutting off the current) give a more or less violent shock to any

patient under treatment at the time. Further, that if, as sometimes happens, the fuse is somewhat sluggish in its action, a current considerably in excess of that intended may pass through the patient for the instant previous to the automatic breaking of the circuit. In a well-regulated current supply, such as that now provided by our English electric light companies, the risk of accidents of this nature is very small. Still, it is well to bear in mind that in using a current from an electric light main we must be prepared against an unexpected and undesirable increase of power, instead of the unexpected, undesirable, and cautious decrease of power which frequently accompanies battery currents.

Since commencing this article I have been informed that an instrument has been devised, and will shortly appear, which provides for the utilization of continuous-current installations for galvanization, faradization, electrolysis, etc., and which affords perfect protection in the use of such currents, being so arranged that it is impossible for more than the maximum current to which the instrument is set to pass to the patient. The maker supplies me with the following particulars: The instrument contains two switches for turning on the continuous or the faradic current. Either of the two has to pass through a sixteen or thirty-two candle lamp to prevent (in case of short circuit) the destruction of galvanometer, coil, etc. The current strength is graduated by means of four graphite and one metal rheostat. The latter contains altogether 1,000 ohms on twenty-eight subdivisions; the former contains 1,000, 10,000, 50,000 and 100,000 ohms respectively, which can be varied without any shocks. All the other connections—current reverser, De Watteville's key, etc.—are exactly as in the combined batteries by the same maker.

In dealing with alternating currents from dynamo circuits, the necessary modification for therapeutic uses can be easily made by means of a "transformer." The function of a transformer is, of course, to "transform"—i.e., to alter the relative values of E.M.F. and current strength as supplied by the mains, and the special use of the medical transformer is not only to render high-potential currents safe by "transforming down," but also (by means of the DuBois Reymond sedge arrangement) to secure the necessary regulation of current strength. One advantage of such transformers is that the current obtained from the secondary circuit, which is that used for therapeutic purposes, does not come direct from the main, and therefore the risk of "shock" to the patient is reduced. It is, however, as necessary that a safety-fuse, or some automatic cut-out, form part of the circuit with alternating as it is with continuous current. A special transformer for alternating current (by the same maker as the continuous-current arrangement already referred to) was recently described in the *Lancet*. It acts as a reversed induction coil—i.e., a weak intermittent current of high E.M.F.—passes through the primary coil which is wound with many turns of fine wire, and induces strong currents of low E.M.F. in the secondary coil wound with a few turns of thick wire. The instrument seems to work very satisfactorily, and I can personally testify to the regular, even, and pleasant character of the current obtained by its use when attached to a lamp lead upon the Grosvenor Gallery circuit in London.

In this connection it may not be out of place to remark that the quality of a current produced by galvanic induction in the secondary coil is not quite of the same quality as that obtained from an alternating dynamo, the former being of a sharper and more accentuated order, in addition to which, in the best of coils, irregularity of vibration is a very frequent occurrence. The dynamo current is

comparatively smooth and wavy, the alternations being "demarcated" by a neutral point smoothly and rapidly passed, rather than by an interval. A "curve of sines" represents it.

The outcome of our enquiry, therefore, seems to be this: that whilst it is clear that electric light circuits cannot be used for medicinal purposes without the strictest measures of precaution against the influx of strong currents, there is also good reason to suppose that efficient protection can be secured by the adoption of the above-indicated or other suitable methods.—*W. S. Helley, M.D., in the London, Eng., Lancet.*

### ELECTRICAL POSSIBILITIES.

THE amazingly rapid developments in the transmission of power by electricity make it difficult to imagine what may yet be accomplished in that line, as the wildest predictions of one year become the sober facts of the next. Some time since it was announced that Mr. Viillard proposed to introduce electricity as a motive power on the Northern Pacific railway. Within the past few days a commission of experts, representing a number of railroad companies, made a tour of the principal electrical establishments in the country. A member of this commission, while in Pittsburgh, stated that many railroad managers throughout the country believe that the adoption of electricity as a motive power on the railroad is merely a question of a comparatively short time. Part of the cost of experiments in that direction is to be borne by the railroads, and it is the opinion of practical railroad men that the problem of using electricity in the transportation of heavy loads is much nearer a solution than is generally supposed.

