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Vol. 27.

TORONTO, JUNE 1, 1894.

No. 11.

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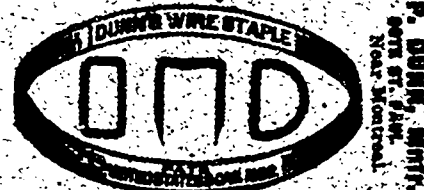
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AGRICULTURAL IMPLEMENTS AND IRON DUTIES.

A few days ago when the House of Commons were discussing the iron duties, Sir Richard Cartwright raised a plea on behalf of the manufacturers of agricultural implements, asking that iron and steel used in their business be placed in the free list. At this point the discussion became both animated and interesting. Sir Richard declared that the duty on iron and steel to this industry amounted to 40

or 50 per cent., and he doubted if it received any protection at all. He believed that if the manufacturers of agricultural implements had been better supporters of the Government they would have been better treated, meaning that the duty upon their product would not have been lowered from 35 per cent. to 20 per cent., or, in the event of the lowering, that the duty upon their raw material, iron and steel, would have been correspondingly lowered. Sir Richard repeated that the tariff had been construed for the benefit of those who helped the Government, to which insinuation Sir John Thompson replied that this was one of the mis-statements Sir Richard made and continued to make; and enquired of him "what are the raw materials employed in manufacturing agricultural implements upon which duty is paid?" To this Sir Richard replied, "every single particle of iron which goes into the production of agricultural implements." A contention ensued between the two Sirs, one contending that because domestic made material was used no duty was paid, the other contending that because of the duty the price was enhanced to that extent. Sir Richard asked, "Is the honorable gentleman ignorant of the fact that the price of every ton of iron and steel in Canada is advanced by the duty?" to which Sir John replied, "I am not ignorant of the fact that that statement has been made, nor am I ignorant of the fact that it is without foundation." At this juncture Mr. Foster intervened a diversion by declaring that Sir Richard's plea was inconsistent with himself, with the policy of his party, and the principles of free trade which he sometimes advocated; which fact had nothing whatever to do with the merits of the discussion; but it was very much to the point when the Minister of Finance showed that the cost of an American binder was \$100, and he would undertake to say that the duty on the raw materials, if imported, instead of being \$20, the amount of the duty would not be more than \$6 or \$8. It was then that Mr. Wallace, the Controller of Customs, saying that Mr. Foster was well within the mark, declared that the iron consumed in the construction of a binder weighed some 1,200 pounds, 600 pounds of which was pig iron and 600 pounds bar iron and steel. The duty upon the pig iron, at \$4 per ton, would be \$1.20, and upon the bar iron and steel at \$10 per ton \$3, making the entire duty only \$4.20. Mr. Wallace challenged Sir Richard to prove that the duty that would be paid by the manufacturers of agricultural implements, even in case of importation, amounted to more than one-third of the protection they received—that as a matter of fact they did not import because the iron produced at home was cheaper.

There were several quite noticeable features in this discussion. It will be remembered that in the early part of April a deputation of manufacturers of agricultural implements proceeded to Ottawa and requested Mr. Foster to place pig iron and bar iron and steel in the free list. These manufacturers imagined that they might strengthen themselves in approaching the Government if they could have the moral support and backing of the Toronto Board of Trade. To obtain this they had previously obtained the consent of the Board to organize what they called a Manufacturers' Section of the Board, composed largely but not exclusively of themselves; but what they did in and at this Manufacturers' Section was not characterized by any

marked efforts to secure the presence at their meetings of any manufacturers who were not in sympathy and accord with their views. Having secured this sub-organization of the Board of Trade they proceeded to formulate an ambiguous resolution in which it was declared that manufacturers should have free raw materials, (whatever that may mean) and, taking this resolution to the Council of the Board, obtained their authority to proceed to Ottawa as representatives of the Board, to present their resolution and advance their arguments in support of it. At that time Mr. Foster had presented his proposed tariff bill in which the duty upon agricultural implements had been reduced from 35 per cent. to 20 per cent.; and in their interview with the Government the point and pith of their request was not that the duty of 35 per cent. be reinstated, but that their raw materials, pig iron, bar iron and steel be placed in the free list.

These gentlemen were well aware of the fact that it was the settled policy of the Government to build up and encourage the iron industry. In the tariff of 1887 the duty upon pig iron was advanced to \$4 per ton and a bounty was also offered for the production of pig iron in Canada, and that the duty upon bar iron was placed at \$13 per ton. In the bill brought down by Mr. Foster on March 27, both the duty and bounty upon pig iron remained unchanged, the Minister explicitly declaring that in that respect the policy of the Government remained unchanged. It is true the duty upon agricultural implements was lowered 15 per cent., but it is also true that the duty upon bar iron and steel was also lowered from \$13 per ton to \$10; and about everything else entering into the construction of implements was correspondingly lowered. Under the previous tariff the agricultural implement industry had grown and prospered to a most gratifying extent, so much so that many of the manufacturers had declared time and again that their interests would not be very much hurt if the tariff upon implements was greatly modified or even removed. Some of them were quite bold in declaring their desire to have access to the American market, where they believed they could hold their own in competition with the manufacturers of that country. Perhaps they were sincere in these expressions—perhaps not.

According to the facts shown by Mr. Wallace, that even if these manufacturers rejected every article of domestic production in making their implements and imported all of their requirements from the United States, paying full duty thereon, the protection they would enjoy under the reduced duty upon implements would amount to at least three times as much as the duty they would have to pay upon their supplies. This completely refuted Sir Richard's contention that these manufacturers received no protection whatever.

We may be accused of obtuseness, but we fail to comprehend the force of Sir John Thompson's argument that the manufacturers of implements pay no duty upon the iron and steel they use if such materials are not imported. Without doubt in this case the price of such materials in Canada corresponds very closely with the price in Great Britain or the United States plus the duty, and, judging from the Trade and Navigation Returns, quite large quantities of such supplies are imported and upon which duties

are unquestionably paid. Sir John's distinction is too fine and intangible for ordinary use. If it is the settled policy of the Government to encourage the iron industry, and we sincerely hope it is, we can see no objection to the bold and unequivocal declaration that the price of iron is enhanced by the duty, and that the duty upon implements was intended to offset this to a certain extent.

There is every reason to believe that a duty of 20 per cent. upon agricultural implements will serve to retard the importation of American implements quite as effectively as the 35 per cent. duty. The Canadian manufacturers of implements, many of them, have declared time and again that under reciprocity with the United States they could sell their implements there, and they have frequently exerted themselves in teaching this doctrine to the farmers. Of course they were insincere; but, taking them at their word the farmers have made such lusty demands for a reduction of duty upon implements that the Government were compelled to regard their cry. If the reduction would seriously injure the industry we would protest against it most vigorously. It deserves to be protected as well as the iron or any other industry, and we cannot but believe that whatever changes in the tariff may be made, the Government will allow no injury to be done to the manufacturers of agricultural implements.

#### THAT TERRIBLE MCKINLEY TARIFF.

Mr. Philip Jamieson, a clothing merchant of Toronto, has recently returned home from a protracted visit to Great Britain, and has given the *Globe* the benefit of some of his impressions regarding industrial matters in that country, gained while there. Mr. Jamieson is somewhat of a politician of the Grit stamp, and a staunch free trader withal. He states that great depression exists in many of the manufacturing centres of England and Scotland, owing largely to the effects produced by the McKinley tariff. Many immense woolen mills are shut down, and thousands of workers thrown out of employment. Greenock, Scotland, presented a deplorable state of affairs. This greatest sugar refining centre in the world has a population less by 10,000 than it had ten years ago. The cause of this is not far to seek. The Americans, who in the past were the largest customers of the British refineries, are now manufacturing on an immense scale themselves, and the consequence is that the British refineries are being shut down. Mr. Jamieson went to Huddersfield where he found over 130 mills standing idle. The McKinley tariff, he says, affects this industrial centre more, perhaps, than any other in England. In Bradford, also, a disastrous state of affairs also exists. Leeds, another great manufacturing place, is also in a similar condition. In all these cities, he says, there is much anxiety as to the final settlement of the American tariff.

From many other reliable sources come similar tales of industrial depression in Great Britain, all attributable to that terrible McKinley tariff. Of course it is to be regretted that mills should be closed, capital forced into idleness, and thousands of people thrown out of employment in that country; but it should be borne in mind that in making and enforcing the McKinley tariff the Government of the United States were legislating not against any other coun-

try, but in favor of their own. These thousands of British workmen were employed in producing goods for consumption by the people of the United States. The McKinley idea was that these goods could just as well be made at home by American workmen, and the McKinley tariff effected that object. Under the operation of that tariff many British manufacturers closed their mills in that country and established mills in the United States, giving employment to thousands of American workmen. Free traders say that condition is an act of unfriendliness on the part of the United States towards Great Britain, but we do not so view it. Undoubtedly it is the duty of all governments to legislate in favor of their own people, and if in thus doing the people of other countries are deprived of occupation, they should not be disgruntled. St. Paul tells us that the man who provideth not for his own household denieth the faith and is worse than an infidel; and if it is the duty of the head of the family thus to provide, it is equally imperative that the head or government of the nation should provide for their people even if other people suffer.

It is a favorite argument with free traders, when they learn that there are idle men in a community such as Canada, to charge the event to the operation of protection, and as a result thereof; but Britain boasts of free trade, and complains that protection in the United States plunges British workmen into idleness. It would be quite as reasonable to argue that free trade in Britain is the cause of the Coxe armies that have been and are swarming over the neighboring republic.

Another argument of the free traders is that if the British workmen had been allowed to produce merchandise, as they would have done had it not been for that terrible McKinley tariff, and the American people had continued to consume these British goods, the goods would have cost much less to the consumers than what the American goods cost under protection—that the cost to the American consumer is increased above the cost of such merchandise made in Britain to just the extent of the duty. Of course this is not so, for in many lines of products the cost of production is almost or quite as low in the United States as in Britain; and if it is not, and if the American people are pleased to pay more for merchandise made at home by their own workmen, in preference to paying a little less for articles made abroad by foreigners, it concerns only themselves and not others.

#### ROUGH ON ITS FRIENDS.

Allusion is made in another article to the championship in the House of Commons of Sir Richard Cartwright and other leaders of the Opposition of the interests of the manufacturers of agricultural implements when discussion arose regarding the reduction of duty upon such implements. The novel sight was presented of Ministers of the Government defending their action in reducing the duty, and of the strongest members of the Opposition pleading for their retention.

On the very day that this event was occurring, the Montreal Herald produced a leading editorial in which it professes to tell the real secret of the tariff reduction, and all unwittingly no doubt, imputes some very rough things

to its friends, giving them some drastic medicine that it intended for the other fellows. Hear it:—

Flagitious as was that exhibition of national debauchery it is now being daily discounted at Ottawa. For in 1877 the manufacturers took gamblers' chances; their reward was contingent on a victory which was problematical. But to-day Mr. Foster, with a parliamentary following humbled to a degree never achieved by Uriah Heep, by the mingled terrorism of the party lash and the seductive promises of future personal advantage, sells the right of private taxation, or rather extortion, to the highest bidder with immediate delivery of the goods. The Roman soldiers, in the decadence of the Empire, gave the Imperial Crown to the man who scattered gold amongst them most freely; and the same brutal spectacle is being repeated to-day in this democracy by the political janizaries who retain their control of the country through the combined influences of fraudulent lists, fixed constituencies, and a corruption fund which makes willing tools of unprincipled voters. We see the departure for Ottawa of the advocates of special interests; upon arrival there we see them vanish behind the oak doors of the ministerial council chambers; and as soon, thereafter as the business can be conveniently transacted, Mr. Foster rises in his place in the House and restores the duties, temporarily reduced in accordance with the administration's scheme, to their old figure. He must indeed be an innocent who sees in all this only that which is natural.

On the very day the Herald was promulgating this screed of blackguardism and abuse against Mr. Foster and his parliamentary followers, and against manufacturers generally, Mr. Foster and other Ministers of the Government were standing in their places in the House of Commons insisting that the duty upon agricultural implements was too high, and that it ought to be reduced, while Sir Richard Cartwright, Mr. Laurier, Mr. Mills and other gentlemen of the Opposition were vehement in combatting the reduction. We hope the Herald will point out where the "mingled terror of the party lash and the seductive promises of future personal advantage" appeared—upon which side of the House. If any "selling" was in progress it must have been that the bold and defiant Sir Richard, and the silver-tongued Mr. Laurier, and the astute parliamentarian Mr. Mills were endeavoring to sell the right of private taxation, or rather extortion, to the agricultural implement men, whose special pleaders they were. The Herald tells us that the Roman soldiers, in the decadence of the Empire, gave the Imperial Crown to the man who scattered gold amongst them most freely; and by the same token, according to the Herald, the same brutal spectacle was repeated in the Canadian House of Commons by the political janizaries, meaning the aforesaid agricultural implement manufacturers, who desire to retain their 35 per cent. duty through a corruption fund which makes willing tools of the leaders of the Opposition. In the mind's eye, according to this crazy screed, might be seen the departure for Ottawa of the advocates of the agricultural implement interest; upon arrival there we see them vanish into the apartments of Mr. Laurier et al of the Opposition; and as soon thereafter as the business can be conveniently transacted, and the corruption fund paid over, Mr. Laurier et al arise in their places in the House and demand that the duties upon agricultural implements, which had been reduced by Mr. Foster, in accordance with the administration's scheme, be restored to

the old figure. These be rough blows the Herald is dealing out to its political friends; but if it and they can stand it, we won't weep.

The Herald tells us, too, that if the motives of the Government could be laid bare it would be found that the reduction of the duty upon agricultural implements was designed with no other object than to screw by compulsion out of the manufacturers a corruption fund very much larger than could be obtained from them by the most fervent suasion—that certain contributory sources of exceeding richness in the past have been dried up since the last election, and with a hard campaign before them the Government has found its future darkened. Now this is quite funny. We are not advised as to the "exceeding richness" in the past the contributions of these manufacturers were to the Opposition party; but with a hard campaign before them, considering the richness of the pasture in which these manufacturers live, no doubt a nice skimming of cream was demanded and received before Sir Richard et al undertook this championship business.

#### CHEAP BINDER TWINE.

"God's in his heaven, all's right with the world." A quotation from Browning, kept standing at head of editorial page as the sentiment of the London Advertiser.

"If you trust in God and yourself you can surmount every obstacle. Do not yield to restless anxiety. One must not always be asking what may happen to one in life, but one must advance fearlessly and bravely." A quotation from Prince Bismarck, kept standing at head of editorial page as the sentiments of the London Advertiser.

On a recent occasion—on January 27—in an editorial re binder twine the London Advertiser said:—

A good deal has been said and written about the manufacture of binder twine at the Central Prison for the use of Ontario farmers, and not a little misrepresentation has been indulged in recently by those interested, for selfish purposes, in decrying the Ontario Administration. Hon. John Dryden, Minister of Agriculture, the other day addressed his constituents on this and kindred subjects. He lucidly explained how the Government had undertaken to supply the farmers with this commodity. Brickmaking, he said, had played out for want of clay, and as it is desirable to keep the prisoners employed this new industry was put in its place. And another explanation was that farmers were the victims of a huge monopoly, and the Government determined to aid them in getting cheaper twine. "Monopolists," continued Mr. Dryden, "tried to prevent the Government from getting the machinery, and, therefore, unexpected delay in beginning the manufacture was the result. In future they had decided to manufacture only one quality of twine, and that the best grade. The output last year did not exceed \$100,000 worth, but though sold at less than 10 cents per pound there was quite a margin of profit. They expected to reach an output of about \$300,000 this year, and there will be a substantial reduction in price. He would use his influence to have the farmers supplied at first cost. Some complaints has been made because Mr. Noxon had been appointed, but the wisdom of the appointment was demonstrated by his success as a manager of this industry, and he had already saved the Government more than twice his salary. All the twine had been sold, and everything has gone on satisfactorily." This will be good news for the taxpayers at large as well as for the farmers. It is not right that prisoners should be kept in idleness at public expense, and it is well when a Government can do a great

good to seven-tenths of the population, while relieving the entire taxpaying community of a very material tax that would otherwise have to be imposed for the maintenance of criminals.

"Which I wish to remark, and my language is plain; for ways that are dark and tricks that are vain; the Advertiser is very peculiar." A quotation from Bret Hart, adapted to the occasion.

The Advertiser is such a goody-good paper that in its impiety it feels compelled to flaunt to the world in its every issue professions that belie its practice. Since the above quoted editorial re binder twine was published, developments have been made under oath, by some of the very men whose names it mentions, which prove conclusively that the most important statements made in the editorial are absolutely false, and yet the goody-good Advertiser has never yet found occasion to retract its falsehoods and to state the real facts.

If God is in his heaven, and if the Advertiser's trust is in Him and in its own goody-good self to the extent that it can surmount its objection to making amends for its false statements, will it tell us whether in the matter of binder twine the farmers were the victims of a huge monopoly, as it asserts; will it tell us whether it is a fact that in the sale by the Ontario Government of binder twine made at Central Prison by convicts "there was quite a margin of profit;" whether it is a fact that there was wisdom in the appointment of Mr. Noxon as manager of this prison factory; that his management of it was a success, and that "he had saved the Government more than twice his salary?" Will it tell us again that "everything has gone on satisfactorily" there? Will it tell us if the developments recently made before the Public Accounts committee of the Ontario legislature is "good news for the taxpayers at large as well as for the farmers?"

We pause for a reply; in fact we have been pausing for quite a number of days that have lengthened into weeks, for the Advertiser to retract its false statements about the advantages (?) to Canada of manufacturing binder twine with prison labor.

#### PROFIT SHARING—A MISAPPREHENSION.

Discussions of the subject of profit-sharing, which is now occupying some attention in certain public journals, derives much of its interest from the curiosity generally entertained to observe a manufacturer who has any profits to share. There are few men engaged in productive industry who would not be considerably better off to-day if their workmen had been employed last year upon a basis of division of profits and losses rather than upon a basis of wages. The plan of giving to workmen a share of the earnings of the employer has an alluring aspect in prosperous times, particularly to the workmen. But this kind of partnership, to be wholly just in its operation, should work in both directions. If the employer must divide when he is making money it would appear to be fair to require that he should divide also when he is losing money. Of course in actual practice this is not possible, because workmen generally are not able to bear their share of such losses; and this is the obstacle, likely to be insurmountable, which halts the philanthropists who urge the movement.—The Manufacturer.

As we understand profit-sharing, our Philadelphia contemporary labors under a misapprehension of the working of it. It does not seem to discriminate between profit-

sharing and commercial co-partnership. Under such co-partnership the workman would be entitled to share in any profits that might accrue in the business, and would have to bear his proportion of loss if any occurred. He would also have the right and privilege of access to all the business transactions of the concern, and would have a voice in the management of it. In other words he would be a shareholder. With profit-sharing no such conditions would exist. Under the system the workman would be paid only such wages as might be agreed upon, and this would be absolute. The manufacturer would retain all his interest in the capital invested in the business, and this would be absolute. He would also absolutely control all details and management of the business. It is certain that the capital invested in the business would be and remain unproductive except for the labor of the workman; and it is equally certain that the brawn and muscle and intellect of the workman would be and remain unproductive to him except for the employment afforded by the capitalist in his factory. The capitalist would be entitled to a fair interest on his investment, and the workman would be entitled to his wages. If the business were prosperous after the payment of the workman's wages, the capitalist would be entitled to draw his interest on his investment; and if more than that were gained in the business, the excess would indicate the amount that would be shared between capital and labor. The proper distribution of this surplus is ascertained by first learning the amount of capital invested in the business, and second, by learning the whole amount of wages paid during the year. If the capital invested was say \$100,000, the wages paid to labor during the year \$100,000, and the profits of the business during the year amounted to \$26,000; if capital was worth 6 per cent. the capitalist would first draw his \$6,000 interest and the balance, \$20,000, would be divided equally between the manufacturer and his employes, each receiving \$10,000. This would be to the capitalist 10 per cent. upon his investment over and above the 6 per cent. interest thereon; and it would also be 10 per cent. to the workman over and above what he had received as wages during the year.