Prof. Trowbridge in a recent magazine article, makes some very interesting propositions regarding electrical developments. He declares it as his belief that a diminution of our coal supply would result in making the transmission of power from Niagara Falls to New York a success. The fact that the storage batteries are becoming a commercial success leads him to the opinion that there is a possibility of employing them to convey a portion of the power of Niagara to Chicago. He then proceeds to examine the possibility of such a project and estimates that six horse power can be stored in a ton of material which constitutes the storage battery. The equivalent of fifty horse power could certainly be carried in one freight car, and it would therefore require 100 freight cars to transport 5000 horse power from Niagara Falls to Chicago. The cost of the batteries would be in the neighborhood of \$2,000,000, and in order to maintain 5,000 horse power in Chicago relays of batteries would have to be employed. Against the expense of this method must be placed the cost of the high insulation of a line of 400 miles under a pressure of 20,000 volts. Prof. Trowbridge admits that under present conditions it would be more economical to generate the electricity at Chicago from coal by the ordinary method of employing a steam engine to drive a dynamo, but he holds that a great change in our coal supply would speedily turn attention to the immense waste of energy which is going on at Niagara Falls and might convert New York state into a bee hive of industries, and Chicago might then find its proposed experimental line of 400 miles of great value.

An important proposition in regard to the further use of electricity in railroading, comes from a correspondent of an electrical journal. He has a plan which he claims will, if adopted, prevent the railway collisions which so frequently horrify the public. The details of the plan, as given by him, are quite lengthy, but a glance over them shows that he proposes to attach a supplemental valve to the throttle-lever in the engine cab, by means of which steam is let into a small engine built on the locomotive and operating a dynamo connected with it. The arrangement is to be such that when steam is shut off from the large engine, it is admitted to the small one, setting the latter in motion, and thereby generating an electric current from the dynamo, which establishes a current with any other locomotive on the same block. The centre rail or wire, being divided into blocks of any desired length, the circuit of the dynamo is open so long as no other locomotive gets on the same block. When, however, a locomotive does pass on the same block, it carries a powerful magnet attached to the lever operating the air brake. This completes the dynamo circuit on the standing locomotive. By the current flowing up and through the throttle and brake magnets of the coming locomotive steam is shut off and the air brakes applied, so as to stop the swiftest train in time to prevent a collision. If this plan is practicable it will be classed among the greatest railroad improvements of the time, and it will doubtless be adopted by the companies as soon as possible.

But the most startling assertion as to the possibilities of electrical development comes from a German paper which has heretofore

been regarded as a reliable journal. This paper in substance states that German experts have recently tested an electro-metallurgical process which is to effect a most complete revolution in the metal industry. This process is said to be such that the current generated by a dynamo driven by a small gas or petroleum engine will be capable of extracting day for day more metal than the largest blast furnace is able to produce. According to the statements this process effects a saving of 80 per cent. on present blast furnace methods. The inventor, as the story runs, first demanded £2,500,000 for his process, but he finally disposed of it to an international syndicate which will erect great works. The names of the inventor and his capitalist supporters are to be made known to the world as soon as the letters patent have been granted; until which time we can learn nothing more of a process which is pronounced an absurdity by the few metallurgists who have given it any attention. It is thought that a man with such a discovery, which included such boundless possibilities, would first protect himself by letters patent before making any announcement to the world.—*American Manufacturer.*

### A SUBSTITUTE FOR PLATINUM.

A RESIDENT of Boston claims to have discovered, after long experiment with many discouraging results, a process whereby copper may be hardened sufficiently to render it of great value in the many uses to which its exceeding degree of softness has heretofore been the one great drawback.

This method is practically a resurrection of one of the ancient Greek arts, which, like many other valuable ideas, was lost with ancient Athens. The Indians had some knowledge of the art, and the Aztecs of Mexico made tools of copper which have been found in one of the old granite quarries in that country, and which were, it is supposed, sufficiently hardened to use on stone work.

The inventor states that the idea of hardening copper first occurred to him while looking out of a window and observing the effect of its own weight upon the street railway wires. He noticed that they would, after a time, begin to sag and would have to be tightened, and finally, after repeated stretching, they would become so weakened as to break. But the principle of the thing was discovered while he was experimenting upon another matter, that of finding a substitute for platinum, and in which, by the way, he has partially succeeded.

But to return to our original subject, samples of treated copper were shown the writer. They were in the form of small buttons, but neither a knife or file had any effect upon them. A small sheet about one-eighth of an inch in thickness, which had been sliced off an ingot, was produced, and notwithstanding the fact that it was cracked from the circumference nearly to the centre in two or three places, it was impossible either to break or bend it with the hands. It is claimed that a bridge made from this hardened copper will last for ever, provided the foundation remained intact, and that it is absolutely proof against weakening by corrosion. The cost of the treated copper will be a little in advance of the ordinary article, something like 15 cents a pound more, but if found practical in all that is claimed for it, this will be but a small item.

Of course the process by which the metal is hardened is kept secret, but the inventor states that it is treated while smelting and not in form.

The substitute for platinum mentioned above is intended particularly for use in the manufacture of the incandescent electric light bulb. This article was shown in form and in a pulverized state. It is black and of a dull hue. Its chemical analysis and specific gravity are the same as of platinum, it being 17.6 times heavier than water, and all that remains is to render it conditionable to draw, and by its use the bulk will be reduced in cost about 87½ per cent., to say nothing of the other uses for which it might be perfected. Platinum to-day costs from \$14 to \$16 per ounce, and is going still higher, regardless of the enormous demand for it, but this substitute, it is claimed, can be put upon the market for \$1 per ounce. It would seem there is a great future for these two discoveries. Repeated inquiries have been made by large consumers, and in time both will probably be in general use.

An interesting patent suit was concluded at Cincinnati last month, in which the Stoddard Manufacturing Company secured perpetual injunction against the Ohio Rake Co. The claim was upon two of the late Mr. E. Fowler Stoddard's patents on disk harrows. The claims upon which the injunction were issued, were for the hinged scraper and hinged joint.

The present system of charges for the use of telephones by annual subscription is by many considered unjust, inasmuch as some subscribers speak often and much, whereas others use the telephone only occasionally. In some German telephone offices an electrically driven clock is attached to each telephone, which will work as long as the telephone is off the hook, and stops directly it is replaced. The service is charged according to the time recorded. It is claimed for this system that unnecessary conversations are prevented, that those that take place are limited to reasonable length, and the useful efficiency of the whole installation is increased.—*Electricity.*

The hardest steel at present successfully worked by the electric welding process is that used for hand saws. Besides the regular work of making the joint in continuous band saws, it has been ingeniously adopted for replacing broken teeth in finished saws. Formerly it was necessary to cut down to a smaller size any saw from which one or two teeth had been broken, thus losing not only the difference in price between the two saws, but also the entire cost of labor in cutting the original saw. Now, when a tooth is broken out, they simply fit in a new tooth, which is electrically welded in place, and a drop of oil applied as the completion effectually restores the temper of the saw to a serviceable point.

W. B. MOORE, Esq., of New Glasgow, late manager of Vale Colliery, has invented a card holder for use on railway freight cars. It is a most ingenious device, made of coiled spring wire, under which the address card is placed, where it is securely held by the pressure of the springs. We are sure station masters and railway officials generally will welcome the holder, as the old inconvenient way that hitherto prevailed of attaching the card to the car by use of tacks was a humbug. Its merits are, the rapidity with which cards can now be attached to a whole train of cars, and the firmness with which they are held there. It is especially useful on coal cars, from the fact that hundreds of them have to be ticketed daily. The holders are being manufactured by Munro Bros., wire-workers of New Glasgow, for use on the Government railways.—*Halifax Critic.*

LONDON Iron says, "the increased demand for platinum for use as poles in electro-chemical batteries, crucibles, etc., has raised the price of that metal to a point never before reached, its present value being nearly three-fourths that of gold. Three years ago platinum cost approximately £16 per pound. To-day it is worth double this price, and is eleven times dearer than silver. The metal, which is indispensable in the manufacture of numerous scientific instruments, is only found in small quantities, namely, in the form of platinum ore in Peru, Columbia and Brazil, and in small steel-gray grains in the Ural mountains, in California, the Oregon hills, and in Borneo. The principal source of production is in the Urals. The yearly output has never amounted to more than four tons, and at present it does not exceed three tons. Should not new and more fruitful deposits be discovered, and this is scarcely probable, platinum will soon be literally 'worth its weight in gold.'"

THOMAS A. EDISON has perfected and patented another wonderful electrical invention. It is one that is intended not only to fur-

ther the interests of commerce, but to protect human life at sea. It is, in substance, a system by which telegraphic communication can be carried on between ships at sea and shore and between the distant points on land. The most remarkable part of all is that this intercommunication can be maintained absolutely without the use of wires or cables. In his specifications filed at the patent office in Washington, Mr. Edison says: "I have discovered that if sufficient elevation be obtained to overcome the curvature to the earth's surface and reduce to the minimum the earth's absorption, electric telegraphing or signaling between distant points can be carried on by induction without the use of wires connecting such distant points." By this method ships can telegraph to each other at sea, one vessel being able to communicate with another far away and out of sight. If a balloon in New York should be sent up to a great height, equipped with a condenser, and held to the earth by a rope cable, in which there was a strand of wire, and another similarly equipped should be sent up from London, a circuit would be formed through earth and air without the aid of wires for transmission, through which messages could be flashed at a greater speed than has ever been attained by any other system.