Our contemporary says that "the plan of giving to workmen a share of the earnings of the employer has an alluring aspect in prosperous times, particularly to the workmen." This sentence, in our opinion, conveys a wrong idea. The "earnings" spoken of are no more the earnings of the employer than of the employe. The share of the employer in the transaction is the capital he invested in the business; and the share of the workman is the labor bestowed by him. There could be no earnings without this combination of both capital and labor. The "allurement" in the case consists of the prospect of earnings; which under profit-sharing would be divided as here suggested. In times like the present the capitalist is not compelled to keep his factory in operation nor to employ labor. By desisting from these he is saved the cost of operating. But if he prefers to operate, even though there be no actual profit in doing so, to prevent the deterioration of machinery, etc., inevitable when not in use, he is morally as well as legally bound to pay the workman for his services; and there is no more reason or justice in asking the work-

man to bear a portion of the loss than in asking the night watchman to do the same thing.

The arguments of our contemporary against commercial co-partnership between employer and employe are sound, but there is no point to them when applied to profit-sharing.

#### MINERAL PRODUCTION OF THE UNITED STATES.

Mr. Richard P. Rothwell, of New York, editor of the Engineering and Mining Journal, who has heretofore published a volume on The Mineral Industry, has compiled the statistics of the mineral production of the United States for volume 2 of that work, having reference to the years 1892 and 1893, advance sheets of which he has kindly sent to us. In a letter to us Mr. Rothwell says:—

We feel not a little satisfaction in having again this year, as we have for several years past, secured the complete returns from states and individuals of the entire mineral and metal output of the United States. A work of such vast magnitude has never before, we believe, been undertaken and accomplished by private enterprise, and we feel, therefore, some pardonable pride in this achievement. As accuracy is the very foundation of value in statistical work the utmost care has been taken to secure it, and also to make this the most complete as well as the most accurate statement of the United States mineral industry ever compiled. A number of substances are here given of which no statistics have heretofore been compiled.

Alluding to the sources from which his information was obtained, Mr. Rothwell says:—

For iron the official figures of the Iron and Steel Association of the United States have been accepted as of the highest authority. The coal statistics have been collected chiefly through the inspectors of coal mines of the several States whose duty it is to visit, several times during the year, each colliery in each inspection district. We have also received returns direct from nearly every coal mine in the country, and from several railroads on which the coal is mined. These figures are therefore checked official figures in the states where there are mine inspectors, and in all cases are compiled with the utmost care. In copper, lead, zinc, nickel, etc., the Engineering and Mining Journal has for many years collected and published the most accurate and authoritative statistics.

The gold and silver statistics of production have been collected direct from all the refiners who put these metals in final marketable form, and in the work we have been indebted to the Director of the U.S. Mint for valuable assistance. He has checked the distribution to states, especially of the gold. In all the other substances also the statistics have been compiled from direct returns, and the greatest precautions were taken to insure their accuracy.

In the year 1893 the mineral and metal production of the United States as compared with 1892 did not decline in quantity as much as might have been expected from the financial depression, but there is a material decline in values, amounting to over \$79,000,000. It is a noteworthy fact that the mineral production alone, while almost one-third greater in value than the metal product, decreased only one-half as much. Of the total decrease, over \$30,000,000 was in the decreased production and shrinkage of values in pig iron; \$9,000,000 was in coke and \$6,000,000 in bituminous coal, both of which were largely due to the decline in pig iron production. In silver the decrease in value amounted to \$6,000,000. In but few cases was there any increase. Anthracite coal gained \$4,000,000 in value



thus partly offsetting the decline in bituminous and gold increased \$3,000,000.

The growth of the mineral industry of the United States has been so rapid as to be wholly beyond comparison with any other nation. Fifty years ago that country began to take rank as one of the important producers. In 20 years it had won a position among the leading nations, and now the value of its product is almost as great as the value of the combined output of Great Britain, France and Germany.

Such a growth is phenomenal. In 1864 the United States with an output of 22,860,000 metric tons stood third among the coal producing nations, Great Britain leading with over 90,000,000 tons, Germany 26,000,000. In the 30 years since that time Great Britain has a little more than doubled its output. Germany has trebled, but the United States has increased eight times, and produces now almost as much as Germany and all the rest of the world taken together, excepting only Great Britain. In the production of pig iron the growth has been even more remarkable. In 1865 the pig iron producing countries ranked with Great Britain first, then France, Germany and the United States; Great Britain alone producing almost six times as much as the United States. But in 1892 the United States output was more than 11 times as much as 30 years before, and almost half again as much as Great Britain; as much as Germany, France, Belgium and Austria-Hungary all together; or as Great Britain, France and Austria-Hungary. These two staples, iron and coal, serve to show the quick rise of the United States to supremacy as a producing country.

Thirty years ago, when American industry commenced its rapid growth, that country had at command the knowledge which had been obtained in Europe through many centuries of experience. The methods and processes were tried, but were not found suitable, and changes were made in them to meet the new conditions; many new methods were devised and adopted. These changes have kept pace with the continued growth of the industry until now, the methods and processes in use, while they may in many cases be similar in principle to the old ones, are altogether different in practice. Practically they are new methods designed to fit the conditions and demands of a vast industry which is itself almost new.

Knowledge of technical and industrial practice has advanced in all civilized countries, but the practice has not always followed the knowledge. In the United States the rapidity with which one improvement has followed another has given American engineers a special training not obtainable elsewhere, so that instead of the United States sending to Europe for experts to advise on processes or direct the operation of industries, the older countries call upon American engineers to go to every part of the world where a mineral industry exists.

#### EDITORIAL NOTES.

The American Artisan, Chicago, has sent us a very pretty little booklet entitled "What Congress has done," written, we are told, by that paper, the outside back cover containing a business announcement of that enterprising journal. The sixteen pages, however, contained within

the cover, and which are supposed to record the legislative exploits of a body of men chosen to represent the great 65,000,000 Yankee nation, is of virgin whiteness and purity, without taint or suspicion of printer's ink. No doubt our esteemed contemporary is vastly disgusted at what the Yankee Congress has not done; but it should remember that the situation presents greatly differing aspects when viewed from different standpoints. In our opinion, the Artisan is more or less tinctured with free trade ideas, in which it differs very widely from American trade journals generally, devoted to the manufacturing interests of that country; and if our recollection serves us correctly, it seemed to be much pleased when Mr. Cleveland and the Democratic party came into so-called power, and promised to smash protection by reducing or removing the duty particularly upon tin plates. We also remember that it was a persistent doubter as to the existence of any tin plate works in the United States, or even the possibility of such existence, even long after such works were in operation and turning out large quantities of the article of as good quality as was ever made in Wales. Of course the free traders want to hold Congress to the very letter of the promises made by the Democratic party, and in that view of the situation, the contents of the American Artisan's little booklet covers the ground very correctly. Congress has not yet smashed protection, nor is it likely to do so. To the desire of the free traders to do this, both in Congress and outside of Congress, may be ascribed and charged the black pall of commercial and industrial depression and disaster that has for so long a time enshrouded the United States; the only hope of the country being in that spirited resistance to this destructive tendency shown by those who believe in protection. Those who have prevented Congress from destroying protection are a Spartan band whose names should live and glow in their country's history.

The expulsion of Mr. T. V. Powderly, who is personally well liked in Toronto, and Mr. A. W. Wright, of this city, from the Knights of Labor is likely to have a serious effect upon the fortunes of the order in Canada. Toronto members spoken to yesterday say that the expulsion was absolutely without justification.—Toronto Globe.

We can observe no good reason why the Canadian Knights of Labor should form an integral part of the general organization as existing in the United States, nor why they should be in any manner dependent upon them. Without reference to the troubles and dissensions now existing among them, which has resulted in the expulsion of Mr. Powderly and Mr. Wright, it appears that this might be a favorable time for a reorganization of the order in Canada of which Mr. Wright would be the head. He is a man of decided executive ability, straightforward, honest and honorable, and withal a Canadian of whom laboring men, labor organizations and Canadians generally should be proud.

The appearance of a specific duty is equivalent to an official intimation to the consumers of the country that it is none of their business how much they are taxed. The only thing they can be certain of is that the poorer they are, the higher taxation they will pay on their purchases. But Mr. Foster appears to have lost sight of the consuming classes

altogether. It would pay the Government politically—if they have not gone out of politics—to take a recess and hold some more popular tariff investigations. At least, we should be left the meagre pittance vouchsafed us on budget day.—Montreal Star.

Sure enough. The foolish furore of last year that sent the ministers perambulating over the country in quest of a deep seated and inextinguishable desire for tariff reform, meaning an abandonment of specific duties, was found to have no realizable sentiment among the masses. Mr. Foster has found, however, that the changes he proposed in his March 27th tariff, very many of them, if persisted in, would work incalculable injury to the country, and like a sensible man he abandoned them. The holding of more tariff investigations would disclose the fact that if the Government desire to carry out the desires of the people of Canada they must not depreciate protection. No monkeying with the buzz saw.

The Ottawa House of Commons has been considering a bill "to authorize a canal between lakes St. Clair and Erie thirteen miles long. The canal is to be 200 feet wide, with only one lock. As there is a fall of four feet from St. Clair to Erie it is a serious international question whether this is not diverting international waters. In the event of the lock giving way, the water of the Detroit river would rush through the proposed canal and make practically a new river through Canadian territory."—The Manufacturer.

Don't fret. There is a much greater fall than four feet from Lake Superior to Lake Huron; but does our anxious neighbor consider it a serious international question the diversion of international waters through the St. Mary's canal, which is wholly within American territory? Suppose the locks in this canal should give way and make practically a new river through American territory, would that become a serious international question? The St. Clair and Erie canal, when built, will certainly divert traffic from the Detroit river route, with the effect of making the city of Detroit only a way station on an unused route; and perhaps this idea is what is troubling the mind of our contemporary.

The Brooklyn Tabernacle fire, with its million dollar loss, is attributed to a badly insulated electric wire coming into contact with some inflammable material in the organ. Probably any evidence that would prove conclusively how the conflagration started has been destroyed with the building. There is evident, however, among insurance men, an inclination to look with suspicion on the multiplicity of electric appliances with which modern ecclesiastical and other structures are supplied, when so-called mysterious fires occur. The end will doubtless be the adoption of very strict regulations in regard to wiring, failure to comply with which will involve a penalty in the shape of extra premium. The new force cannot be banished, as it is too valuable, and electric contractors would be doing their clients a service by co-operating in the work of devising and making general such rules as would reduce an evident risk to a minimum.—Montreal Gazette.

Those trade restriction advocates who have been in the habit of asserting that Canada would be better off if all its trade relations with the United States were taken away, will find material to work upon among the thousands of workmen who are thrown out of employment by the inability of their employers to obtain supplies of United States coal through the miners' strike.—London Advertiser.

This is a silly and far-fetched effort to connect the coal

famine with protection. Last year under similar circumstances, when the English coal miners were out on strike, the price of coal in London and other cities in Great Britain went above \$10 per ton, the nominal price being about as many shillings. What has either protection or free trade to do with the scarcity of coal?

In another page will be found a most interesting communication re Gold Mining in Ontario, from which it will be seen that in the section of country alluded to there are very extensive deposits of very rich gold bearing ores. We can vouch for the reliability of our correspondent, and the utmost credit may be accorded to what he says. It is to be hoped that the fact that these gold deposits are so extensive and so accessible, being within a hundred miles of Toronto, may excite an interest that will lead to extensive operations in their development.

Michigan lumbermen, who live upon exported Canadian logs, feel hurt because the Dominion authorities will not admit duty free the booms and chains which they use in towing away the wealth of the country, and they are going to appeal to Congress about it. They should have the able assistance of The Globe in this. That paper supports the reckless and wasteful policy of the Ontario Government in dealing with the timber lands, and must regard with aversion anything tending to hamper its friends, the Americans, from denuding the pineries of the province as speedily as possible in order that the Government may have the much needed funds. And the Government is sorely in need of funds just now.—Toronto Empire.

The repetition of this nonsense day after day is puerile and nonsensical. The Ontario Government, with which the Empire is not in accord, has no more power to prevent the export of logs from Canada than it has to prevent their import into the United States. The Empire is supposed to be in accord, however, with the Dominion Government, and that Government have the power to place an export duty on logs whenever they desire to do so.

Forty years ago the United States was hardly in the race at all as a producer of pig iron. In 1850 our total product was no more than 564,000 tons. In 1892 we produced 9,157,000 tons or nearly 16 times as much. In that year our product was almost 50 per cent. larger than the product of Great Britain and 50 per cent. larger than that of Germany and France combined. Of the total production of the four countries we supplied more than 45 per cent. Since 1889 the output of Great Britain has declined nearly one-fourth. That of Germany has remained stationary and that of France has slightly increased. That of the United States fell off last year, because, of course, of the extraordinary depression of business which was in a degree peculiar to this country, but up to that time it gained enormously. That is what persistence in the policy of protection has done for one of our great foundation industries. But for that policy no doubt we should still be largely dependent upon Europe for our supplies of iron. It is argued by some of the free traders that protection has done harm by inducing over-production. But, until Mr. Cleveland began to assail American industry, the product, large as it was, all went into consumption. Prices were low, but the quantities, indisputably, were not in excess of the consumptive demand. If the Wilson bill shall pass Great

Britain will have a chance to regain some of her lost ground, in this industry, and American iron-masters will take their turn at loss of business.—The Manufacturer.

Mr. Arthur Schoell, of the Niagara Falls Hydraulic Power & Manufacturing Company, is considering a novel plan which bids fair to a large development of manufacturing enterprises in the locality. The plan contemplates the construction of a stone building 50x220 feet, and 15 stories high. The foundations will rest at the bottom of the gorge on solid rock, and the roof of the building will be nearly on a level with the top of the bank. In this building he proposes to arrange space for numerous factories, which will be furnished with power for manufacturing purposes from the most powerful Leffel turbines. He has been assured by some of the best engineers that the plan is a feasible one. There is an unlimited quantity of stone on the ground. The remainder of the structure would be of iron and steel.

The London Advertiser approvingly reproduces the following from the Port Hope Times:—

Farmers who have sheep are rejoicing over an extraordinary increase. Nearly every ewe has two lambs and some have three. One farmer had seventeen lambs from eight ewes. It is generally remarked as a great year for lambs, but will lamb chops be cheaper?

We wonder if our pessimist contemporaries really wish that lamb chops would become cheaper. The tariff tends to keep American lambs out of the Canadian market, giving that much advantage to our farmers; and these Grit papers are crying to have the price of lambs reduced.

Senator Drummond, after permitting the statement that he draws \$60,000 a year for managing the sugar refining combination to be in circulation for years, now asserts that that money is not paid to him. As the taxpayers of Canada help to make his sugar refining combine profitable by their compulsory contributions, perhaps Senator Drummond will be good enough to say just how much he draws? —London Advertiser.

This is the refinement of impudence, and would be on a par with asking a man how many times he kisses his wife. Was it not for promulgating this falsehood concerning Senator Drummond that Mr. Laurier had to apologise a few days ago?

The Germans give bounties to native sugar refiners who export their products, practically taxing themselves to supply foreigners with cheap sugar. In the United States, where similar theories obtain, this cheap sugar is regarded as commercially injurious, and the people put on a tax to keep it out, or, at least, to divert the bonuses from themselves to the Government. The Germans are indignant, and threaten to retaliate by taxing themselves when buying American pork. This recalls the revenge of the Chinese, who goes to the house of his offender and commits suicide.—Toronto Globe.

The Germans, under their system of bounties for the production of beet-sugar for export, have made their country one of the largest sugar producers of the world, the cultivation of the beet for that purpose being more profitable to the farmers than any other crop. The soil and climate of Canada, especially of Ontario and Quebec, are

admirably suited for raising sugar-beets, and under proper encouragement we should become exporters of sugar, instead of having to import every pound we use.

A few weeks ago and previous to the day when Mr. Foster brought down his tariff resolutions, in which agricultural implements were rated for duty at 20 per cent. ad valorem, the London Advertiser produced a tirade against Mr. H. A. Massey, a manufacturer of agricultural implements, in which it said:

When the N.P. came into force, Massey was comparatively a poor man. He is now a millionaire and able to present a hall costing \$100,000 to the citizens of Toronto. The tariff on agricultural implements has been maintained at 35 per cent. to enable him to accumulate this wealth. If the tax had been left at 15 per cent., or even at 25 per cent., Massey would have had to be contented with his hundreds of thousands instead of his millions; the Toronto people would have been without their music hall, or would have been compelled to subscribe for it themselves; there would have been less inducement for Massey to buy up the smaller implement making concerns, and other cities would have been benefited; the farmer would have been able to purchase his implements at a cheaper rate; he could have money in his pocket that goes to enable Massey to pose as a philanthropist for the benefit of Toronto; and the money thus left in the possession of the farmer would be spent, not in Toronto, but in the purchase of commodities manufactured in London and other centres of population.

There is this that may be said concerning Mr. Massey—honest poverty is not considered a crime in Canada, neither is it a crime to be a millionaire if the wealth is accumulated in legitimate business, therefore the sneers of the Advertiser are impertinent and not to the point, neither is the giving of a music hall to Toronto to the point. According to the ethics of protection when the tariff first imposed a duty of 35 per cent. upon agricultural implements it was considered that that amount of protection was necessary to develop that industry. According to the same ethics, when it was found that the industry would not be injured by a reduction of the duty, a change was promptly made to 20 per cent. The Advertiser suggested a duty of 25 per cent. as being sufficient to prevent the accumulation of great wealth in this industry, such as had been acquired by Mr. Massey, its argument being that if 25 per cent. had been the rate Toronto people would have been without the Massey music hall, or they would have been compelled to have subscribed for it themselves. Mr. Foster has fixed the rate at actually less than the Advertiser's figure, and still it and its free trade friends are not happy, Sir Richard Cartwright, Mr. Laurier and even the good Mr. Mills, from their places in the House of Commons, declaiming against the reduction as an injustice to Mr. Massey and the other manufacturers. "Consistency, thou art a jewel." And how silly in the Advertiser to say that the 35 per cent. duty had enabled Mr. Massey "to buy up the smaller implement making concerns." Mr. Massey started in as a poor man, we are told, then why was it that larger concerns then existing did not buy him up? They all benefited equally by protection. If the full development of the agricultural implement industry could not have been effected with a duty less than 35 per cent., then that was properly the protection that should have been accorded it. Having attained its full develop-

ment—when it is no longer an infant industry—it is quite in accordance with the ethics of protection to reduce the duty to 20 per cent. if the circumstances will allow, or to whatever may be the correct rate. But sneers at Mr. Massey, attempts to array one class of the community against another class, vile insinuations against the honesty of manufacturers who desire protection, well mixed with religious hypocrisy are not correct methods of discussing important economic questions.

Labor Commissioner Carol D. Wright has some interesting statistics on machinery and men in his late report on Industrial Depressions. The figures given show most forcibly the great benefit the United States has derived from the introduction of labor-saving machinery and the great saving in cost effected by the employment of steam and water power in place of human labor.

The mechanical industries of the United States are carried on by steam and water power representing, in round numbers, 3,500,000 horse-power, each horse-power equaling the muscular labor of six men, that is to say, if men were employed to furnish the power to carry on the industries of this country, it would require 21,000,000 men. and 21,000,000 men represent a population, according to the ratio of the census of 1880, of 105,000,000. The industries are now carried on by 4,000,000 persons, in round numbers, representing a population of 20,000,000, only. There are in the United States 28,600 locomotives. To do the work of these locomotives upon the existing common roads of the country and the equivalent of that which has been done upon the railroads the past year would require in round numbers 54,000,000 horses and 13,500,000 men. The work is now done, so far as men are concerned, by 250,000, representing a population of 1,250,000, while the population required for the number of men necessary to do the work with horses would be 67,500,000. To do the work now accomplished by power and power machinery in our mechanical industries and upon our railroads would require men representing a population of 172,500,000, in addition to the present population of the country of 65,000,000, or a total population, with hand processes and with horse-power, of 227,500,000, which population would be obliged to subsist on present means. In an economic view the cost to the country would be enormous. The present cost of operating the railroads of the country with steam power is in round numbers, \$502,600,000 per annum; but to carry on the same amount of work with men and horses would cost the country \$11,308,500,000.