It seems to be demonstrated that the new method of riveting by electricity is a remarkable success and will take its place among the most important improvements in the industrial arts. The apparatus comprises a transformer, the primary of which is formed of a heavy copper bar, laid parallel to a coil of fine wire, and over the two are clamped two angular segments of iron, forming, when united, a complete iron shell, which is claimed to increase the efficiency of conversion. The structure creates a current of great volume in the copper bar. In the end of this bar is mounted an anvil, provided with a regulating screw for moving it up or down, and a follower provided with a screw. Its circuit of a primary is placed a choke coil provided with a regulating switch for cutting in more or less of the coil by which the strength of the current induced in the secondary may be controlled. The bars or pieces of metal are placed upon the anvil and the rivet dropped in place, the

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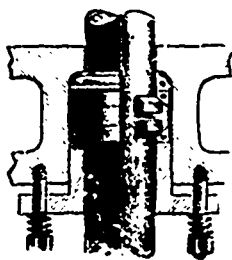
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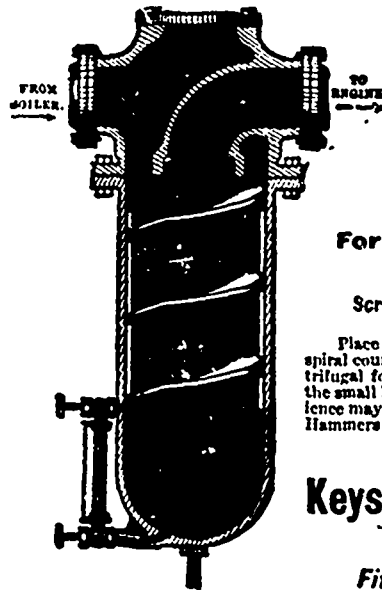
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Applied to any stuffing box without disconnecting. Steam, air and water-tight without the aid of soft packing, under highest steam pressure and piston velocity. Automatic, admits of excessive vibrations, lashing, and crowding of rod, does not bind, economical, guaranteed to outlast all other packing. Used by the largest Iron Works, Steamships, and Electric Light Companies.

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## GENTRIFUGAL

## STEAM SEPARATOR,

For Supplying Clean and Dry Steam to Engines, Dry Houses, etc.

Screwing Flanges included with each Flanged Separator.

Place Separator as close to engine as possible. The steam taking a spiral course between the threads causes the water to be thrown by centrifugal force against the outer walls, while the dry steam goes through the small holes to centre of pipe. Steam can enter at A or B as convenience may require; also used in conveying steam long distances for Steam Hammers and Dry Houses.

### Keystone Engine & Machine Works

W. L. SIMPSON, M.E.

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anvil being then screwed up until the plates of metal are firmly held between it and the two insulating legs secured to the upper limb of the copper bar. The face of the bar is covered with insulating material, except at a central point where it is left bare, and, when forced against the rivet, the latter establishes connection from the upper limb of the primary bar to the lower limb, the current developing sufficient heat to make an upsetting of the rivet shank very easy under the pressure of the screw.

The Bernardos-Howard electric welding process is again discussed in English technical journals, and results of the actual workings of the system are now made public. The Bernardos apparatus was first brought out in Russia about four years ago, and differs essentially in its form and uses from the Thompson machines in general use in this country. For two years the system has been used at Birmingham, England, in the works of Lloyd & Lloyd, under the charge of Mr. Henry Howard, and it is now pronounced commercially practical and economical. The principal consists in the con-

centration of heat upon a small area by means of the electric arc. With his work connected to one pole of the dynamo, either by a flexible lead or by lying on an iron bench in communication with the mains, and with a carbon joined to the other pole of the dynamo and carried to a non-conducting handle, the smith can apply the arc just as he sees fit, either concentrating it in a spot the size of a quarter dollar, or moving it over a narrow line. When the metal is sufficiently melted the arc is shut off and a few blows of the hammer finish the weld. Messrs. Lloyd state that their experience indicates that this process cost only a fourth of gas welding, but they do not contend, it is said, the substitution of the arc for the smith's fire, for work that can be done in the latter. For plain work, the smith can certainly excel in speed and cost. It is at the point where an ordinary smith has to confess himself beaten, and the most skilled members of the craft make numerous wasters, that the electric process begins to make its advantages felt.

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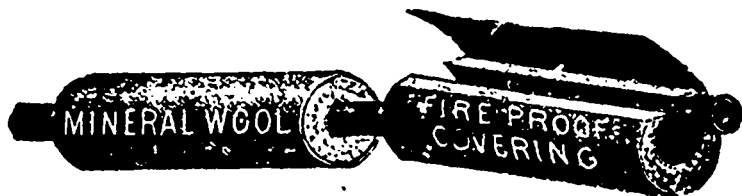
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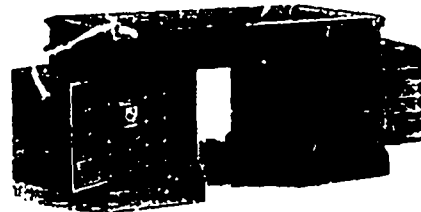


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2. To obviate heavy losses from the fires that are unavoidable by the nature of the work done in mills and factories.
3. To reduce the cost of insurance to the lowest point consistent with the safe conduct of the business.

METHODS.

All risks will be inspected by a competent officer of the company, who will make such suggestions as to improvements required for safety against fires, as may be for the mutual interests of all concerned.

Much dependence will be placed upon the obligation of members to keep up such a system of discipline, order, and cleanliness in the premises insured as will conduce to safety.

As no agents are employed and the company deals only with the principals of the establishments insured by it, conditions and exceptions which are so apt to mislead the insured and promote controversy and litigation in the settlement of losses will thus be avoided.

The most perfect method of insurance must, in the nature of things, be one in which the self-interest of the insured and the underwriters are identical, and this has been the object aimed at by the organizers of this company.

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J. H. WALKER, Manager.

**TORONTO.**

JANUARY 1, 1892.

STATEMENT OF THE CONDITION  
OF THE

**Manufacturers' Life Insurance Co.**

OF TORONTO.

ASSETS.

Dominion Government Bonds.....	\$53,000 00
Huntsville Municipal Debentures.....	4,975 00
West Toronto Junction Debentures.....	41,847 40
Call Loans on Bank Stocks (Dominion and Imperial Banks, at net value \$20,750.00).....	25,000 00
Mortgages on Real Estate.....	200,243 30
Reversions and Life Interests.....	3,902 00
Bills Receivable.....	2,051 14
Office Furniture.....	4,457 75
Agents' Ledger Balances.....	3,268 47
Outstanding and Deferred Premiums, less 10% held for cost of collection..	53,906 84
Interest due and Accrued.....	5,339 25
Loans on Policies.....	2,123 85
Cash on hand and in Bank.....	31,784 47
	<b>\$431,069 47</b>

LIABILITIES.

Reserve (10% of) on all existing policies in force.....	\$259,152 00
Death Claims unadjusted, not resisted.....	0,000 00
Contingent Fund for Medical Fees, etc.....	1,616 84
	<b>\$260,768 84</b>

Surplus on Policy Holders' Account ..... **\$135,290 63**

INCOME FOR THE YEAR (1891.)

Cash received for Premiums.....	\$194,029 35
Cash received for Interest and Rents.....	13,457 14
	<b>\$207,486 49</b>

DISBURSEMENTS.

Expenses of Management, including Salaries, Commissions, Rents, Taxes, Medical Fees, etc.....	\$77,024 27
Death Claims.....	35,208 82
Surrendered Policies.....	2,660 79
Reinsurance Premiums.....	9,345 60
	<b>\$124,239 48</b>