The Michigan lumbermen are exercised over the collection of a duty of 20 per cent. by the Canadian Customs officials upon boom sticks brought over from Michigan for the purpose of enclosing Canadian logs to be towed to the sawmills of that state. These lumbermen are fortunate to get off so cheaply. They are now taking about 500,000,000 feet of lumber annually from the forests of Ontario across to Saginaw and other points on Lake Michigan without let or hindrance, to the serious prejudice of the saw milling industry of Ontario. They employ American laborers and American supplies in the work, and about the only advantage any Canadian interest derives is the payment of stumpage dues to the Ontario Government. If the Federal Parliament instructed the Government to place a substantial export duty on logs, the consequence would be greatly to the advantage of the home industry. —Montreal Gazette.

If the Michigan lumbermen get off cheaply, it is because the Dominion Government so will it. If they are taking such large quantities of logs away from Canada, to be cut

into lumber in American mills, without let or hindrance, it is because the Dominion Government decline to impose an export duty upon logs as they should do. It is refreshing, however, to notice that the Gazette shows that the remedy for the evil lies in the hands of the Dominion Government, in strong contrast with the Empire, which charges the delinquency to the Ontario Government.

#### The Montreal Meeting of the American Society of Mechanical Engineers.

The programme of the forthcoming meeting of the American Society of Mechanical Engineers, which is to be held in Montreal, June 5th to 9th, has been distributed. Tuesday will be devoted to seeing something of the city, and the opening session of the society will be held in the evening of the 5th, in Molson Hall of McGill University. Addresses of welcome will be delivered by the Mayor of Montreal; by Hon. Sir Donald A. Smith, LL.D., Chancellor of the University; by Prof. H. T. Bovey, LL.D., Dean of the Faculty of Applied Science; and by Herbert Wallis, Esq., Chairman of the Local Committee. After a response by President Eckley B. Cox, the usual preliminary business of the society will be taken up, after which professional papers will be presented as follows:

- Notes on the Theory of Shaft Governors, by A. K. Mansfield.
- Heat Units and the Specifications for Pumping Engines, by Albert F. Hall.
- A New Recording Pressure Gauge for Extremely High Ranges of Pressure, by W. H. Bristol.
- A Note on Compressed Air, by Frank Richards.
- The Relation of the Drawing Office to the Shop in Manufacturing, by A. W. Robinson.
- The Theory of the Steam Jacket; Current Practice, by R. H. Thurston.
- Results of Experiments with a 50 Horse-power Single Non-condensing Ball & Wood Engine to Determine the Influence of Compression on Water Consumption, by D. S. Jacobus.
- Cylinder Proportions for Compound Engines, Determined by their Free Expansion Losses, by Frank H. Ball.
- A New Method of Compound Steam Distribution, by F. M. Rites.
- Tests of a Small Electric Railway Plant, by Jesse M. Smith.
- Power Losses in the Transmissive Machinery of Central Stations, by W. S. Aldrich.
- Rustless Coatings for Iron and Steel, by M. P. Wood.
- Corrosion of Steam Drums, by Jas. McBride.
- A New Mechanical Fluid, by C. W. Hunt.
- First Stationary Steam Engines in America, by F. R. Hutton.
- Cost of an Indicated Horse-power, by DeCourcy May.
- A New Form of Canal Waste Weir, by John R. Freeman.
- Effect of Varying the Weight of the Regenerator in a Hot Air Engine, by G. W. Bissell.
- Mechanical Draught for Boilers, by W. R. Roney.
- The Saturation Curve as a Reference Line for Indicator Diagrams, by R. C. Carpenter.
- Results of Measurement of the Water Consumption of an Unjacketed 1,600 Horse-power Compound Harris Corliss Engine, by Messrs. Denton, Jacobus and Rice.
- Notes on the Corrosion of a Cast Steel Propeller Blade, by F. B. King.

The social features of the meeting will consist of a reception to be tendered by Hon. Sir Donald A. Smith at his residence, on Wednesday evening, and a garden party at the house of Mrs. J. H. R. Molson, on Friday afternoon. Excursions will be made to various points of interest, including one by courtesy of the Grand Trunk Railway, on Wednesday afternoon, which will go to Lachine. At Lachine wharf a steamer furnished by the Harbor Commissioners will take the party down the Lachine Rapids. Afternoon tea will be served on the island, and the Harbor Commissioners' steamers will afterwards convey the party to view the dredging operations in the harbor.

Saturday will be devoted to an all-day excursion to Ottawa, and a visit to points of interest in and around that city.

Topical discussions to be presented during the meeting are as follows:

Are there certain general principles underlying the proper connection of steam boilers and engines in a power plant?

What form of filing cabinet have you found most convenient for chippings, etc.?

Can it be made practicable to design a machine which shall unite the merits of both the milling machine and the planer? Is not this problem a paradox in machine construction?

For filtering oil having very finely divided metallic particles in suspension, what have you found to be the best filtering material, either for one operation or in a series?

What is the economy, if any, of damper regulation in firing with liquid or gaseous fuel?

In boilers fired with liquid or gaseous fuel, is there any advantage in simultaneous regulation of the fuel supply and the position of the

dampers, either by the same or by different mechanisms under the ordinary control of the steam pressure?

Are there any conditions under which oil fuel is cheaper than coal for generating steam at points in the Atlantic Seaboard States, if so, what are they, and where?

Has any term ever been suggested to discriminate between the elastic resistance offered by a body to a force tending to change its shape and that offered by the same body to a force tending to change its volume? How much of the latter kind of elasticity has India rubber?

In a centrifugal pump at constant speed, how is the efficiency affected (a) by throttling the delivery, (b) by a by-pass?

In a centrifugal pump receiving water under a head, does the whole amount of the head add to its normal lift?

What is the common method and best practice for determining the largest sizes of pipe desirable to use in mill heating, both by live and exhaust steam?

In the operation of annealing tool steel, what is the essential or principal condition to be observed to insure the best success? What is the best telephone system for connecting departments of a large works with each other and the central office?

What rule is there for determining approximately the horse-power required to drive disk fans for exhausting and ventilating?

Has anyone found it to pay to exhibit in recent International Expositions, where to do so entails a cost of attendance, transportation and other heavy charges?

Is there any reliable method of calculating the cost of one machine if the cost of a larger number is known, or conversely, if you know the cost of one machine, can the cost of building a larger number of the same machine be satisfactorily calculated?

What information can you give as to the best method for the extraction of oil from condensed steam, where it is desirable to use the exhaust steam repeatedly for boiler-feed purposes?

Scribner's Magazine for June contains an article by John Heard, jr., which tells the tragical story of "Maximilian and Mexico," in the light of many documents which have recently been published in France. This dramatic recital of an episode which the writer calls "one of Napoleon's Day Dreams," gives a clear account of the event from its conception to the execution of Maximilian. The narrative is enriched with a series of striking pictures by Marchetti and Gilbert Gaul. Mrs. Frances Hodgson Burnett has written "The Story of a Beautiful Thing," in which she tells of the rise and growth of a London charity known as "The Invalid Children's Aid Association," which is devoted to making life pleasanter for those little incurables who have been given up by the hospitals as hopeless and returned to their miserable homes. The article is illustrated by John Gulich, an English artist. Professor N. S. Shaler begins in this number a group of articles on Domestic Animals. The present article on "The Dog" is full of the most entertaining information in regard to the development of the various kind of dogs, their habits and associations, with incidents of their intelligence and what the author calls their "social culture." A series of pictures by Hermann Leon, the French animal painter accompanies the article. Doctor Leroy M. Yale writes a brief article upon some of the best known "American Game Fishes."—the brook trout, the striped bass, black-bass, salmon, etc. The illustrations are by Charles B. Hudson. Archibald Forbes, the veteran war correspondent, writes a paper on "The Future of the Wounded in War," in which he predicts that the great advance in the manufacture of deadly weapons will make it impossible in the next great war, to give proper attention to the wounded; and that war, instead of being more humane, will be more cruel.

Outing for June is in text and illustration fully up to the high standard maintained by this popular magazine. The contents are "The Curse of the Winkleys," by Anne R. Taibot; "Romance of a Dry Ranch," by E. Barnard Foote; "Hunting with Patagonia Welshmen," by "The Master Mariner"; "In the Land of the Breadfruit," by F. M. Turner; "A Woman in Camp," by Mary R. Andrews; "The Birch-bark Canoe," by Eugene McCarthy; "Hints for Amateur Sailormen," by A. J. Kenaley; "Afoot in the Hartz," by Wm. H. Hotchkiss; "A Bluegrass Cycling Tour," by J. B. Carrington; "Leuz's World Tour Awheel"; "An Indian Ball Game," by L. N. Ludlow; "A Day in the Shepaug," by G. B. Drake; "Bird Loves," by Traber Genone; "Black Bass in Eastern Waters," by "White Label"; "Touring Europe on Next to Nothing," by J. Perry Worden; "The Michigan National Guard," by Capt. C. B. Hall, and the usual editorials, poems, records, etc. Outing is the earnest advocate of healthful outdoor exercise for men and women. Canoeing, camping, fishing, shooting, fiction and travel, all have their place in a magazine which should be read by young and old, for none can find harm in its teachings.

The Popular Science Monthly furnishes both light and substantial fare in its number for June. The opening article by Dr. Andrew D. White, on "The Final Effort of Theology," describes the hostile reception which the theologians gave to Darwin's epoch-making book. The Mosquito country is described in a fully illustrated article, by Dr. Robert N. Keely, jr., under the title Nicaragua and the Mosquito Coast. Prof. G. F. Wright gives an account of The Cincinnati Ice Dam, showing how the effects of its presence can be seen for many miles back from Cincinnati. The distinguished physiologist, Dr. Austin Flint, contributes an illustrated account of The Eye as a

Optical Instrument. Of special interest to parents and teachers is the essay of James L. Hughes, of Toronto, entitled The Kindergarten a Natural System of Education. The author of Astronomy with an Opera-glass, Mr. Garrett P. Serviss, has in this number the first of a series of illustrated papers under the general title Pleasures of the Telescope. Dr. T. D. Crothers asks, Should Prohibitory Laws be Abolished? and gives reasons for questioning the confident assertion of Mr. Appleton Morgan in an earlier number. There is another installment of A. R. Wallace's paper on The Ice Age and its Work, and a biographical sketch, with portrait, of Gerard Troost, for many years State Geologist of Tennessee. New York: D. Appleton & Company. Fifty cents a number, \$5 a year.

The mother of America's favorite boy hero, "Little Lord Fauntleroy," Mrs. Frances Hodgson Burnett, writes to the mothers of boys in the June issue of The Ladies' Home Journal upon "When He Decides," in which she points out to what extent mothers should influence their sons in regard to their choice of an occupation. Mr. Frank Stockton takes the quaint "Pomono" through some ridiculously funny escapades in this installment of her "travels." Mr. Howells reaches the seventh installment of his literary autobiography, "My Literary Passions." A practically illustrated article on a timely subject is Mr. John Gilmer Speed's explanation of "The Game of Golf for Women." W. Hamilton Gibson occupies an entire page with one of his out-of-door illustrations of "A Garden of Long, Long Ago." Palmer Cox takes his inimitable Brownies on a visit to "The Goddess of Liberty," and the words and music of the song, "A Spanish Serenade," to which the prize of one hundred dollars was given in the Journal's Musical Series, are given. Maria Parloa, who is in Paris in the interests of the Journal, describes "The Apartment Houses of Paris." A carefully-prepared article on the serving, canning and preserving of "The Berries of Summer," by Eliza R. Parker, will prove valuable to householders generally. Frank O. Small has made for the issue an exceedingly dainty cover. Published by The Curtis Publishing Company, of Philadelphia, for Ten Cents per number, or One Dollar per year.

#### Gold Mining in Ontario.

EDITOR CANADIAN MANUFACTURER: Sir,—An industry which requires no protection and seeks for no bonus is something unique in Canada at the present time; not such is that of gold mining, which produces an article in itself the standard of value and for which no market need be sought.

It may be a surprise to many to know that gold is found within about 100 miles east of Toronto, and that several deposits containing the precious metal in that district promise to be highly remunerative.

So far as known there are no alluvial or placer gold mines in Ontario, the gold occurring in quartz veins and the sulphurets therein.

The processes of mining and milling have been so much improved and cheapened during the last few years that a comparatively low grade ore will now pay handsomely if found in large quantities, but the strictest attention must be paid to economy both in mining and milling, and must be conducted on the same business principles which are necessary to success in other enterprises.

The Carscallen gold property, about 8 miles west of the Village of Marmora, contains several veins of gold bearing ore, there being some gold visible in the quartz, but more in the iron and copper sulphurets, which is not visible. From the oxidized vein matter of one of the pits, an assay by Professor Chapman showed \$94 gold per ton, and from the bottom of a shaft 122 feet deep his assay of average samples showed \$16 gold per ton. In some places this vein is about 13 ft. wide and at the bottom it now measures about 6 ft. Other veins on the property are of larger size, ore containing gold in paying quantities.

Assays from different parts of the property have given results varying from \$13 to \$68, and some of the concentrates have shown over \$400 per ton.

On the next lot to the south are situated the Ledyard gold mines where several veins have been found showing free gold and a considerable proportion of sulphurets rich in gold. Shaft No. 1 is about 60 feet deep on an east and west vein, which varies from 4 to 6 ft. in width and has well defined walls of talcose schist, exceedingly favorable for a gold vein.

Seven assays of the sulphurets taken from this shaft at various depths showed an average of \$325 gold per ton of ore, running from \$117 to \$922 per ton. There was no gold visible in any of these, and they were not picked samples. A drift is now being made in the shaft at about 30 ft. deep, from which good ore is obtained.

About 200 yards west of this shaft is a knoll which contains a net work of veins; the first assay of sulphurets here giving \$210 gold per ton. This knoll contains large quantities of ore already in sight which can be quarried at very slight expense.

About 50 yards further west again is another vein about 10 feet wide, showing good sulphurets, an assay from which gave \$102 gold per ton.

There are several other veins on this property from which gold has been panned, but which have not yet been much developed. In order to work these ores a mill plant has been erected with 40 horse-power engine and boiler. The machinery consists of a Dodge ore breaker with grizzly and drum screen, an automatic ore feeder and Huntington centrifugal roller quartz mill. A good deal of the free gold is caught in the mill and there is also an amalgamated copper plate

outside. After passing over this, the ore goes to a golden gate concentrator, which separates the sulphurets from the rock and collects the valuable portions of the ore into concentrates which can then be shipped to the smelter or treated by the chlorination process. This mill plant has a capacity of working 15 to 20 tons of ore per day, and if the ore yields only \$5 gold per ton, there should be a good profit in working it.

Ores not yielding more than \$4 per ton are now being worked successfully in North and South Carolina.

The Alaska-Treadwell Mine, with an ore averaging less than \$3 per ton, has produced nearly four million dollars' worth of gold at a net profit of over \$2,500,000, although the cost of labor and supplies in Alaska are very much higher than they are in Ontario.

Wonderfully good work has been done by the Huntington mill at the Spanish mine in Nevada County, California, where a profit was made on 4,000 tons of ore which only yielded 65 cents per ton. The total bullion produced from 30 days' work on 4,047 tons of ore was \$2,644.

The total expenses were \$2,120, leaving a profit of \$524. The cost of mining, done under very favorable circumstances, was less than 32 cents and the milling less than 21 cents per ton.

With these facts on record there is no reason why gold mining and milling in Ontario, if conducted carefully and economically, should not yield very handsome returns.

ONTARIO.

**A Municipal Electric Lighting Plant for Toronto.**

City Engineer Keating is in favor of the city of Toronto investing in a civic electric street lighting plant. He figures it out that about \$30 can be saved per lamp per year on the present cost, \$108.58, by the city owning and operating its own plant.

During 1893 the city paid \$135,243.17 for street and park lighting, of which sum \$105,29,356 was for electric lights and the balance for gas lamps. We have now in the city of Toronto about 1,000 arc lights and 1,100 gas lamps distributed throughout the city for street lighting purposes. The estimate given below is for a plant of 1,300 arc lights of 200 candle power, burning all night and every night, the intention being to shut off and discontinue all or nearly all of the gas lamps. The capacity of the proposed station will be sufficient to run about 1,500 lights.

The estimated cost of a plant for 1,300 lights is as follows:

Buildings, etc.....	\$42,000
Engines and boilers.....	60,000
Dynamos.....	40,000
Poles, line and wires.....	100,000
Lamps.....	40,000
	<hr/>
	\$282,000
Add 10 per cent. for contingencies.....	28,200
Total cost.....	<hr/>
	\$310,200

This estimate is considered liberal, and is largely in excess of the figures quoted by some of the electric companies with whom Mr. Keating has corresponded.

The annual cost of operating the station would amount to \$106,324, made up by coal, \$39,420; carbons, \$10,409; oil, waste, etc., \$2,000; interest at 4 per cent. and depreciation 6 per cent. on \$310,200, \$31,020; labor, \$23,475. The staff that would be required to carry on the work would include 1 chief engineer, \$1,500; 1 electrician, \$1,500; 2 assistant engineers, \$2,000; 2 dynamo tenders, \$1,500; 3 boilers, etc., \$1,800; 3 firemen, \$2,100; 15 trimmers, \$7,500; 2 inspectors, \$1,600; 2 linemen, \$1,200; 1 helper, \$600; 1 driver, \$300; 1 clerk, \$800; 1 machinist, \$500; keep of horse, \$175.

On that basis the annual cost per lamp would be \$81.78 for 1,300 lights and \$75 for 1,500 lights. The city pays now \$108.58 per light per annum.

Mr. Keating says: "I am now in communication with the Cataract Construction Company, of New York, regarding the transmission of power from Niagara Falls, but no definite offer has yet been made by the company. There appears to be a difference of opinion amongst electricians as to the feasibility of conveying power from this source such a distance to compete with steam. The Cataract Construction Company, however, propose transmitting power to Buffalo before the end of this year, and when this is done the public will be better able to judge as to the commercial value of the undertaking. The same company also contemplate transmitting power from Niagara Falls to the city of New York."

The Cataract company have notified the Engineer that they will not be in a position to transmit power to Toronto before September, 1895.

Mr. Keating thinks it would not be advisable to utilize the present engines or boilers at the main pumping station for electric light purposes, as they are not suitable, and the boilers could not produce steam at a high enough pressure to be economical. He thinks an entirely new plant necessary. The buildings could be erected on the water works grounds south of the main pumping station.

As the price of electrical appliances is very low just now, the City Engineer recommends expedition in the undertaking of the work if the civic plant idea is adopted by the Council.

**Mineral Wool.**

Mineral wool is essentially a vitreous substance converted to a fibrous condition. In appearance it consists of a mass of very fine fibers interlacing each other in every direction, thus forming an innumerable number of minute air cells. The resemblance of these fibers to those of wool or cotton has given to the material the name of mineral wool in this country, and of silicate cotton elsewhere, but it is only in appearance and softness that any similarity exists between the mineral and organic fibers. Mineral wool appears in a variety of colors, principally white, but often yellow or gray, and occasionally quite dark. The quality of the wool is not at all dependent upon, or affected by, its color, as all the peculiar properties which constitute its value are present in equal proportions in any of the shades. Mineral wool partakes of the nature of glass without its brittleness the fibers being soft, pliant, and inelastic. They are of irregular thickness and cross each other in all possible directions. It is made by converting scoria and certain rocks while in a melted condition to a fibrous state.

By improved processes of manufacture lately invented and perfected, the quality of the wool produced is much improved in strength of texture, lightness, and freedom from dross over that hitherto made.

One of the most important qualities of mineral wool is its great power to resist the transmission of heat and cold. This can readily be accounted for in the fact that it holds in confinement a greater proportion of air than other materials. "Air is so subtle and rapid in movement when unconfined, and so slow to carry heat, except by its own motion, that it is at once the best distributor of heat and also the greatest barrier to its transmission, according as it has, or has not, freedom to circulate." So long as air may circulate at all it is conveying heat from one place to another. An air-chamber, whatever its size, if sufficient to permit any movement of the air, fails as an insulator of heat, although the air may be confined to the chamber, for any difference in the degree of heat affecting the distinct sides or parts of the air space will impart motion to the air, which continually changing place will convey the heat and distribute it. But when air is confined and held in position by a medium, the heat must be conducted, not conveyed. Further, if the air-confining material is not loose and porous and of small percentage as compared with the volume of air it encloses, the encasing material itself will transmit heat, and the more compact the material the greater its capacity for conducting heat.

In converting vitreous substances into mineral wool of the ordinary grade it is found that the material increases in bulk twelve times, so the resulting fibers encase twelve times the quantity of air that the material did before conversion. In other words, a given quantity containing 100 per cent. of material before transmission, contains afterward but 8 per cent., the remaining 92 per cent. of its volume being air held in close confinement in the myriad of minute air cells. In the same way the select grade has 94 per cent. and the extra grade 96 per cent. of its volume of air.

Closely allied to the subject of heat insulation is the very important question of frost-proofing. A good protection against frost has long been desired. While there may be conditions under which nothing short of absolute heat will resist the insidious attacks of frost, repeated trials have shown that the liberal use of mineral wool makes a most excellent protection. In protecting water pipes from freezing it has been eminently successful where other means have failed. Its free use for this purpose will relieve the householder and manufacturer from the serious annoyance and loss resulting from freezing pipes. A thickness of two inches of mineral wool and upwards, according to the exposure, is recommended.

Mineral wool is non-combustible and practically indestructible by heat. As a protection against fire, properly used, it may be of inestimable value. So long as inflammable material is used in the construction of buildings they cannot be made entirely fire-proof—but even when constructed principally of wood, they may be made to burn very slowly by the use of mineral wool, and great security against fire be thus effected. If the spaces between timbers are filled with this indestructible material, should a fire get started in the building, the flames cannot spread through hidden passages, thus conveying the destroying agency with great rapidity to all parts of the structure, but can only progress as they work their way, exposed to sight, along the outer surface of the walls and floors. It will be readily seen that the opportunities of extinguishing the flames when thus retarded are much increased, and the liability of destruction of the building greatly lessened, while the opportunities of escape, afforded the inmates, are so greatly multiplied as to make the use of mineral wool for fire-proofing an advantage sufficiently obvious to require no more than the calling of attention to it. The use of wire or corrugated iron lath, in connection with the filling of mineral wool between the studding is being largely adopted by progressive architects. This plan of construction affords the very best protection against fire, short of the use of absolutely non-combustible materials in the entire building.

Mineral wool possesses especial value as a non-conductor of sound. Its inelasticity and want of solidity prevents the transmission of sound through it, and the material is coming largely into use as a deadener or deafener of the floors and walls of buildings. As sound is communicated by the actual contact of beams, and especially by the vibrations of the air between them, it can be well understood how a porous material like mineral wool will have a muffling influence on

the solid parts of the building and so occupy the space as that wave motion will not be possible.

The analysis of mineral wool shows it to be a silicate of magnesia, lime, alumina, potash and soda. It is plain there is nothing organic in the material to decay or become musty; or to furnish food and comfort to insects or vermin. On the other hand the fine fibers of glass are irritating to anything which attempts to burrow in them. All past experience shows that houses lined with mineral wool will not become infected with animal life. All earths, mortars, felts and sheathing papers contain organic matter, such as hair and vegetable fiber, which after a time undergo decomposition and create a variety of disease germs. The dangers to health arising from the presence of these sources of infection are greatly aggravated by the continued filtering of dust particles and water through cracks. To leave the floor spaces empty would not avoid contamination in this way, unless such parts are open to thorough ventilation, as otherwise they would simply form a refuge for a mixed population.

The use of mortars, cements, or earths, to imbed floor timbers for deafening or other purposes, is generally followed by the dry-rotting of the wood. This never occurs in connection with the use of mineral wool, for the material itself contains a large percentage of air, and it does not so imbed the timbers as to prevent the access of air to them.

Mineral wool is especially valuable as applied to buildings, rail road cars, steam pipes and boilers, and other places where insulation is desirable.

The properties of mineral wool make it of special value for lining cold storage warehouses, refrigerators and coolers of all kinds. The proprietors of one of the largest refrigerating houses in this country, having all of its walls insulated with mineral wool, finds its insulation properties so perfect as to enable them to dispense with the use of one large ice machine, which was put in when the building was constructed. Previous experience with other methods of insulating had caused them to believe that a house of the size could not be sufficiently cooled without the constant use of two machines of the capacity adopted. With mineral wool insulation the desired result was obtained with one machine, and the other has been idle from the beginning, saving the expense of running it. Mineral wool is equally valuable for brewery vaults, ice houses and all similar places where it is desirable to prevent the extraction of cold, or the entrance of outside heat.

Mineral wool is invaluable in hospitals and asylums and similar institutions because of its non-decaying properties and that it contains nothing to harbor disease germs, in connection with its insulating qualities, arresting the spread of fire, deadening of sound, etc.

The properties of mineral wool which commend it for use in other buildings, make its application equally important in school houses, music and concert rooms, etc. In any of these the question of insulation of sound is an important one.

In addition to the properties already enumerated, which are also desirable in places where many people habitually congregate, especial attention is directed to the application of mineral wool for the purpose of fire-proofing public halls and theatres, particularly those parts of the structures adjacent to the stage. The free use of this material will so retard any fire that may get started in a theatre as to afford ample time for the escape of the audience, to say nothing of the greatly increased probability of quenching the fire and saving the structure itself.

In addition to floor deafening, fire-proofing, etc., the insulation of the division partitions between suites of rooms in residences separated only by a partition, so that "each family may consume its own noise" only, and not be annoyed by that of its neighbor, is obviously a great advantage. In dwelling houses standing alone, especially if the outer walls are of wooden construction, the lining of such walls with mineral wool between the studding will add greatly to the warmth in winter and to its coolness in summer. Indeed, where it has been so supplied it has been found that the slight addition to the first cost of erecting the building is soon more than balanced by the saving of fuel required to heat the same. A filling of mineral wool in the roofs of dwellings or other buildings will prevent the upper rooms from receiving the heat of the summer sun and storing it up for the occupants during both day and night. They will remain as cool as those on the floor below. In cold weather it will retain the heat which rises through stair wells, bringing about regularity of temperature. Water fixtures in bath rooms, closets and pantries will not be exposed to extremes of cold and heat, in houses built as herein recommended. This lining is also especially desirable about bath rooms to deaden the noise of valves and flowing water.

Having herein shown some of the excellent qualities of mineral wool, and of the uses to which it may be put, it may be well to state that the Canadian Mineral Wool Co., of Toronto, who are manufacturers of the article, for which they enjoy a large sale, having procured a suitable factory at Dundas, Ont., will soon be prepared to make the crude material which has heretofore been imported from the United States. The slag which they use will be brought from the iron blast furnaces at Tonawanda, N. Y., until such time as the blast furnace now being built at Hamilton is put in operation.

Any who may desire further information in this matter can obtain it by application to the Canadian Mineral Wool Co., Toronto.

R. Inche's planing mill at Sudbury, Ont., was destroyed by fire May 16, loss about \$3,500.

### Canada Tool Works' Catalogue.

Messrs. John Bertram & Sons, proprietors of the Canada Tool Works, Dundas, Ont., have favored us with a copy of their 1894 catalogue having reference to the iron working machine tools manufactured by them.

All the illustrations in the book are taken direct from photographs, and truly and faithfully represents the machine. Messrs. Bertram have made this departure in illustrated catalogue work because wood engravings are in many respects unsatisfactory in correctly showing details. This departure has been accomplished at great expense; it being necessary in many instances to build machines especially in order that a truthful photographic reproduction thereof might be obtained.

Although the illustrations contained in the catalogue represent a large number of the machines built by this concern, there are quite a number of other of their machines not shown because they are of too special a character to find place in a catalogue of general machinery; and of these they will take pleasure in sending photos with full description upon application.

The list of machinery and tools includes such as is suitable for use in machine shops, repair shops, electrical works, factories for the manufacture of brass goods, railroad shops, locomotive and car shops, rolling mills, steam forges, ship yards, bridge works, boiler shops, engine works, etc. The concern are constantly adding to their equipment for furnishing such machinery; and such as they offer include all the latest improvements.

In the construction of this machinery Messrs. Bertram have followed the best English and American practice, and have also profited by their own long experience in supplying the requirements of the country. All the material used by them is carefully inspected and tested by special testing machinery constructed for the purpose, in order that a proper margin of safety might be obtained, while at the same time utility, good finish and durability are secured.

Allusion is made to the gratifying and successful exhibitions of their machinery, which Messrs. Bertram made at Centennial Exhibition at Philadelphia in 1877, the Colonial and Indian Exhibition at London, Eng., in 1886, and at the World's Columbian Exhibition at Chicago in 1893, at each of which highest awards, diplomas and medals for excellence of design and workmanship were awarded.

The Canada Tool Works were established in 1861—33 years ago—in a building of modest dimensions, and have steadily grown until the works now occupied have a floor space of some 60,000 square feet, the entire premises covering several acres. Each department of the works is under the charge of a competent foreman, assisted by a staff of skilled workmen; the entire works being constantly under the personal supervision of the proprietors. Each machine made in this establishment is carefully and critically inspected during its construction, and thoroughly tested upon its completion to ensure its accuracy and perfection.

The mechanical and artistic excellence displayed in the production of the catalogue here alluded to is such as to deserve special mention, and the credit thereof given to those who have earned it. The paper is very heavy, fine coated, and the best that is made. The printing, press work and binding, all done by James Hough, of Guelph, Ont., would be creditable in presenting any valuable literary work intended to adorn any library, and is a decided credit to that enterprising young Canadian. The photographic illustrations—and the book abounds with them—are the handiwork of Mr. R. Laidlaw, of Hamilton, Ont., who makes a specialty, and a success, of that class of work, this information being valuable to manufacturers who desire such reproductions.

### Emery Wheels.

The Brown & Sharpe Mfg. Co., Providence, R.I., have issued a brochure having reference to emery wheels, and in which many valuable suggestions are made in regard to their selection and use, from which we have drawn liberally in the following. It is well known to our readers that this concern have a most enviable world-wide reputation as manufacturers of fine machinery; and it is interesting and instructive to learn something of the machinery and appliances used by them in attaining the accuracy and fine finish which characterizes all of their products. It will be observed that they attach the utmost importance to the use of the emery wheel; and they manufacture special machinery adapted to the use of emery wheels in all kinds of grinding, cutting and polishing work, preference being given by them for the emery goods manufactured by the Norton Emery Wheel Co. of Worcester, Mass.

A satisfactory emery wheel is an important factor in the production of good work. Too much, however, must not be expected of one wheel. A variety of shapes, sizes and grades of wheels are necessary to bring out all the possibilities of the grinding machine, the same as a variety of shapes and sizes of tools are necessary to obtain the best results from the lathe or milling machine.

Our aim in grinding is usually to obtain an accurate or true surface, but as a true surface is almost always a good surface it should be remembered that generally the same methods are employed, whether an exact size or a fine finish is the object desired.

Our suggestions are not offered as positive rules but as the embodiment of our experience and as representing the methods which our shop practice has indicated are desirable.

In selecting and using a wheel, we are governed by the character

of the metal to be operated upon, the shape and size of the work and the degree of accuracy desired. We have to consider the size of the particles of emery in the wheel, the hardness of the wheel and its width. We also have to determine the speed at which it is to be revolved, the speed at which the work is to travel or be revolved, and whether or not water is to be used.

For the sake of clearness we refer separately to the various characteristics of wheels, but it should be borne in mind that a wheel should not be selected for a single characteristic but that each of the essential elements is importantly affected by the others, and that all should be considered in choosing or using a wheel for any desired work.

Wheels are numbered from coarse to fine; that is, a wheel made of No. 60 emery is coarser than one made of No. 100. Within certain limits, and other things being equal, a coarse wheel is less liable to change the temperature of the work and less liable to glaze than a fine wheel. As a rule, the harder the stock the coarser the wheel required to produce a given finish. For example, coarser wheels are required to produce a given surface upon hardened steel than upon soft steel, while finer wheels are required to produce this surface upon brass or copper than upon either hardened or soft steel.

Wheels are graded from soft to hard and the grade is denoted by the letters of the alphabet, A denoting the softest grade. A wheel is soft or hard chiefly on account of the amount and character of the material combined in its manufacture with emery or corundum. But other characteristics being equal, a wheel that is composed of fine emery is more compact and harder than one made of coarser emery. For instance, a wheel of No. 100 emery, grade B, will be harder than one of No. 60 emery, same grade.

The softness of a wheel is generally its most important characteristic. A soft wheel is less apt to cause a change of temperature in the work, or to become glazed than a harder one. It is best for grinding hardened steel, cast iron, brass, copper and rubber, while a harder or more compact wheel is better for grinding soft steel and wrought iron. As a rule, other things being equal, the harder the stock the softer the wheel required to produce a given finish.

Generally speaking, a wheel should be softer as the surface in contact with the work is increased. For example, a wheel 1-16 inch face should be harder than one 1/2 inch face. If a wheel is hard and heats or chatters, it can often be made somewhat more effective by turning off a part of its cutting surface; but it should be clearly understood that while this will sometimes prevent a hard wheel from heating or chattering the work, such a wheel will not prove as economical as one of the full width and proper grade, for it should be borne in mind that the grade should always bear the proper relation to the width.

The width should be in proportion to the amount of material to be removed with each revolution, and as a wheel cuts in proportion to the number of particles in contact with the work, less stock will ordinarily be removed by a narrow wheel than by one that is of full width. The feed will also have to be finer if a narrow wheel is used.

The quality of the work as a rule is improved by using a wheel of full width if the wheel is soft in proportion. Judgment should be exercised in deciding upon the width of wheel to be used, as sometimes the work is of such size and shape as to make it necessary to use a wheel with a narrow face. Where this is the case the wheel should, where strength will admit, be only that width throughout, and care should be taken that the grade is kept in the proper relation to the width.

A wheel is most efficient in grinding just at the point before it ceases to crumble. The faster it is run up to this point the more stock will be removed and the more economically the work will be produced. Occasionally, however, it is necessary to run a wheel rather slowly, as the more slowly it runs the coarser it cuts and the less likely it is to change the temperature of the work. As a general rule, on any given stock, the softer the wheel the faster it should be run.

Should a wheel heat or glaze it can often be made somewhat more effective by being run more slowly. On the other hand if it be too soft, it can often be made to somewhat better hold its size and grind straight by being run more rapidly.

The surface speed of the work should be proportionate to the speed of the wheel, that is, other things being equal, if the speed of the wheel is reduced the speed of the work should be reduced also. The desire is to have the work revolve at such a speed as to allow time for the wheel to cut away the high points on the work. If the work is run so fast that there is no time given for the wheel to cut, but the work is simply crowded against the wheel, the tendency is for the wheel to follow the inequalities in the form of the work and straight or round surfaces are not obtained. When the wheel is not free cutting and the pressure of the wheel against the work is sufficient to cause the work itself to spring or to cause a slight movement of the oil upon the centres the accuracy of the result is impaired.

The coarser or softer and more free cutting the wheel the greater can be the speed of the wheel and consequently of the work. It is, however, not necessary to graduate the speed of the work as closely as the speed of the wheel. The character of the wheel being influenced so readily by a change of speed it is sometimes essential and often very convenient on universal grinding machines to be able to slightly increase or decrease the speed of the wheel.

The desire in accurate grinding is to have a free cutting wheel and to obtain the proper speeds so that the stock may be removed with

the least possible amount of pressure, thus preventing a change of temperature in the work and allowing the high parts to be most speedily reduced.

Thus far we have had in mind the selection and use of wheels for the comparatively small or medium sized work ordinarily ground on our machines. The requirements in grinding extremely large or long pieces are somewhat different. For example: in grinding a piece of steel three inches long, one inch diameter, on a universal grinding machine we have indicated that the most absolutely accurate work would be accomplished by selecting a wheel only just hard enough to retain its size while passing six or eight times over the surface of the piece, and we have suggested that such a wheel should be run at a high rate of speed. We have considered rapidly of production as more important than economy of emery. If, however, we should attempt to use such a wheel to grind a piece of steel one inch diameter and three feet long, it is clear that before the wheel had passed over two of the three feet it would have ceased to cut.

The problem now is to maintain the diameter of the wheel so as to take a uniform cut over a large area. Each particle of emery must be used as long as possible before being thrown away. A wheel full width and full diameter should be used, and the face should be true so that as many particles as possible may be brought in contact with the work and each particle be dulled as little as possible while the wheel is passing over the work. The particles may be used a longer time and are not so rapidly thrown away in a hard as in a soft wheel. Accordingly one expedient in grinding large areas is to use harder wheels as the area of the work increases the speed of the wheels being reduced as the grade is increased.

The loss of fine particles will not decrease the diameter of the wheel as rapidly as the loss of coarser or larger particles. Thus another expedient is to use a finer wheel. A fine wheel can be relatively softer than a coarser wheel, and so with a fine one there need be less pressure between the wheel and the work and there is more certainty of obtaining an accurate surface.

As the length or area of the work increases the feed should be coarser, so that the wheel may travel the entire length or area of the piece while its diameter is practically unchanged.

Water should be used on such classes of work as are injuriously affected by a change in temperature caused by grinding. It should be used upon work revolved upon centres, as in this work a slight change of temperature will cause the wheel to cut on one side of the piece, after it has been ground apparently round.

In very accurate grinding it should be remembered that the exactness of the work will be affected by a change in temperature which is not perceptible to the touch.

In very accurate grinding it is also well to use the water over and over again, as by so doing there is less difference between the temperature of the water and that of the work than if fresh water is used. For many purposes soda water is the most satisfactory as it has less tendency to rust the work or the machine.

Water should not be used on the universal cutter and reamer grinder, or on the surface grinding machines with the wheels give in the following list, for these wheels are of such a character that they will grind more satisfactorily without water.

Water need not be used on work held in the head-stock spindle on universal grinding machines, such as saws, collars, boxes, etc., with wheels given in the list.

Cast iron plates are an exception to this rule. They require a large supply of water with slow wheel speed when ground with the wheels specified in the list.

For internal grinding it is especially important that a wheel should be free cutting and the work revolved so slowly as to enable the wheel to readily do its work. The wheels should generally be softer than for external grinding, as a much larger portion of the periphery is in contact with the work. Their small diameters make it impossible for the proper periphery speed to be obtained, and this must be considered in regulating the speed of the work.

To repeat some of the more important suggestions offered above, the numbers given on the labels denote the coarseness, and the letters indicate the grades of the wheels.

Soft free cutting wheels such as are made by a number of the companies using the vitrified process are the best for most purposes. The ideal wheel is the one composed entirely of cutting materials. The width of the wheel should be in proportion to the amount of stock to be removed at each revolution. The wheel should be soft in proportion to the surface in contact with the work. The speed of the wheel should be in proportion to its softness, and the speed of the work should be in proportion to the speed of the wheel.

#### A New Storage Battery Plant.

Messrs. H. Morgan & Co., perhaps the largest dry goods concern in Montreal, have lately made a new departure in the Canadian practice prevailing in private lighting plants.