Capital Stock Paid Up..... **\$127,390 00**

Surplus as above on Policy Holders' Account ..... **\$135,290 63**

**GEO. GOODERHAM,**  
President.

**JNO F. ELLIS,**  
Managing Director.

**BELL UPRIGHT PIANOS**  
**REED ORGANS**  
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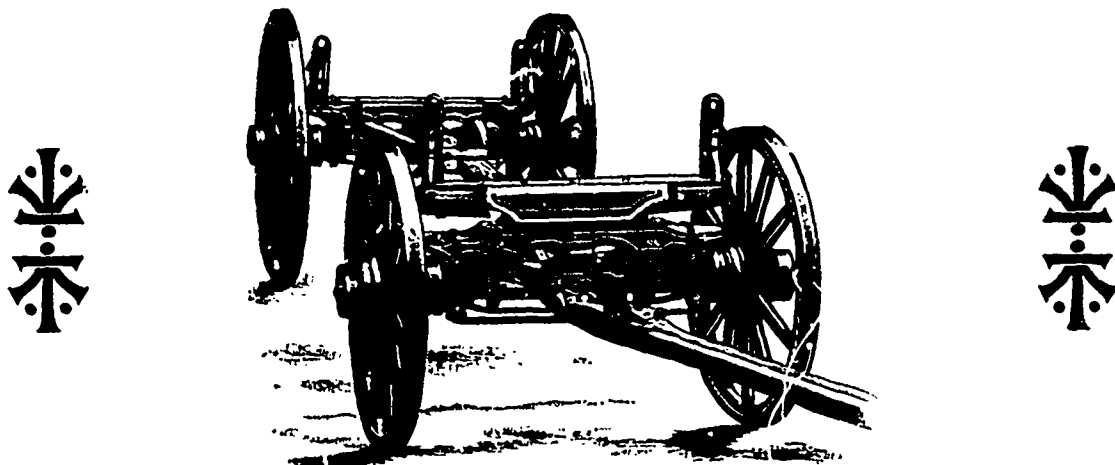
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**COW TIES, TIE WEIGHTS, ETC.**

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**WOOLEN MACHINERY**  
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One Hydro Extractor, 40-inch basket.  
Three Balling Machines for 2nd breakers.  
Three Bank Feeds for 2nd breakers.  
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Five Broad Crompton Looms, 4 boxes each end.  
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All of the above are in good order, and can be seen running. Also  
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Two Water Wheel Gears, newly cogged.  
One Knowler Steam Pump.

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**The Eno Steam Generator**

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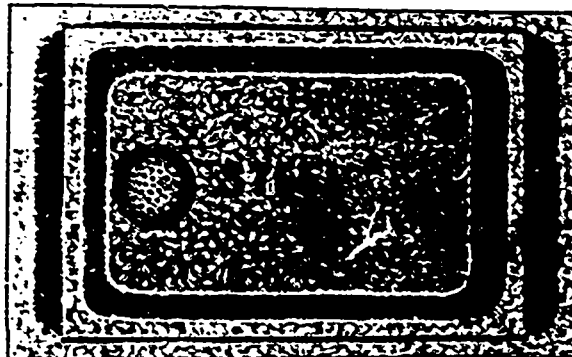
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**SINGLE SHEETS OF STEEL**

without seams or joints, rounded  
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no dirt can possibly collect any-  
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These Kitchen Sinks are fin-  
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**BREAKAGE IS IMPOSSIBLE**

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CHARGES are less than HALF  
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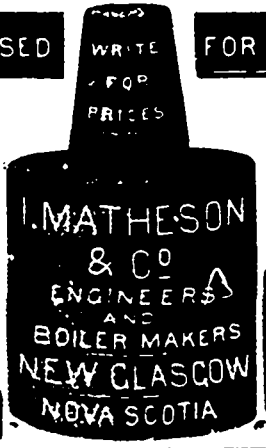
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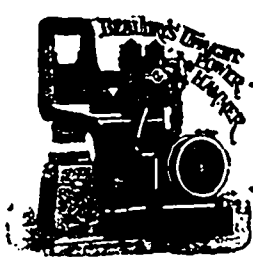
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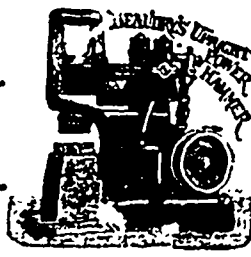
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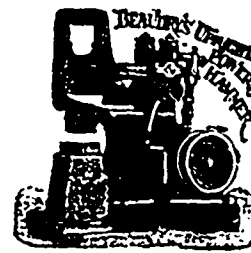
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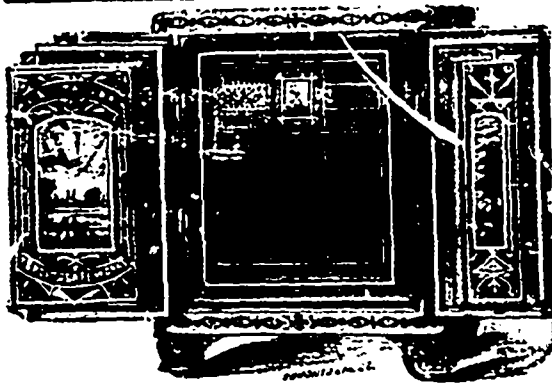