They have for some time past followed the usual custom of generating their electrical current for lighting purposes during the greater part of the day, and getting the current required for night purposes from the local electric light company through a small transformer. But their electrician, Mr. McMurtrie, conceived the idea that this cost for current at night could be greatly reduced by means of a far better arrangement.

Throughout the day steam has always been used in this store for elevator and other purposes, in addition to the necessary basement



electric lighting, therefore to generate a trifle more current during that time would have no appreciable effect upon the coal bill and would need no increase whatever in the generating machinery and labor required.

Mr. McMurtrie suggested that a small storage battery be added to the firm's present equipment, which could be easily charged during the day time and would be sufficient to entirely dispense with the services of the local lighting company at night, thus crediting their monthly bill against simply the first cost of the battery.

This, perhaps, sounds very nice on paper, but Canadians have already learnt how very treacherous are many of the storage batteries that flood the market. Mr. McMurtrie was also well aware of this fact, but he wisely did not judge "all batteries by some batteries," neither did he aim at any hasty conclusion before making a complete investigation.

The various periodicals soon told him that Europe had been successfully handling batteries for some time past, and that in the "old country" there were many installations similar to the one he required; and further that their success was amply proven by the annual increase in their number and size. When companies are willing to spend \$75,000 on batteries alone there surely must be a considerable commercial advantage in them!

The Crompton-Howell E.S. Co., of London, England, have made several sales to that extent, and so Messrs. H. Morgan & Co., through their electrician, soon decided to put equal confidence in that company's goods, and purchased, in the autumn of last year, a battery of sufficient capacity for their purpose.

This plant commenced its work during January last, and has given complete satisfaction ever since. It easily carries all the night load, and is recharged again by such machinery as is always running during the day hours.

There are other and special advantages also gained by the use of this improvement, as it is now possible to switch on without running any special machinery; and this, at seasons of special work, must always be a great convenience. Another important item is that if a break-down unexpectedly occurs to the machinery the battery is at hand as a reserve and can carry as much as 200 amperes for a considerable period. Engineers of any experience are fully aware of the value there is in this factor of safety.

The characteristics of this type of battery are its high efficiency, its great durability, its low cost of maintenance, and its capability of standing high discharge rates. It is perfectly safe and practicable to discharge these batteries at times within an hour and at a rate of  $3\frac{1}{2}$  times as great as the normal discharge rate.

The result of this "step in the right direction" has been that the owners of many other similar electric plants in Montreal are considering like improvements, and some have already introduced Crompton-Howell batteries.

The advantages to be obtained from the use of such plants vary more or less in each individual case, and it is extremely easy to form erroneous ideas of the size required for any one installation. It is therefore wise to always get advice on this matter while considering it, and the above named company are very willing to give any assistance in such directions, feeling, as they do, that it is to their best advantage that all patrons should buy the article which will give them perfect satisfaction. It might be said that this plant is being charged from a Crompton continuous current dynamo, the complete installation of battery and dynamo being all of Crompton manufacture.

The Canadian agent for this battery company is Mr. John Forman, of 650 Craig street, Montreal.

## 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 capital stock of the St. Catharines, Ont., Box and Basket Co., has been increased from \$10,000 to \$30,000.

The Wine Harbor Gold Mining Co., with head offices at Truro, N. S., is being incorporated with a capital stock of \$160,000 to work gold mining areas at Wine Harbor and elsewhere in that province.

The London Furniture Company, London, Ont., has received an order for the complete furnishing of the Grand Hotel at Yarmouth, N. S., which will be one of the largest and finest hotels in the Dominion.

John J. Gartshore, 49 Front St. West, Toronto, has just completed a shipment of about 200 tons English steel rails to Niagara Falls Park and River R. R., and 50 tons for Toronto and Scarborough Electric Ry., for the extension of these lines.

Messrs. D. E. Bouck & Son, of Bouck's Hill, Ont., write thus to Dodge Wood Split Pulley Co., Toronto: GENTS,—Enclosed please find the amount for pulley sent us. It gives us perfect satisfaction. No more iron pulleys for us. Please accept our best thanks for promptness.

The Climax cheese factory at Tiverton, Ont., was destroyed by fire May 29, loss about \$5,000.

The pulp mill of the Dominion Paper Co., at Maddington Falls, Que., was destroyed by fire, May 26.

Mr. J. E. Mollur is endeavoring to form a company to manufacture woolen goods at St. John's, Que.

The capital stock of the Niagara Falls Electric Light and Power Co., has been increased from \$40,000 to \$75,000.

The Welcome Soap Co. has been incorporated at Fredericton, N. B., with a capital stock of \$50,000, to manufacture soap, etc.

The Anderson Tire Co., of Toronto, is being incorporated with a capital stock of \$40,000 to manufacture wheel tires, bicycles, etc.

The Dodge Wood Split Pulley Co., Toronto, have recently made a shipment of their patent wood split pulleys to Sydney, N.S.W., Australia.

"The National Bakery" is the name of a company in Montreal seeking incorporation, with a capital stock of \$50,000, to manufacture biscuit, bread, confectionery, etc.

The Ross Packing Co., recently organized at New Westminster, B.C., are erecting works at Terra Nova, B.C., and expect to put up 2,000 barrels of salmon this season.

The Stanstead Electric Light Co., of Stanstead, Que., are applying for incorporation with a capital stock of \$25,000 to manufacture electricity for commercial purposes.

The Dodge Wood Split Pulley Co., Toronto, have received an order for all the wood pulleys required by Price Bros. & Co., Toronto, for refitting their mill after recent fire.

The Napanee Pulp and Paper Co., whose mills at Napanee and Fenelon Falls are working to full capacity, contemplate changing the location of their Newburg mill, probably to Lindsay.

The Ontario Wood Pulp Co., of New York, was incorporated in that State a few days ago with a capital stock of \$50,000, and will manufacture wood pulp in the Provinces of Ontario and Quebec.

Fire in the Royal City Planing Mills, at New Westminster, B.C., on May 26, destroyed the principle planing mill, the machine shop, a shingle warehouse and a large amount of lumber. Loss \$100,000.

Mr. W.L. Doran, of the Dominion Suspender Co., of Niagara Falls, Ont., and associates, are applying for the incorporation of the Niagara Falls Hotel Co., that place, to erect a large hotel at a cost of \$60,000.

The Dodge Wood Split Pulley Co., Toronto, have contracted with the E.B. Eddy Co., of Hull, for another big rope drive and a large quantity of belt pulleys and clutches for their new paper factory now nearing completion.

Mr. L.J. Cosgrove and associates, Toronto, are applying for the incorporation of the Cosgrove Brewery Co., with a capital stock of \$200,000 to carry on the business of brewing and malting with power to acquire any similar business now being carried on.

The lumber mill of the Rathbun Co., at Lindsay, Ont., which has been undergoing considerable improvement has been put in operation. Among the improvements and additions made were a 100 h.p. Wheelock engine, made by Goldie & McCulloch Co., of Galt; a new shingle mill, and an automatic machine for feeding the furnace with shavings, sawdust, etc.

The loss incurred by the Montreal Silk Mills Co. on May 24, amounts to between \$35,000 and \$40,000. The future arrangements of the company have not been decided upon, but they will probably move elsewhere. The company have sold their whole output for the next twelve months and are therefore under the necessity for getting under way again as rapidly as possible.

The E. R. Burns Saw Co., whose works in Toronto were destroyed by fire a couple of weeks ago, have begun the rebuilding of their factory, which they hope to have completed and ready for occupation in a short time. The new building, which is being constructed of brick, will be very much larger than the old one, and will be supplied with a full outfit of modern machinery. This concern own and operate a branch factory in Montreal, where all their orders are now being filled.

The Paul Frind Woolen Machinery Co., Toronto, are making deliveries of machinery this week as follows:—Fisher & Co., Allison, Ont., 3 broad looms; Dobson & Co., Cannington, Ont., 1 Curtis & Marble shear; S. S. Clutton & Sons, Vienna, Ont., 1 set scouring rollers, 1 rotary fulling mill; Geo. Hogg & Co., Barrie, Ont., rub. rolls, burr cylinder and noiseless combs; Haight & Theaker, Mt. Albert, Ont., 1 jack; John Childerhose, Eganville, Ont., 1 jack; Henry J. Bird, Bracebridge, Ont., 1 rotary fulling mill.

Attention is directed to the business card in another page of the New York and Boston Dyewood Co., manufacturers of dyewood extracts, and agents in the United States and Canada for Actien-Gesellschaft Fur Anilin-Fabrikation, Berlin Germany. Mr. A. W. Leitch, Hamilton, Ont., who has for a number of years represented the New York and Boston Dyewood Co., carries a large and well-assorted stock of these anilines, and other dye stuffs, which will be found a great convenience to his many customers. He hopes his friends will make a note of this fact and communicate with him at the address named in the advertisement.

The puddling furnaces and rolling mills of the Londonderry Iron Co., at Londonderry, N.S., are to be put in operation.

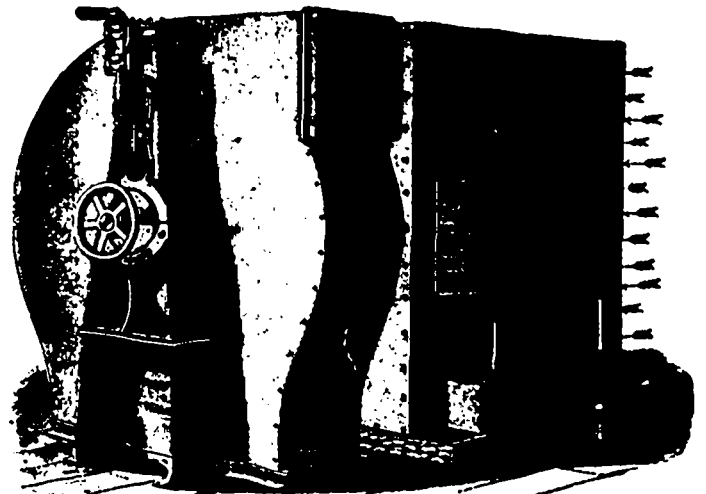
Messrs. Darling Bros., Montreal, inform us that they have just been favored with orders for three of their hydraulic elevators to be placed in the building occupied by the Montreal Cold Storage and Freezing Co., owned by Messrs. J.E. Mullins & Co., that city.

The London Machine Tool Company is making rapid progress on the new pumps to be placed at Springbank. The four massive cylinders, weighing 3½ tons each, have been cast, and will likely be placed in position at the waterworks in a few days. The smaller parts of the pumps are being rapidly turned out, and with the staff working overtime, as they are at present, the contractors expect to have every thing in readiness for operation on July 1.—London Advertiser.

Yesterday morning H. D. Johnston, General Manager, and J. Ecker, Mechanical Supt., of the Studebaker Bros. Manufacturing Co., South Bend, Indiana, arrived in Chatham to examine the dipping process in use in painting the wagons manufactured by the Chatham Mfg. Co. Both gentlemen were taken through the works by Manager Van Allen, and they were delighted with the completeness of the works and the excellence of the goods manufactured. They considered it the most complete factory for the size they had ever visited. Studebaker Bros. are the largest makers of wagons in the world, and when such a firm finds it necessary to send to Chatham for pointers it is no small compliment to our local institution.—Chatham, Ont., Planet.

The J. B. Armstrong Mfg. Co., Ltd., Guelph, Ont., are to the front as usual this season with new improved specialties in their various lines and report a very encouraging demand for their goods. Their Columbian cart, which was awarded a silver medal at the Chicago Columbian Exhibition is a very stylish affair, and its riding qualities are unexcelled. They inform us that it is the lightest cart for its capacity on the market. Their two passenger cart, with or without top, has a new patent front attachment quite novel and absolutely perfect in its riding results. Their four wheel buggies and carriages embrace many styles including road wagons, buggies, phaeton, jump seat carriages, run about wagons, etc., which combine lightness, stylish appearance and perfect riding results with durability and satisfaction for years of use. This Company is well-known in Canada and all the vehicle using countries of the world, and though they do not pretend to compete with many present day cut up prices, they are kept busy on their high standard work which they have figured to lowest possible living prices, allowing the use of best quality of material and highest class of workmanship in its output. They will be pleased to mail catalogues and give any particulars upon application.

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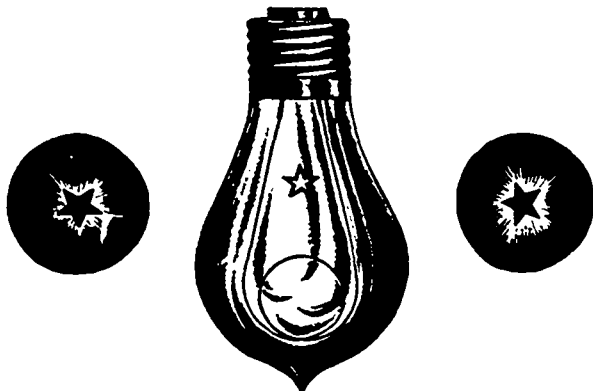
All Users of Buffalo Kilns write letters similar to this one:

"The Kiln answers every purpose to perfection; the Dry Rooms are run with exhaust steam at mere nothing in the way of cost, compared with the old way. Your arrangement is very simple and easily managed, besides being a money saver in operation. We are able, with the Kiln you sent us, to dry soft woods in three days, and hard woods in five days. That's good enough for anyone."—SMITH BROS., Sayre, Penn.

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Write for Quotations, stating Voltage and Base used.

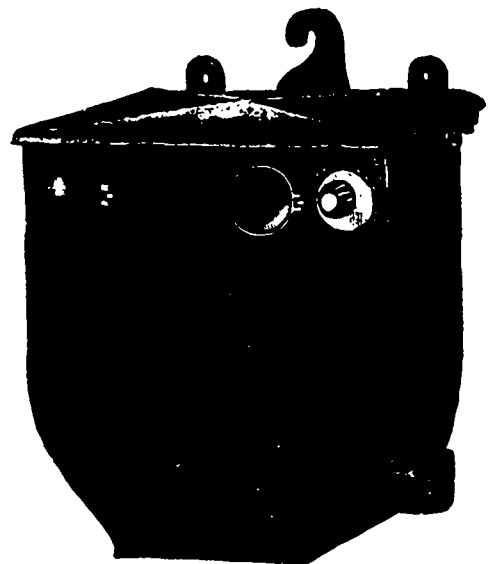
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Highest Efficiency



Perfect Insulation

**Practical Perfection Attained.**

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No Short Circuits.

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No Burn Outs.

.....OUR CLAIM.....

In every respect the Best Transformer on the market.

**PACKARD LAMP CO., Ltd., MONTREAL, Que.**

W. R. Thompson's saw mill at Teeswater, Ont., was destroyed by fire May 17, loss about \$5,000.

St. Pierre & Gamache's foundry and machine shop at Pic, Que., was destroyed by fire May 24.

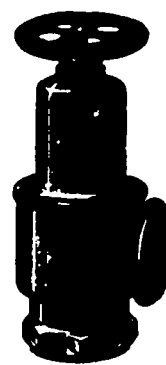
Mr. E. D. Tilson, of Tilsonburg, has received an order from Hanover, Germany, for a carload of his make of oatmeal.

The factory of the Oakville Tent and Tarpaulin Co., Oakville, Ont., was destroyed by fire May 15, loss about \$3,500.

Work is to be begun immediately, if rumor is correct, on a trolley line to Lachine. The council of Notre Dame de Grace (west of Cote St. Antoine) has been asked for permission to lay tracks through that municipality. Cars would start at Cote St. Antoine, pass the Mackay Institute, and take the Upper Lachine road to destination. The Standard Light and Power Company, of which Mr. Bickerdike is president, will construct the road.—Montreal Witness.

Rhodes, Curry & Co. have just turned out of their shops the best second-class sleeper ever made for the I. C. Ry., one which for handsome appearance, finished workmanship, and comfort and convenience for the passenger, is alike creditable to the builders and the railway department. The mechanical superintendent, who inspected it here, expressed himself as greatly pleased. The exterior is of cherry and interior of Cumberland black ash. Everything, practically, except the car-springs, interior brass fittings, and lamps, was made in the car-works. As the value of the car is nearly \$6,000, it will be seen that the concern must be of great advantage to our town and county. The first-class cars which the company has under contract will cost about \$7,000.—Amherst, N. S., Record

A deal of considerable magnitude has just been consummated between the Anderson Trading Company of Toronto, Ald. Morris and another Ottawa gentleman, by which the alderman and his friend become stockholders and part owners of the world's patents for the new Sharpe cash recorder and total adding Machine, which has just been perfected and patented by the aforesaid company. This is the only Cash Recorder that adds as it goes along, and you can tell at a glance how much money has been taken in at any time during the day or at the end of a week as you may desire. It is constructed entirely of metal, is beautifully nickel-plated and weighs about 125 pounds. Already orders are coming in so fast at headquarters that facilities must be enlarged to enable the company to turn out machines fast enough. There are 3 or 4 sizes made. The merchant who tries to carry on business nowadays without the aid of a cash recorder is not in the swim. It's as necessary as a telephone or a safe. It prevents leaks and systematizes business.—Ottawa Citizen.



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Crosby Pop Safety Valves, for all kinds of boilers; Water Relief Valves, including the Underwriter, which is fully approved by the Associated Factory Mutual Ins. Cos.; Crosby Steam Engine Indicators, with Sargent's Electrical Attachment; Crosby Improved Steam Gages and Patent Gage Testers; The Original Single Bell Chime Whistles.

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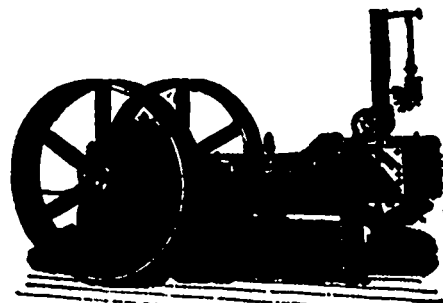
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Perfect Regulation and  
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Steam Pumps  
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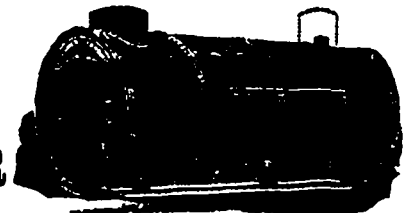
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Send for Price List

The capital stock of the Brunette Sawmill Co., New Westminster, B.C., will be increased to \$300,000.

Messrs. Leguin & Lalime, St. Hyacinthe, Que., have their new factory completed and are moving in. They have put in considerable new machinery and a new 65 horse-power Corliss engine and 80 horse-power boiler built for them by Cowan & Co., Galt, Ont.

The Paul Frind Woolen Machinery Co., Toronto, who announce their business in an attractive card in page 478, are dealers in and manufacturers of woolen machinery, mill supplies, etc., and handle as specialties English steel card clothing, Williams' heddles, slubbers, reeds, heddle frames; Dodge wood split pulleys, oak-tanned belting lace leather, etc. They also do all kinds of loom repairs. Mr. Frind is well known in the trade throughout Canada.

A project is on foot to run an electric railway from Hazel Hill to Canso, N. S., a distance of three miles. There is considerable traffic between the two points, and it is contended the power at the cable station is sufficient to supply the motive power. There is also some talk of establishing a similar line between the pulp mill at Milton and Liverpool town, a distance of six miles. As in the former case the power is already furnished.—Halifax Herald.

The mammoth Canadian cheese which weighed eleven tons, and which was exhibited at the Chicago World's Fair last summer was taken to England and there cut up, and a large section of it sent back to Professor Robertson, of the Dominion Experimental Farm at Ottawa, who was its designer and under whose direction and inspection it was made. Prof. Robertson has distributed portions of this cheese for the purpose of showing the soundness and quality of it after having been subjected to most trying conditions. The sample sent to the CANADIAN MANUFACTURER was most delicious and appetizing. This monster cheese was put into place before the exhibition opened in May and remained there often in a temperature of 95 degrees, until November. It will be remembered that it was reported as perfectly rotten. That this was a mistake was proved when it was recently cut up in England. With the exception of a few inches on the surface it was sound throughout. It has been a capital advertisement for one of the most important industries of the country.

The Union Card and Paper Co., of Montreal, are establishing a branch of their business in Toronto, where a stock of cardboard, colored papers, photo mounts, playing cards, etc., all manufactured in Canada, will be kept on hand.

The Kingston Hosiery Co., Kingston, Ont., will close down their mill for a few days for the purpose of placing and arranging the new patent machinery heretofore alluded to in these pages.

The W. S. Hill Electric Co., Boston, Mass., shipped during the month of May two orders for their electric switches, to one concern, that weighed over 11 tons; and notwithstanding the unprecedented hard times, in that country, their gross sales for the past nine months average nearly 75 per cent. more than for the corresponding months of last year.

**Galvanized Iron, "Gordon Crown."**

**'Fin Plate, "M. L. S."**

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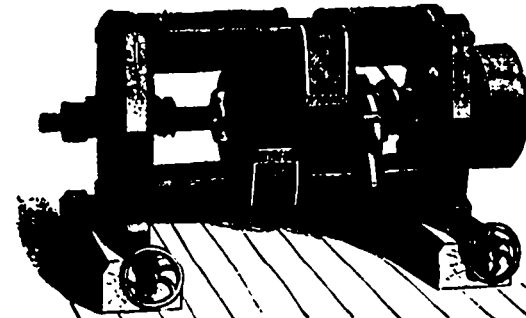
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**SWITCHES**  
For Power and Light Stations.  
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**Arrester**

- - FOR ALL CIRCUITS - -

rice \$15.00.

Discounts on Application.



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

In a 500 Volt Circuit

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

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

**133 Oliver St., BOSTON, MASS.**

Represented in New York City by  
The Elson & Brewster Eng'g Co., 141 Liberty St.

The shoddy department of the J. T. Huber works at Berlin, Ont., together with all the machinery contained therein was destroyed by fire May 29; loss heavy.

Messrs. Robin & Sadler, Leather Belting Mfrs., Montreal, have commenced the construction of their new factory at the intersection of William and Seigneur streets.

Burrows Bros., of the Royal Carpet Co., have enlarged and remodelled their show room. It is now forty feet square, and fitted up in elegant style. Their carpet industry is booming this spring.—Guelph Herald.

The Canadian Pacific Salt Works, at Windsor, Ont., are now turning out about 1,000 barrels a day, and the orders are in for more than 12,000 barrels, which will cause the works to be run night and day until the orders are filled.

Mr. John McDougall, proprietor of the Caledonian Iron Works, Montreal, is building a large addition to his works, which will be used as a boiler department. The building which is 160x60 feet, is at the intersection of William and Seigneur streets. Mr. McDougall has just imported a quantity of new machinery of the latest improved type specially for manufacturing boilers, among which is some fine hydraulic riveting machinery.

"The simplest and safest rig in the world is the leg-of-mutton sail. It is the one fitted exactly for river work, where one is sure to encounter puffs of some force as ravines are reached or valleys passed. To amateurs it is the sail par excellence for experimenting with, for no matter how many blunders are made a mishap is well nigh impossible. The leg-of-mutton sail has no gaff, nor need it have a boom. There is little or no leverage aloft, and all the power for mischief it has can be taken out of it by slacking off the sheet and spilling the wind. The learner might with advantage practise with a sail of this shape until he becomes proficient. If he eventually determines upon a jib and mainsail or yawl rig for permanent use, he may avoid wasting it by having it made over into a storm trysail."—From "Hints for Amateur Sailormen," in *Outing* for June.

The Bissett saw mill at Vernon, B. C., has been purchased and will be operated by S. McIvaine and W. G. Ellis.

The Thomas Davidson Mfg. Co., with headquarters at Montreal, has been incorporated with a capital stock of \$500,000, to manufacture metal and other goods, etc.

The contract for the construction of the steel bridge at the Soulanges Canal has been awarded to the Dominion Bridge Company, Montreal, and the contract for supplying cement for the canal to Hyde & Co. of the same city. Both companies have been notified by the Department of Railways and Canals that their tenders have been accepted.

**Don't Miss Sending for Quotations**

**New Railway Generators and Station Equipments. Complete Railway Car Equipments. Direct Current Lighting Dynamos. Direct Current Power Motors.**

**Alternating Single and Two Phase Current Generators, for Lighting and Power.**

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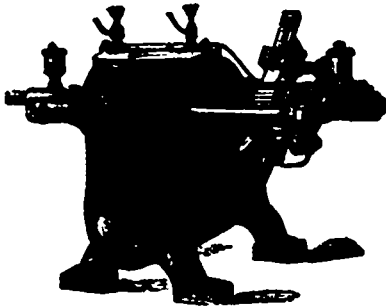
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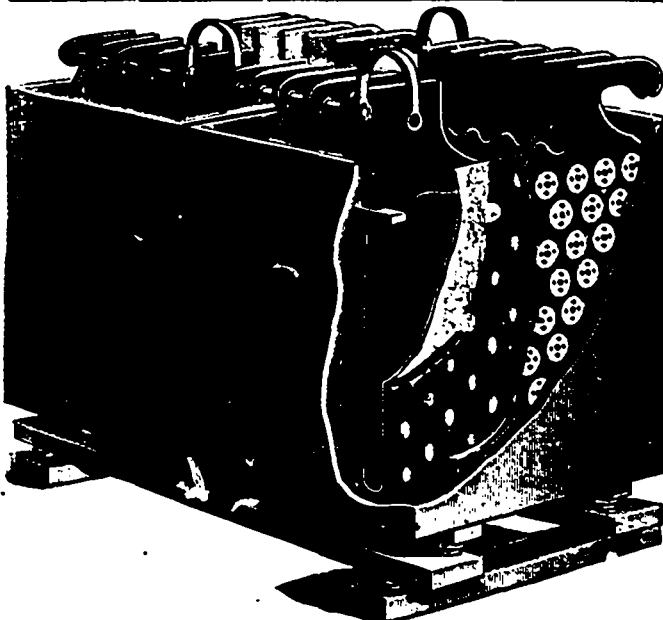
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**The Electric Storage Battery Co.**

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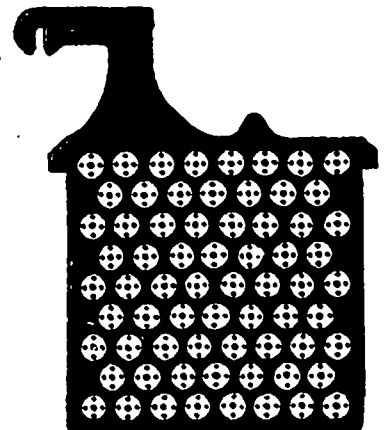
**The Chloride Accumulator**

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

**Traction Cells a Specialty**

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

**Drexel Building - Philadelphia**



Messrs. Paquette & Godbout, St. Hyacinthe, Que., will place a new 80 horse-power boiler in their planing mill.

Doherty's lumber, carding and grist mills at Campbellton, N.B., were destroyed by fire May 19, loss about \$12,000.

The Canadian Pacific Railway contemplate the construction of a new steel bridge over the Columbia river at Revelstoke, B.C.

Messrs. E. F. Keene & Co., of Sherbrooke, Que., will build extensive saw mills at Spaulding, near Lake Megantic, that province.

Messrs. J. A. & M. Cote, St. Hyacinthe, Que., will put a new 60 horse-power boiler into their shoe factory to take the place of the two smaller boilers now in use.

† Capt Carter, manager of the railway department of the Rathbun Company, has obtained permission from the Oshawa council to establish an electric railway in that town.

The Napanee Pulp and Paper Co., Napanee, Ont., has been incorporated with a capital stock of \$90,000 to take over the assets and business of the Napanee Paper Co. and to manufacture pulp, paper, etc.

Mr. Bickerdike, president of the Standard Light & Power Company, said to a Star reporter that the Company had now all the money it wanted for the building of an electric railway to Lachine. He expected the work to be finished by the autumn of this year.—Montreal Star.

The pioneer in what has become an important branch of Canadian industry, namely, the manufacture of buttons, died on May 6th, in the person of Mr. Emil Vogelsang, of Berlin. The deceased gentleman, who died in his 60th year, was born in Batmen, Germany, and came to Canada in 1866, choosing Berlin as his residence. Starting with small capital, he built up a good trade. In partnership with Jacob Y. Shantz, the first button factory, the one lately vacated by the Shantz Button Co., was built. Nearly all the button men in business in Canada to-day served under Mr. Vogelsang, says the Record. In 1880 he built the old part of the factory now occupied by the Williams, Greene & Rome Co., who bought the building in 1884, upon which Mr. Vogelsang moved to Port Elgin, where he had a button business for about five years. He returned to Berlin two years ago and started his dye works. He was a man of energetic and straightforward character.

E. B. Nicklin and Moses Smith are establishing a tannery in Georgetown, Ont.

H. J. Hall has taken over and will refit and operate the Shantz planing mill at Berlin, Ont.

John Piggott & Sons have taken over and will operate the W. G. Nutson planing mill at Windsor, Ont.

McCloskey, Watt & Co. will start a factory at Sarnia, Ont., to manufacture a patent threshing machine.

Messrs. Bennett & Constable, Spencerville, Ont., are placing in their flour mill a new 65 horse-power Corliss engine and a 70 horse-power boiler, built by Cowan & Co., Galt, Ont., as an auxiliary to their water power.

The Canadian Cone Coupler Carriage Co., with headquarters at Palmerston, Ont., has been incorporated with a capital stock of \$50,000, to acquire the St. John Cone Coupler patent and to manufacture road vehicles of all sorts.

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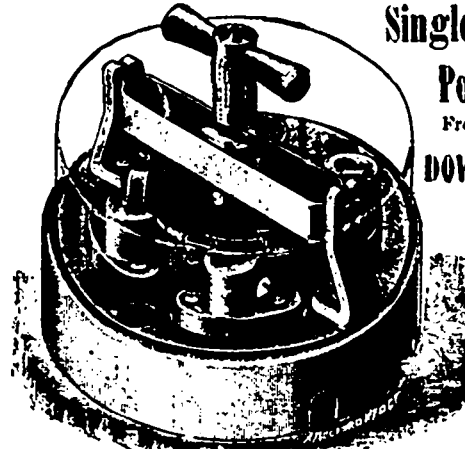
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Single and Double Pole Switches

From 5 to 150 Amperes

DOVETAIL ROSETTES

LAMP SOCKETS

All of Superior Workmanship and Design

Manufactured by the

Perkins' Electric Switch Mfg. Co.

Hartford, - - Conn.

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

## A STRAIGHT TIP . . . . DON'T MISS IT !!

We have just published a little affair that should be in the hands of every cotton manufacturer, whether president, treasurer, agent, superintendent, carder or in any way interested in the business. It contains points that will put money in your pocket. It will be sent with pleasure to any of our friends who will write and ask us for it.



THE METALLIC DRAWING ROLL CO. -:- Indian Orchard, Mass.

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

**CAUTION**—The patents held by this Corporation cover every description of Metallic Rolls so separated or adjusted as to perform the function of drawing or elongating the fibers of cotton or other material preparatory to twisting or spinning the same. Consequently, whoever makes, sells, or offers for sale, or uses, or has in his possession, any infringing devices with intent to use the same, will be promptly prosecuted to the utmost extent of the law for damages.

The Morden Office File Co., of Toronto, is being incorporated with a capital stock of \$12,000 to manufacture office files, fixtures, appliances, etc. Messrs. W. H. Morden, A. S. Irving and J. S. Lockie are to be the first directors.

The Canadian Office and School Furniture Co., Preston, Ont., have sent us their new illustrated catalogue and price list having reference to the office desks and furniture manufactured by them. They say that in the construction of their desks, writing beds, panels and extension slides, are built up of three and five-ply stock, grains crossing at right angles, thus preventing warping, shrinking, swelling and cracking. Their improved curtain is durable and certain in operation, is built up on the lap-stick principle and is practically dust and knife proof. Extension slides are now supplied above upper drawers in all these desks, thus increasing table room at will. The backs are all panelled and finished the same as the ends, and a combination lock automatically secures all the drawers when cover is closed. Reference is also made in the catalogue to the Standard letter file made by this company, regarding which it is stated that it enables one to file letters quickly and correctly, so that they can be instantly referred to, preserved from dust, and so available that any letter or document may be readily found at any time, even years hence. Regarding the intrinsic value of the desks made by this concern, it is confidently claimed that they embody the very best devices in their line. They are intended for actual service, and not to compete with those of ordinary construction. The catalogue embraces descriptions and illustrations of a very large variety of desks and furniture, from which any choice may be gratified. Any who may be interested would do well to send to the company for further information.

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TO LET at low rent, for any term of years, a Brush Factory with a complete outfit of machinery and ready for operation. Suitable for other manufacturing purposes. Water power, Steam Auxiliary power. Substantial stone building. Lighted with gas. Brick engine house. Apply to

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We build Canoes of CEDAR, BUTTERNUT, BASSWOOD and other woods, for Paddling, Sailing, Racing, Fishing, Etc. Skiffs of all sizes.

STEAM LAUNCHES to carry six persons, from \$175 up.

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Than is commonly done with such risks situated in Ontario or Quebec.

Write for particulars,  
Mentioning this paper.

C. R. G. JOHNSON  
FIRE INSURANCE BROKER

42 St. John Street,  
MONTREAL.

Mr. W. Bradden is organizing a stock company at St. Thomas, Ont., to manufacture handles.

Fire, on May 24, in the building in Montreal in which are the factory of the Montreal Silk Mills Co. and the Montreal Watch Case Co., did damage to the extent of \$10,000.

The Sarnia, Ont., Gas and Electric Light Company have closed a contract with the Canadian General Electric Company, of Toronto, for the entire equipment of their plant, work upon which will be commenced at once.

The Dominion Government have received a letter written in German from Josef Wendler of Haida, Ober Schlesian, Germany, in which he asks information respecting the removal of his large Bohemian glass factory from that town to Canada. He points out that the trade of his house is mainly British and American but the heavy taxation on his industry in Silesia, and the strong Socialistic tendencies of the country, are interfering so disastrously with his business that he is desirous of removing, with 500 families whose heads are employed in his works, to this country. He asks for full information as to the quantity of sand and wood to be obtained and what facilities could be offered toward settling in Canada.

His Excellency, Lord Aberdeen, the Governor-General, has purchased for his private use one of the electric launches used in the lagoons at the World's Fair, Chicago, and it is now on the river at Ottawa. This launch is 35 feet 10 inches over all in length and 31 feet 6 inches on the water line. The beam is 6 feet 2½ inches and the draught 27 inches. It carries twenty people with plenty of room and comfort, and indeed can seat thirty. The lines are as near perfection as they well can be. At whatever rate the launch runs there is practically no wake. The hull of the boat is constructed of white oak frames, with white cedar planking. The inner paneling, decks and other parts are of mahogany. All the woodwork is finished in its natural color, thus giving a very rich appearance. The motor is underneath the flooring of the boat, where it turns the propeller shaft. One man in the bow controls both the motor and the steering. The storage batteries, which can be charged from any trolley or lighting wire, are under the seats. Fully charged, the batteries can give the launch a run of 70 or 80 miles. The ordinary speed is about six miles an hour, but a turn of the lever can put this up as high as ten miles an hour. The cost of running the launch as far as the electricity is concerned is only about 6 cents an hour, at the ordinary rate of speed.

A press telegram from Ottawa states that the Government of the United States has in contemplation the erection of extensive works for the smelting of nickel ores, which will give a great impulse to mining in the Sudbury district. The American Government, it is said, will locate their works somewhere in the state of New York near the international boundary. It has been ascertained that in the extraction of nickel from the matter a very valuable constituent is lost, and the American Government sent an expert metallurgist to Germany, where for six months he studied the processes there employed for the production of nickel. His investigation resulted in the discovery that to obtain the highest quality of nickel it is necessary that it be extracted directly from the ore and without the intermediate process to which all along it has been subjected on this continent. So satisfactory has been the results under the new process that the Government at Washington recently obtained from Congress an appropriation for the purchase of a suitable site and it is said to be their intention shortly to erect works for the treatment of ore by the direct method at a cost of probably a million dollars. In all probability, the works will be located as stated near the international boundary since the supply of ore must be drawn direct from the Canadian nickel deposits. This action of the United States Government is taken in mining circles to indicate an immense revival in the very near future of the nickel mining industry in the Sudbury district. Tests made recently with plate composed in part of nickel produced by the new process have been so satisfactory that there can be no doubt that the authorities at Washington contemplate its extensive use not only for the armor of warships but for the strengthening of land fortifications as well.

A few days ago in the House of Commons Mr. McMullen asked for particulars as to the use of the Ottawa Electric Street Railway for carrying the mails from the railway stations to the postoffice, and elicited from Sir Adolphe Caron an interesting reply. The contract had been made, the Minister informed Mr. McMullen. It was for four years and dated from November 1, 1893; it was for \$4,000 a year and had so far proved safer and more convenient than the old method, and was more in the interests of the men, and it was preferable in every way to the old method by mail carts. The cost of collecting by the mail carts had been \$3,882.24 a year.

Among recent shipments made by the Metallic Drawing Roll Co., Indian Orchard, Mass., are 88 deliveries of metallic rolls for the Weetamoe Mills, Fall River; 12 railway heads to John P. King Mfg. Co., Augusta, Ga.; 10 railway heads to the Graniteville Mfg. Co., Graniteville, S.C.; 48 deliveries of drawing for the Exeter Mfg. Co., Exeter, N.H. for atherton frames; 15 deliveries drawing for the Pacolet Mfg. Co., Pacolet, S.C.; 25 deliveries drawing for the Derby Cotton Mills, Shelton, Conn.; 60 deliveries to the Erwin Cotton Mills, Durham, N.C., for Whitin frames. Also a large number of rolls for other mills, including the Ada Cotton Mills, Charlotte, N.C.; Overland Cotton Mills, Overland, Col.; Wm. E. Hooper & Sons, Baltimore, Md.; Mt. Vernon, Co., Baltimore, Md.; Victoria Mills, Newburyport, Mass.; Swift Mfg. Co., Columbus, Ga.; Berkeley Mills, Berkeley R.I. Included in these shipments are numerous repeat orders from mills that have had the patent metallic roll running on a large scale, and also orders from several mills that had never before tried it.

Messrs. Munderloh & Co., Montreal, of whose electrical and mechanical department Mr. John A. Burns is manager have sent us the following circular which explains itself:

Having been appointed sole agents in Canada for the Allgemeine Electricitats-Gesellschaft (German General Electric Co.) of Berlin, Germany, we beg to solicit your orders for any goods you may require in the electrical line. The General Electric Company of Berlin is one of the largest in the world, and owing to their manufacturing in very large quantities, are able thereby to supply goods lower in price than smaller firms. Owing to the superior quality and variety of their exhibit at the World's Columbian Exhibition, they already enjoy an enviable reputation in the United States. The A.E.G. incandescent lamp is universally known in the electrical trade, over 10,000 lamps per day being turned out of their factory. We are therefore in a position to quote you on lamps for any voltage, socket and candle power, at prices which, we think, will meet with your approval. If you are in the market for supplies we will be pleased to forward you quotations with desired information.

## Fire Bricks :- Cement :- Drainpipes

AT LOWEST PRICES

F. Hyde & Co., 31 Wellington St.  
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## Wood Working Machinery

Principal Gold Medal Toronto Exhibition, 1883

The GODERICH ORGAN CO., Goderich, write:—

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

**Exhaust Fans, Single and Double.**

WRITE FOR CATALOGUES AND PRICES

GALT - - - - - ONT.



The Strathroy Petroleum Co. are applying for incorporation with a capital stock of \$90,000 to take over and operate the oil wells now owned by G. A. McGillivray and others at Strathroy, Ont.