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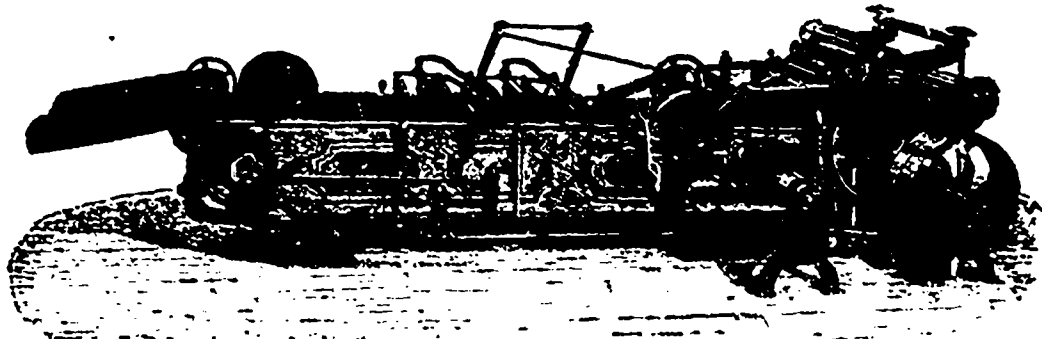
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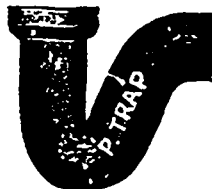
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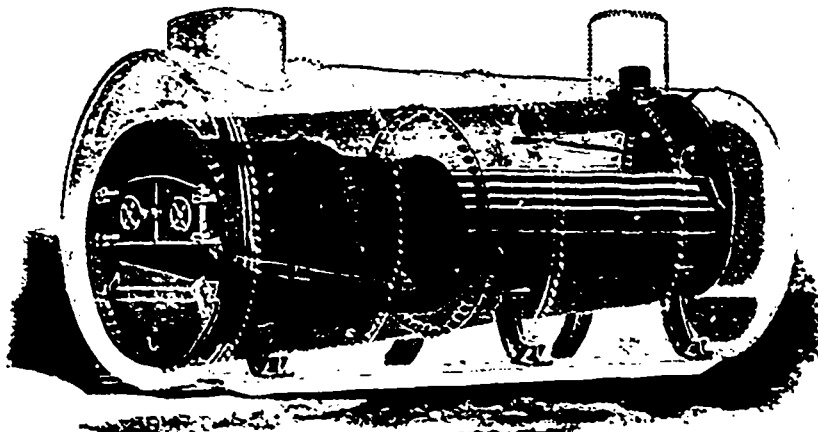