The Lanark County Electric Railway Co., with head offices at Perth, Ont., is being incorporated with a capital stock of \$100,000, to construct and operate an electric railway in that town and to points adjacent thereto.

Messrs. Robert Young, Robert W. Young and associates are being incorporated into a joint stock company under the name of The Young & Brother Co., with a capital stock of \$150,000 to manufacture plumbers' and steam fitters' supplies, lamp goods, etc.

The Allgemeine Elektrizitäts-Gesellschaft (The German General Electric Co.) of Berlin, Germany, for whom Messrs. Munderloh & Co., Montreal, are sole agents in Canada, have sent us a very beautiful souvenir having reference to their exhibition at the World's Columbian Exposition, Chicago, in 1893. Those who had the pleasure of seeing this exhibit, particularly at night, could not but admire the marvellous effects that were produced by the electrical devices manufactured by this company, and even to many who possessed some knowledge of the applications of electricity, the methods of making some of these displays remained to them a mystery. In this book they are explained. The book also explains the character of all the more important exhibits displayed by this company; and it also makes mention of many specialties manufactured by this company, and of applications of electricity for general industrial purposes, which it was impossible to exhibit there. Some of the specialties manufactured by this company at their extensive works in which some 2,500 workmen are employed, include steam engines, dynamos, electromotors for continuous alternating and three-phase currents, transformers, measuring and testing instruments, fittings, electroliers, incandescent and arc lamps, wires, cables, materials for installations, electric railway equipments, etc.

**CANADIAN PATENTS.**

The following patents have been issued from the Canadian Patent Office, from March 15 to March 30, 1894, inclusive.

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

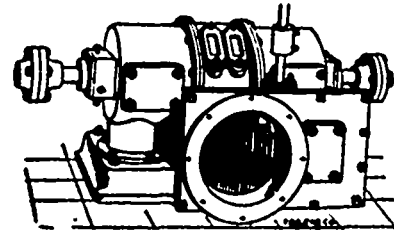
Fetherstonhaugh & Co., Bank of Commerce Building, Toronto.

Ridout & Maybee, 103 Bay street, Toronto.  
A. Harvey, Central Chambers, Ottawa.  
J. A. Grenier, Imperial Building, Montreal.

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

- 45,556 Method of distilling wood waste, Franz Josef Bergmann, Neheim, Prussia, Germany, March 15.
- 45,557 Pneumatic tire, Charles Frederick Lavender and Thomas Fane, Toronto, Ont., March 15.
- 45,558 Sash fastener, The Rhoads Sash Balance Co., San Francisco, Cal., March 15.
- 45,559 Joint coupler, William H. Hampson, Cambridge, Mass., March 16.
- 45,560 Wrench, Lewis Petty Davidson, Owen, Wyo., March 16.
- 45,561 Key opening sheet metal can, John Thornley, Montreal, Que., March 16.

**"Little Giant" Turbine Water Wheels**



HORIZONTAL TYPE

For All Purposes, HORIZONTAL and VERTICAL.

.....Makers of.....  
The Improved Walsh Double Acting Water Wheel Governor  
Machine Dressed Gearing, Pulleys, Shafting, Bearings, Etc.  
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**STEAM PUMP**

Often Imitated, but Never Equalled

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

MUDDY OR GRITTY LIQUIDS  
HANDLED WITHOUT WEAR

Descriptive Catalogue, with Prices, Furnished on Application.

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

Established 1834.

Incorporated 1876.

**J. B. Armstrong M'fg Co.**

(LIMITED)

..Guelph, = = Canada..

..Manufacturers of..

**Tempered Steel Specialties**

:: Including ::

- Buggy, Carriage and Seat Springs,
- Gears, Jump Seat Steels, Spring Horse Rake, Cultivator and Harrow Teeth, Seeder Springs, Coil Springs, Etc.

The oldest established Canadian Makers of these lines.

Correspondence Solicited.

- 45,562 Adjustable handle, William A. Faber, Brooklyn, N.Y., March 16.
- 45,563 Valve, Harvey Hallock Burritt, Newark, N.J., March 16.
- 45,564 Can washing machine, Moore Letson and Frank Burpee, New Westminster, B.C., March 16.
- 45,565 Automatic elevator fire trap, Thomas G. Lamb, Homestead, Pa., March 16.
- 45,566 Ladder shelf or scaffolding, John George Heilig, Hamilton, Ont., March 16.
- 45,567 Self-acting doors for mines, William Maddin, Westville, N.S., March 16.
- 45,568 Attachments for window and door frames for securing storm sashes and the like, John D. Johnston, Newport, R. I., March 16.
- 45,569 Churn, William H. Church, Fenelon Falls, Ont., March 16.
- 45,570 Machine for forming heel stiffeners, Louis Cote, St. Hyacinthe, Que., March 17.

- 45,571 Sheet iron heating stove, Robert McD. Smith and Charles B. Rose, Louisiana, Mo., March 17.
- 45,572 Window, Zotique Leroux, Montreal, Que., March 17.
- 45,573 Knife or cutter for mowers, etc., De Wane B. Smith, Deerfield, N.Y., March 17.
- 45,574 Locomotive, William Ezra Worthen, New York, N. Y., March 17.
- 45,575 Wire stretcher, William P. Negus, West Branch, Ia., March 17.
- 45,576 Sash holder, James Dolphin and William Thomas Whitehead, Magog, Que., March 17.
- 45,577 Car brake, Edwin Webster, Luce, Meadville, Pa., March 17.
- 45,578 Window shade and roller clip, Thomas P. Brown, Belleville, Ont., March 19.
- 45,579 Fastener for head covering, William Y. Allen, Boston, Mass., March 19.
- 45,580 Machine for scouring and rinsing cloth, Matthew H. Kohlrusch, Billerica, Mass., March 19.

**...JOHN MCDUGALL...**

**Caledonian Iron Works, for BOILERS, - ENGINES, - PUMPS.**  
Gearing, Hangers, Shafting, etc.

Office: **WILLIAM Cor. SEIGNEURS ST., MONTREAL.**

**CASSIDY, BONNER & CO.**  
128 Queen Street, Montreal, Que.  
MANUFACTURERS OF LEATHER

**BELTING**

Lace Leather, Etc., Loom Strapping and Mill Supplies.

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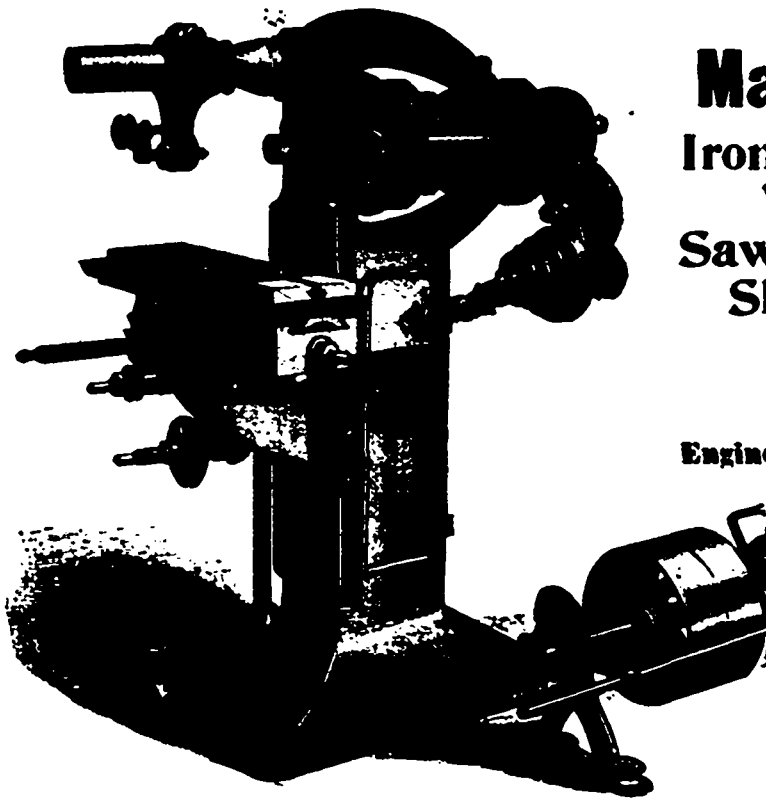
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- 45,581 Cultivator, Andrew T. Donaldson, Mount Clemens, Mich., March 19.  
 45,582 Furnace, Samuel P. Hutchinson and S. Lloyd Wiegand, Philadelphia, Pa., March 19.  
 45,583 Moulding machine, Lewis Edworthy, Hamilton, Ont., March 19.  
 45,584 Thill support, Charles M. Caughill, Melita, Man., March 19.  
 45,585 Wagon jack, Sam. S. Joy, New Market, N.H., March 19.  
 45,586 Metal wheel, Joseph W. Bettendorf, Springfield, O., March 19.  
 45,587 Rail joint, Edward P. Caldwell and C. Wright Davidson, Minneapolis, Minn., March 20.  
 45,588 Slatted fabric, John C. French and Walter C. Pratt, Lansing, Mich., March 20.  
 45,589 Truck, George F. Armstrong and Meylert M. Armstrong, Philadelphia Pa., March 20.  
 45,590 Sash fastener, William L. Eveland and Alonzo Herrick, Port Stanley, Ont., March 20.

- 45,591 Mud guard for vehicles, James W. Shone, George W. McTaggart and Charles F. Wilkin, Rochester, N. Y., March 20.  
 45,592 Bicycle, J.R. Sederguest and George J. Clark, Saint Stephen, N. B., March 20.  
 45,593 Window Ventilator, David N. Cook and Henry W. Cook, Salem, Mass., March 20.  
 45,594 Steam-trap, Egbert Habberton Gold, Chicago, Ill., and Edward E. Gold, New York, N.Y., March 20.  
 45,595 Ore roasting furnace, Arthur Kitson, Philadelphia, Pa., and Alexander Keith, Toronto, Ont., March 20.  
 45,596 Water heater, William Morrison, Toronto, Ont., March 21.  
 45,597 Cheese vat, John Warren, Sterling, Ont., March 21.  
 45,598 Railway signalling, John George Dixon, Birkby, County of York, England, March 21.  
 45,599 Machine for finishing twisted staves, Daniel F. Miller, H. G. Trimble, and George V. Frazier, Somerset, Ky., March 21.

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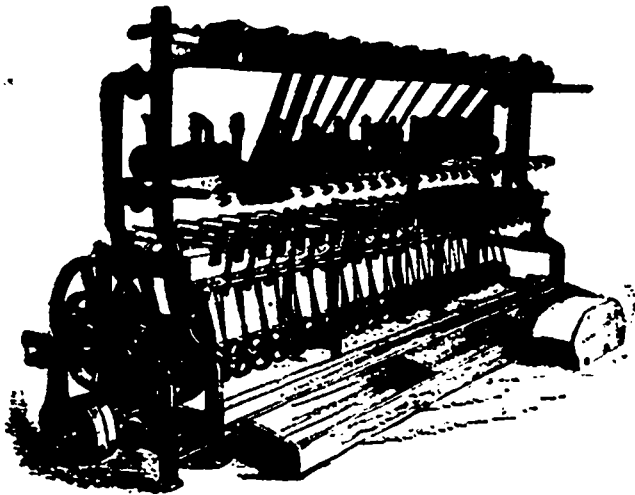
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- 45,600 Pump, John Clark, Pontiac, Mich., March 21.
- 45,601 Sap spout, George John Record, Conneaut, O., March 21.
- 45,602 Railway time signal, Angus Cameron Gordon, Rochester, N. Y., March 21.
- 45,603 Heater, Christian Schellhammer, Warren, Pa., March 21.
- 45,604 Car coupler, David William Brunton, Aspen, Col., March 21.
- 45,605 Buckle, Albert Daniel Field, Naugatuck, Conn., March 21.
- 45,606 Car brake, James McGee, Houston, Texas, March 21.
- 45,607 Street clearing apparatus, A. E. Trevithick, St. Henri, Que., March 22.
- 45,608 Street clearing apparatus, A. E. Trevithick, St. Henri, Que., March 22.
- 45,609 Spark arrester and steam condenser, Thomas Lee, Home City, O., March 22.
- 45,610 Thill coupling, George W. Baugher, Valparaiso, Ind., March 22.
- 45,611 Stove-stand and ash-holder, George F. Eldin, New Westminster, B. C., March 22.

- 45,612 Combined rake and tedder, James Murray Spangler, Canton, Ohio, March 22.
- 45,613 Apparatus for producing a draft in smoke stacks, etc., Ray Gaul, Brooklyn, N. Y., March 22.
- 45,614 Fire or waterproof paint, George H. McAlpine, Concorde, N. H., March 22.
- 45,615 Camera stand, John H. Green and George W. Baker, Ishpeming, Mich., March 22.
- 45,616 Pneumatic saddle for cycles, etc., John Carroll, Belfast, Ireland, March 22.
- 45,617 Apparatus for the electrolysis of chlorides and other salts, James Hargreaves, Farnworth-in-Widnes, and Thomas Bird, Cressington, near Liverpool, Lancaster, England, March 22.
- 45,618 Apparatus for the electrolysis of chlorides and other salts, James Hargreaves, Farnworth-in-Widnes and Thomas Bird, Cressington, near Liverpool, Lancaster, England, March 22.
- 45,619 Road cart, Jacob S. Shoemaker, New Lothrop, Mich., March 22.

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- 45,620 Tobacco can, Bernard Goldstein, Montreal, Que., March 22.  
 45,621 Adjustable shafts, The Rhoads Sash Balance Co., San Francisco, Cal., March 24.  
 45,622 Folding square, Hervey Copley Goodgion, New York, N.Y., and Wm. Sower, Orange, N.J., March 24.  
 45,623 Car fender, William Henry Judson and Matilda Judson, Toronto, Ont., March 24.  
 45,624 Irone, the firm of Haarmann and Riemer, Holsminder, Prussia, Germany, March 24.  
 45,625 Thill coupler, Mark Wemple and Frank H. Vrooman, Chicago, Ill., March 24.  
 45,626 Crank shaft and bearing for bicycles, William Henry Fauber, Chicago, Ill., March 24.  
 45,627 Air purifier, John S. Dodge, Minneapolis, Minn., March 24.  
 45,628 Filter, Adolphus Davis, Montreal, Que., March 24.  
 45,629 Freight car, George T. Morris, Guttenburg, N. J., March 24.  
 45,630 Plumbers test pump, Robert Sampson, Quebec, Que., March 24.  
 45,631 Injector, Lovren E. Hogue, Greenville, Pa., March 24.  
 45,632 Car-coupler, Daniel Hunt, Round Grove, Mo., March 24.  
 45,633 Wheel, Joseph David Everett, Belfast, Ireland, March 24.  
 45,634 Georg Walez, Munich, Kingdom of Bavaria, Germany, March 24.  
 45,635 Pneumatic cash carrier, Frederick J. H. Hazard, Toronto, Ont., March 24.  
 45,636 Method of and means for preventing the clogging of ventilators, James E. H. Paddon, Montreal, Que., March 27.  
 45,637 Manufacture of tea, Harrison Jackson, Southport, Lancaster, England, March 27.  
 45,638 Air compressor, Charles Frederick Fogg, New York, N.Y., March 27.  
 45,639 Water purifier, Thomas Craney, Bay City, Mich., March 27.  
 45,640 Food receptacle, Jean Leembruggen, 9 P.C. Hoofsraat, Amsterdam, Holland, March 27.  
 45,641 Wire stretcher, Peter A. Leonard, Erie, Mich., March 27.  
 45,642 Boiler cover, Henry Colbeck Michell, Toronto, Ont., March 27.  
 45,643 Process of heating, drying and ventilating, John Langfield, Manchester, England, March 27.  
 45,644 Boot and shoe burnishing machine, Charles Henry Southall, Leeds, England, March 24.  
 45,645 Machine for paring the edges of boot and shoe soles, Charles Henry Southall, and Robert Heap Southall, Leeds, England, March 27.  
 45,646 Process of and apparatus for the production of nickel, etc., Carl Hoepfner, Giessen, Germany, March 27.  
 45,647 Hand fire extinguisher, Daniel D. Wilson, Toronto, Ont., March 27.  
 45,648 Method of manufacturing hollow wooden articles, etc., Carl Wittkowsky, Berlin, Germany, March 27.  
 45,649 Match racking machine, John D. Manton, Hull, Que., Charles D. Chitty and Edwin S. Leetham, Ottawa, Ont., March 30.  
 45,650 Lawn mower, Robert D. Robins, Port Perry, Ont., March 30.  
 45,651 Duplicating copying book, Hermon Henry Cook, Toronto, Ont., March 30.

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## TORONTO

- 45,652 Car coupler, Charles W. Patton, Ohio Falls, Ind., J. Ramsey, and Thomas J. Ramsey, Shelbyville, Ky., March 30.
- 45,653 Car coupler, John Jacob Schairer, Clint, Frank E. Hunter and John W. Duffus, El Paso, Texas, March 30.
- 45,654 Rotary engine, The Consolidated Car Heating Co., Albany, N.Y., March 30.
- 45,655 Rotary engine, The Consolidated Car Heating Co., Albany, N.Y., March 30.
- 45,656 Hand truck, Emilio Cardarelli and George W. Dick, Sumter, S.C., March 30.
- 45,657 Hub for vehicle wheels, The Messer Elastic Rotator Co., Philadelphia, Pa., March 30.
- 45,658 Draught preventing apparatus, Norman Willis Buss, London, England, March 30.
- 45,659 Track cleaner, Lawrence Curtin, Toronto, Ont., March 30.
- 45,660 Door opener, Micajah C. Plummer and Orrin O. Dinsmore, Paralta, Ia., March 30.
- 45,661 Steam injector, The Penberthy Injector Co., Detroit, Mich., March 30.

## UNITED STATES PATENTS.

GRANTED TO CANADIAN INVENTORS.

The following patents were issued from the United States Patent Office, on May 17 and May 22, 1894, and reported especially for the CANADIAN MANUFACTURER by Glasecock & Co., patent attorneys, Washington, D. C. Printed copies of these patents can be obtained from them for 25 cents each.

- Isaac Frechette, Montreal, hand lasting tool.
- Thomas H. Allen, Toronto, car brake.
- Jean F. Chazotte, assignor of two thirds to G. Maisons, 3d. and A. Roy, Montreal, garbage cremating furnace.
- Edward A. Parson, assignor of one-half to H. Millar, Ottawa, multiple electric fuse box.
- Louis E. Simoneau, assignor to Automatic Telephone and Electric Co. of Canada, Montreal, automatic telephone system.

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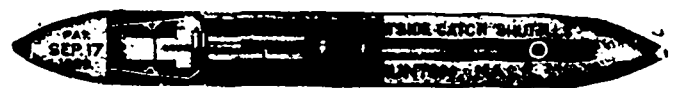
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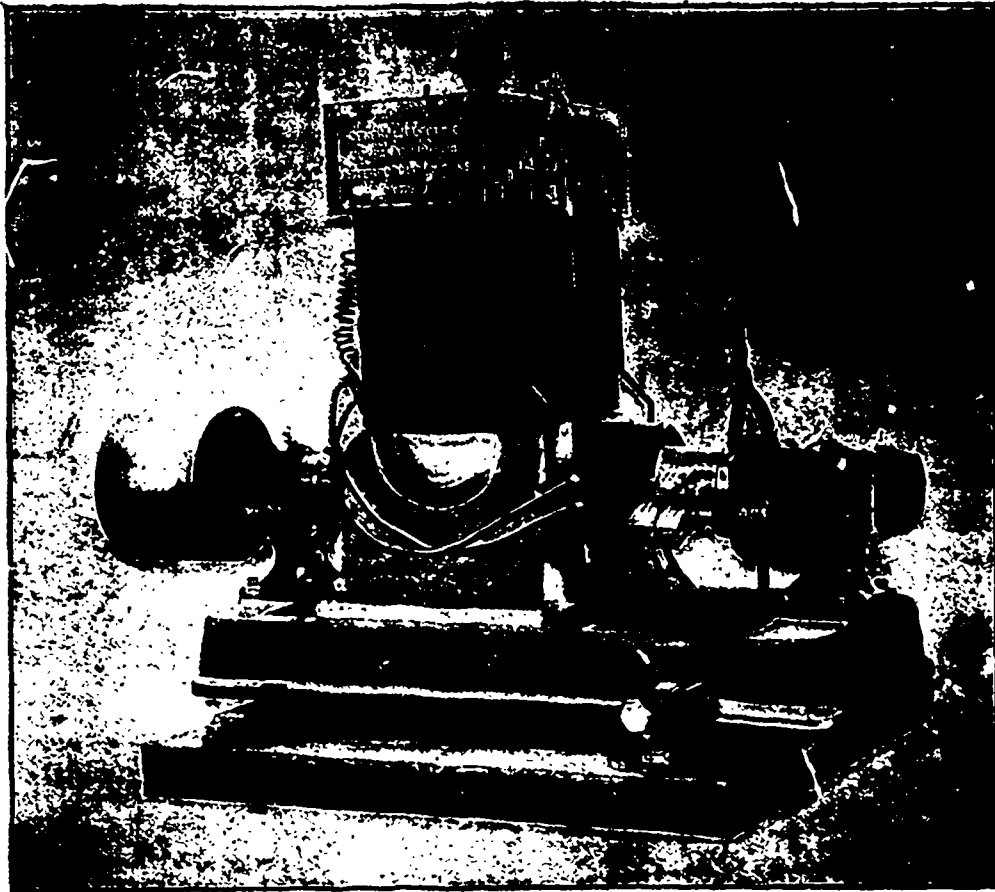
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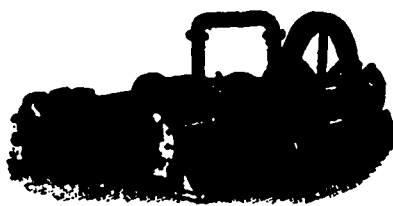
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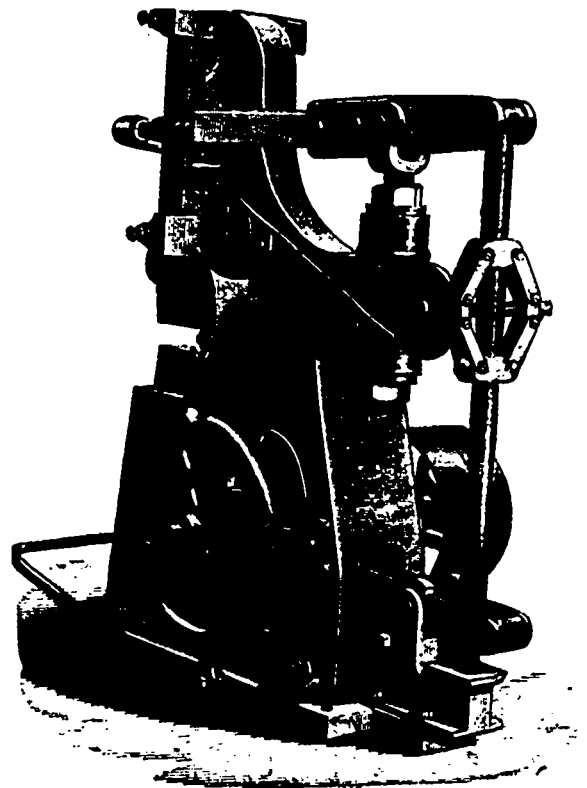
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1 3/8	1 3/8	5.01	"	3	2 7/8	22.59	"
1 1/2	1 1/2	5.94	"	3 1/4	3 1/8	26.60	"
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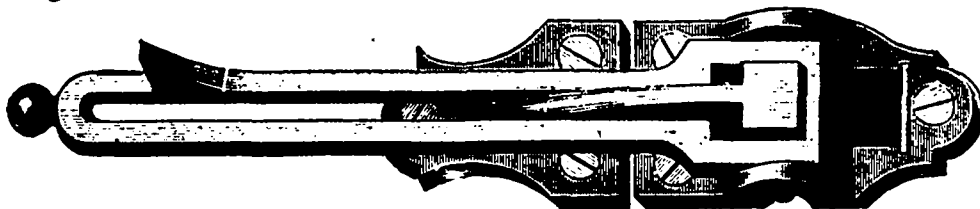
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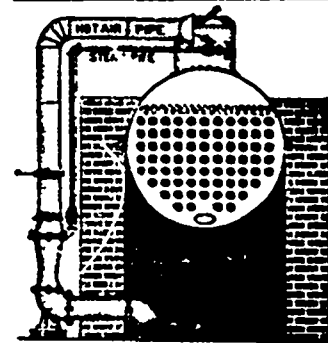
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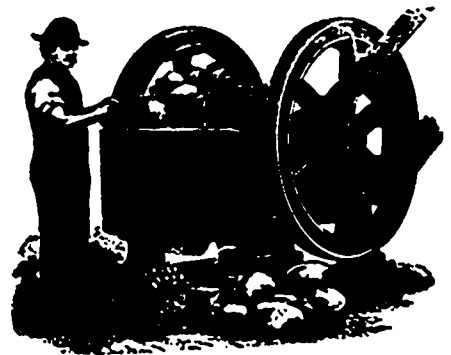
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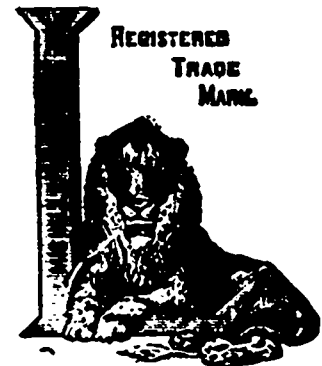
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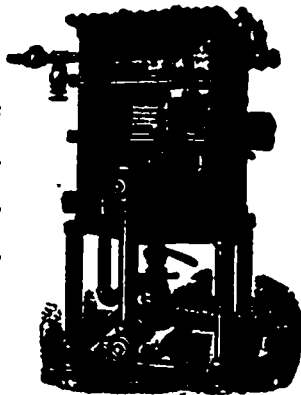
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## JOHN FORMAN,

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# Webster Feed Water Heater and Purifier

Guaranteed to heat the feed water to 210 to 212 degrees and relieve the back pressure on the Engines



Awarded the three  
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Efficiency, Economy,  
and Simplicity.

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350,000 Horse Power in operation including some of the largest steam plants in the world. Send for our New Illustrated Catalogue.

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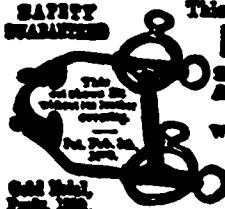
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# NOTICE

Manufacturers and Capitalists Patent  
Acts of 1872, and Amendments,  
Section 22.

NOTICE is hereby given to all persons desirous of practicing the invention in the manufacture of Aluminum and Alloys thereof, for which certain letters patent of the Dominion of Canada were granted on June 7th, 1889, to Chas. Martin Hall, assignor to the Pittsburg Reduction Co., to wit: Nos. 31, 512, 31,513, 31,514, 31,515, 31,516, 31,517; and also the invention in aluminum alloys and manufacture thereof, for which certain letters patent of the Dominion of Canada were granted on July 20th, 1892, to John W. Langley, assignor to the Pittsburg Reduction Company, to wit, No. 32,402, that the undersigned is prepared to grant licenses upon reasonable terms under each and all of same letters patent, and otherwise place the patent invention in possession of the public in accordance with the provisions of the above recited act.

Communications to the undersigned may be addressed to 701 Ferguson Building, Pittsburg, Pa., U.S.A.

(Sgd) The Pittsburg Reduction Co.  
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Preventing Condensation and Loss of Steam. Others have done it, why not you.

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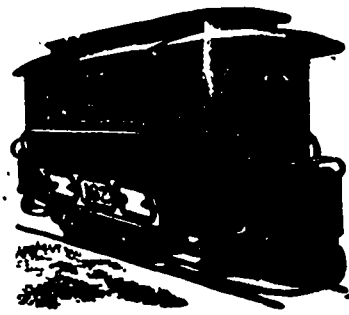
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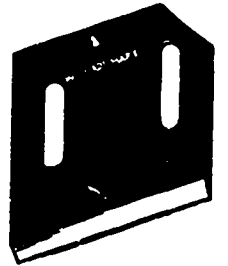
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Radial Drills.

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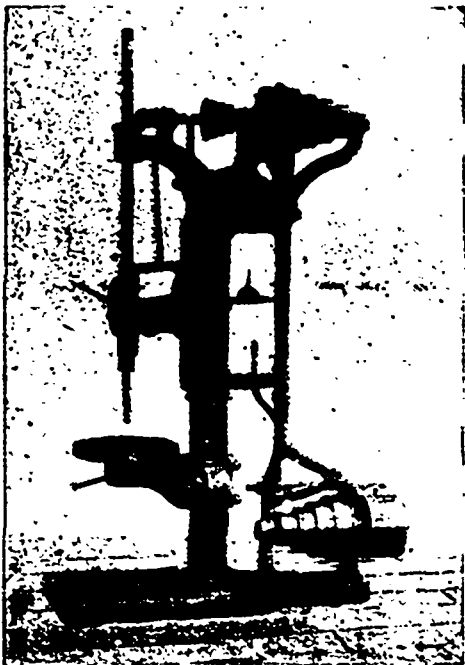
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20 Inch Drilling Machine.

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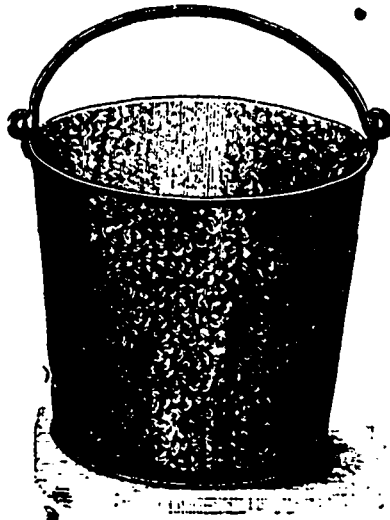
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**Improved Pattern**

Something entirely new, and superior to the old style buckets, made in three sizes.

They are superior to the ordinary flaring English bucket, being of greater capacity.

They are stronger in shape, consequently more durable.

They will not slop over, nor tip over, owing to the wide bottom.

They nest very close and firm, which protects them in shipping.

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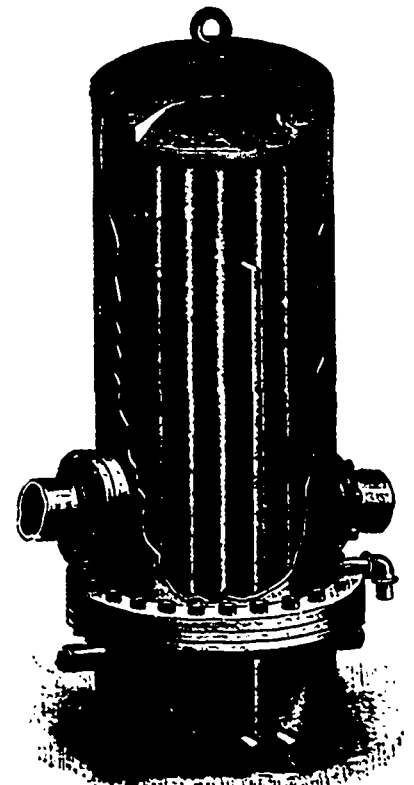
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**The Jacobs Patent Water Tube  
Feed Water Heater and Purifier.**



**GREAT EFFICIENCY, SIMPLICITY  
OF CONSTRUCTION and LOW COST.**  
Has a Cast Iron shell, which will never wear out, with seamless drawn brass tubes expanded into tube-plates at top and bottom, with double blow-off.

The tubes being surmounted by a cap forming a chamber at the top, and being fastened rigidly only to the lower tube plate, free play is given for expansion, thereby preventing rupture and leakage of joints.

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ROOFING**

It is superior to any other Roofing, and unequalled for House, Barn, Factory, or Out-Buildings; it costs half the price of shingles, tin or iron; it is ready for use, and easily applied by anyone; it is the best Roofing in the market, in durability, to all others.

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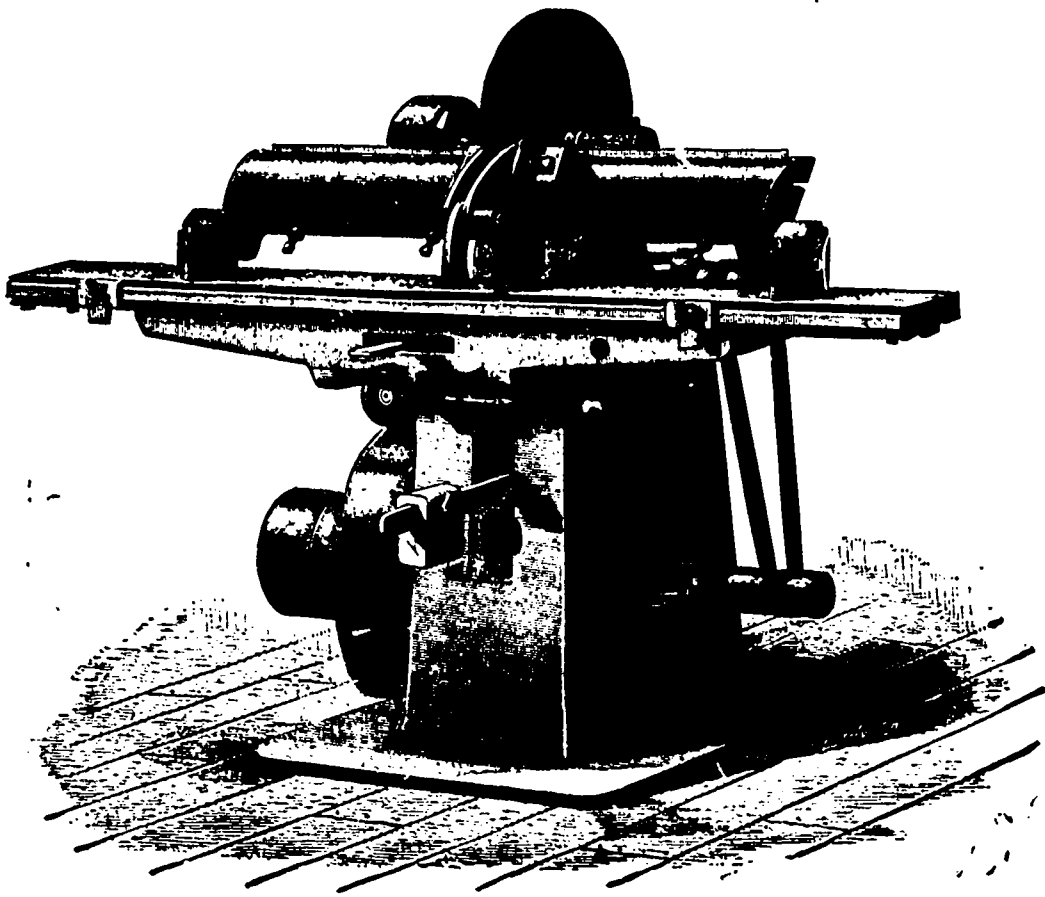
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The best known paint in the world for Tin, Iron, or Shingle Roofs, Fences, Sides of Barns and Out-Buildings. It costs only 60 cents per gallon, in barrel lots, or \$1.51 for a 5 gallon tub. Color dark red. It will stop leaks in tin or iron roofs that will last for years. It is guaranteed not to peel, crack, scale, nor wash off, and is fire-proof against sparks. TITLY IT.

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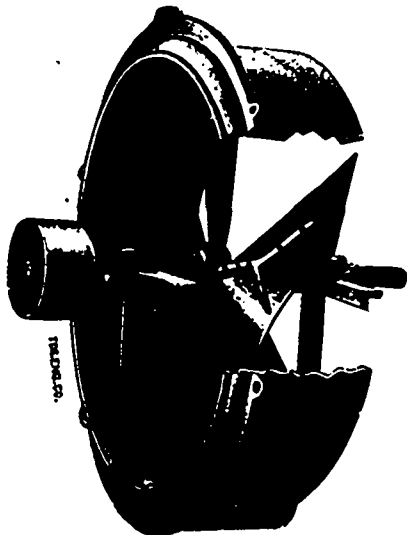
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**McEachren's Improved Fan**

PATENTED 1893

For Ventilating, Heating, Drying, Etc.



Specially adapted to  
**HEAVY WORK**

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

For particulars address

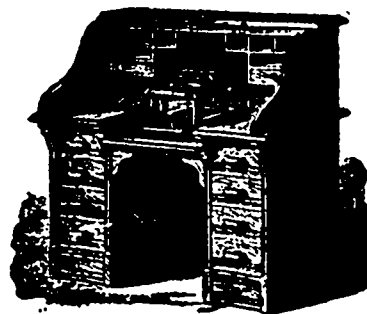
**J. D. McEACHREN - - GALT, Ont.**

Rockwood, March 16th, 1893.

Mr. J. D. McEachren, Galt.

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

Yours truly, HARRIS & Co.



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Simple,  
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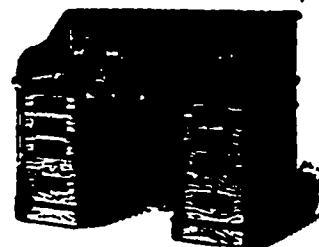
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THE CHEAPEST**

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M'grs for Toronto and Eastern Ont.

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NEW FEATURE...

**...JOINT INSURANCE FOR PARTNERSHIPS**  
Important to Manufacturing Firms

**MEDLAND & JONES,** General Agents  
MAIL BUILDING, TORONTO.

**Manufacturers . . . . .  
Life Insurance Company**

**RESULTS FOR 1893**

New Business Issued . . . \$2,490,210  
(Increase over 1892) . . . \$487,960  
Assets 31st December, 1893 . \$673,738  
(Increase over 1892) . . . \$137,671

Gross Cash Income . . . \$287,340  
(Increase over 1892) . . . \$45,825  
Surplus on Policyholders' acct. \$164,598  
(Increase over 1892) . . . \$30,922

Insurance in Force 31st December, 1893, - - \$8,937,834

**GEORGE GOODERHAM,**  
President.

**JOHN F. ELLIS,**  
Man. Director.



**THE STANDARD DRAIN PIPE CO., St. John's, P.Q.**

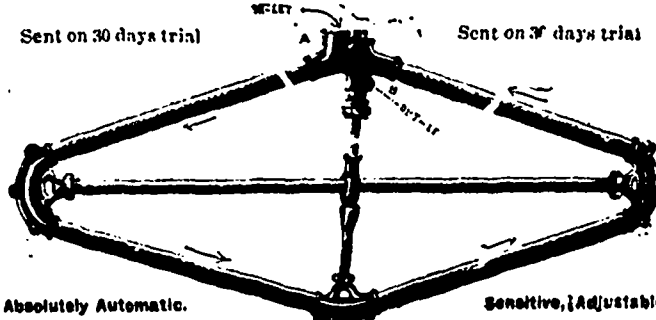
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The Standard Drain Pipe Co., of St. John's, P.Q., (Ltd.) W. C. THORNTON, President

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Sent on 37 days trial



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FINE BRASS CASTINGS.

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IMPROVED DUPLEX SYSTEM, for  
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HAVE MANY PATENTED IMPROVEMENTS NOT FOUND IN OTHER MAKES

That will well repay an investigation by those who desire to secure

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Moulding, Tenoning, Mitreing

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AND OTHER IRREGULAR SHAPES

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Once mastered it is a valuable addition to his capital. every intelligent business man

NONE OF THE MODERN INVENTIONS

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Saves Time, Saves Belts, Saves Money  
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Malleable ..  
Iron .... ✦  
Works ..

Capacity  
**2,000 Tons ..**

**WILLIAM H. FROST**

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SMITH'S FALLS : Ontario, Can.

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