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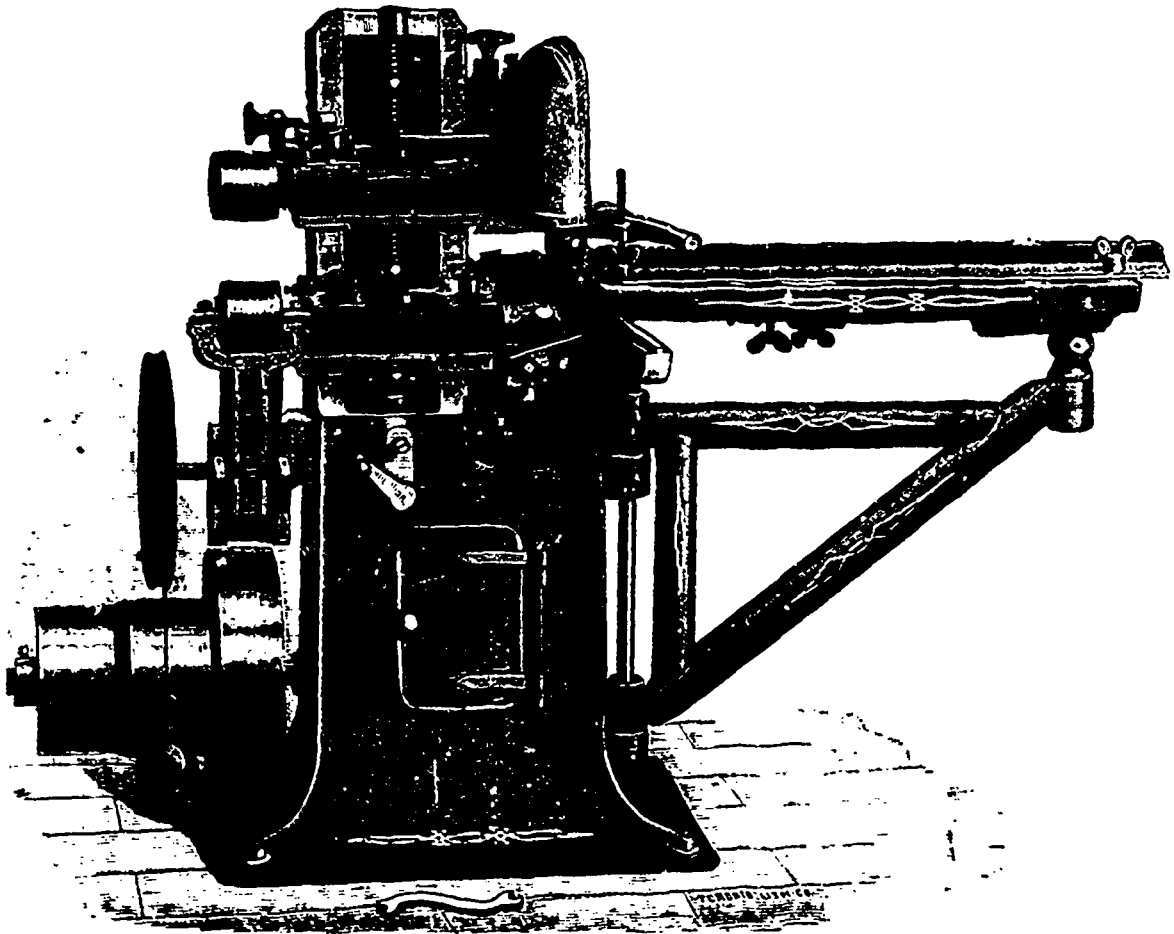
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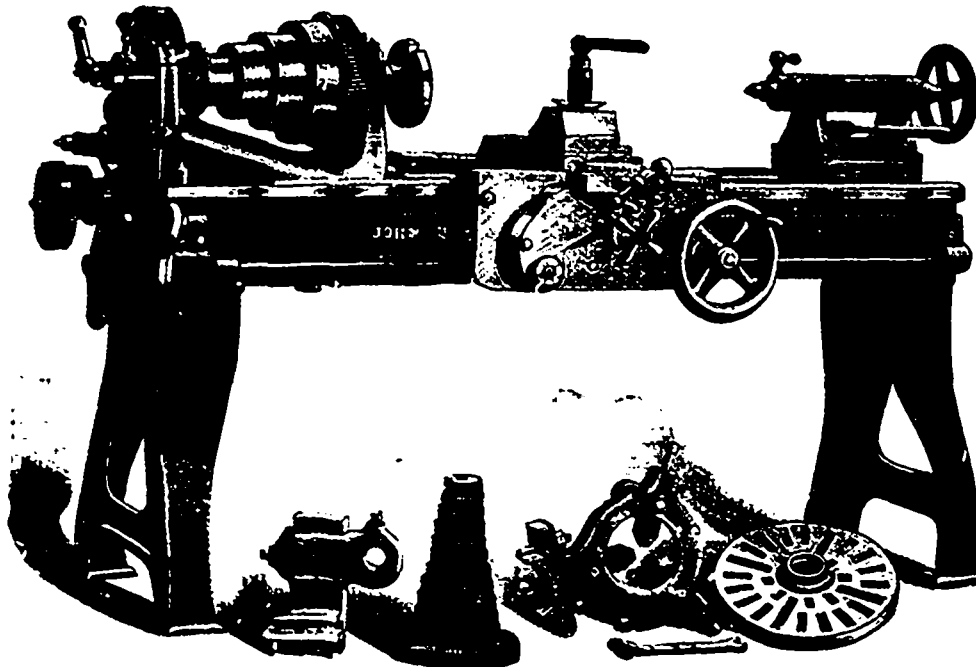
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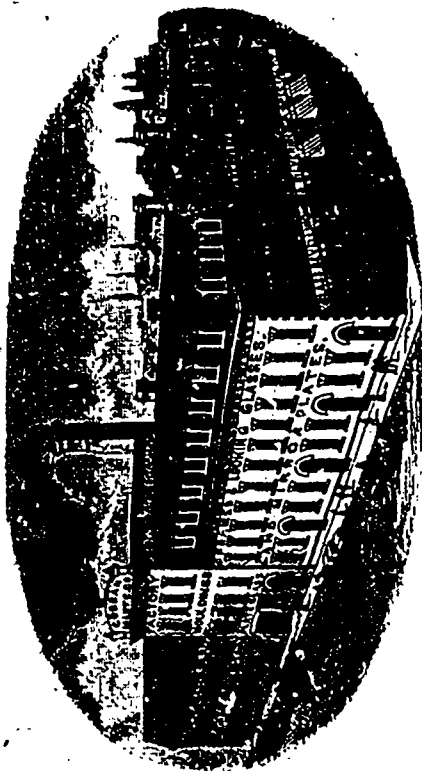
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