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The
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AND INDUSTRIAL WORLD
DEVOTED TO THE MANUFACTURING INTERESTS OF CANADA.

VOL. 55. TORONTO, NOVEMBER 15, 1907. No. 10.

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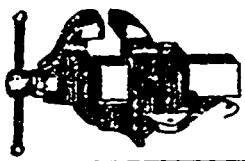

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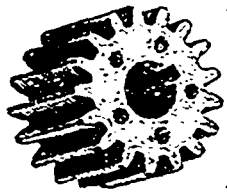

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## THE CLAY WORKING INDUSTRY.

No industry is more intimately connected with the growth and prosperity of a country than the clay working industry.

It is the basic industry in the building operations which are making the cities and towns of Canada so attractive to the visitor and so comfortable for the resident. On this industry the farmer depends for the brick which makes his home warm and comfortable through the rigorous winter of a northern clime and for the tile which makes possible modern methods of drainage in his fields.

With all due respect to the many varieties of Canadian wood and to the undoubted value of cement in many building operations the demand for brick and the variety of purposes to which it can be put is steadily expanding. Consequently the importance of this industry to the community is being more and more recognized.

For several years those engaged in this industry have sought the establishment of a "Clay Working School," to give technical education covering this important industry in the same way as is now done by similar schools in Great Britain, Germany and the United States, and as the "School of Mines," at Kingston, Ont., is now doing for the mining industry in Canada.

Here is a serious need. The Ontario government promised a year ago to fully consider the proposition. It is to be hoped the clay-workers of Canada, and particularly those of Ontario, will give the weight of their influence to make this demand so emphatic that action will be taken at once.

## MR. JOHN F. ELLIS, THE HISTORIAN.

At the last convention of the Canadian Manufacturers' Association held in Toronto in September last, Mr. John F. Ellis, addressing the convention said:—

"Mr. President and gentlemen:—About eight years ago the membership of this Association did not amount to as many hundreds as it does now thousands. At that time, it was seriously considered by many of the members "Had we not better close up the Canadian Manufacturers' Association?" They questioned its value. A few thought differently; they thought that the Association had a mission, and that if it was properly managed that mission would work out for the benefit of the manufacturers of the Dominion. In their meetings the first question they considered, and the one which they thought the most important was the appointment of a secretary. This Association has been singularly fortunate in the choice of its secretaries during the last eight years, and without reflection on the rest of the exectuive, even from the president downwards, I consider that the secretaries that we have had for the last eight years are the cause of the brilliant success of the Canadian Manufacturers' Association."

Mr. Ellis was president of the Association at the time he questioned its value; and because of his misapprehension of his duties as president, and his peculiar views of the duties of the secretary, there was a lack of that harmony that had always from the organization of the Association and until that time, characterized it as an organization.

At the same general annual meeting at which Mr. W. K. McNaught was elected president of the Association, Mr. J. J. Cassidey was also elected secretary, after having served as assistant secretary under Mr. Frederic Nicholls from 1887. Mr. Cassidey was the editor of the CANADIAN MANUFACTURER, which had several years before been declared by the Association as its official organ; and Mr. Cassidey and the CANADIAN MANUFACTURER were continued as indicated until the time to which Mr. Ellis alludes.

During the time of the incumbency of Mr. McNaught as president of the Association, to test the question as to whether, in his dual capacity, the secretary and editor was working to the best advantage in the interests of the Association and the manufacturers generally, an expression of opinion regarding it was requested of some of the prominent members, in reply to which among many others he was in receipt of the following from Mr. McNaught, then the president:

"It affords me no small pleasure to bear testimony to the ability and fair-mindedness which has characterized your editorial management of the CANADIAN MANUFACTURER. Your articles not only bristle with facts, but are sound and to the point; and in my opinion it would be a good thing for the country if they could be read by every voter as well as every manufacturer in the Dominion. In regard to your services as secretary of the Canadian Manufacturers' Association, I consider that you have performed your duties faithfully and with marked ability; and from an intimate personal knowledge of what has been done and is being done, I am of the opinion that the Association has been singularly fortunate in securing your services."

Mr. McNaught, almost or quite from the inception of

Association, has been one of its most intelligent and active members; and since his retirement from the presidency, has maintained his interest in it, most of the time as chairman of the tariff committee.

Mr. George Booth, also, who has for many years been treasurer of the Association, which position he occupies at this time, wrote to Mr. Cassidey as follows:—

"It was no slight responsibility to succeed to the position held by Mr. Nicholls, the late secretary of the Canadian Manufacturers' Association, and I am pleased to bear testimony that you have ably filled the place. You have been indefatigable in your attention to the requirements not only of the individual members, but of the Association as a whole. The finances of the Association have been put on a better basis by you than at any previous time. I congratulate the Association in having secured your services."

"It is a dirty bird that befouls its nest."

J. J. Cassidey.

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## CANADA'S FULL-GROWN INDUSTRIES.

A few months ago the Dominion Census Bureau, of which Mr. Archibald Blue is superintendent, issued a number of bulletins having reference to the manufacturing industries of Canada, comparisons being made of conditions in 1900 and 1905. Allusions to some of these bulletins have been made from time to time in these pages; and at the recent convention of the Canadian Manufacturers' Association, Mr. Blue delivered an address on the subject, basing his remarks on the facts set forth in the bulletins.

When these bulletins were first issued the Toronto Globe, reproducing some of the facts, took occasion to attribute the prosperity of the country to the financial policy of the party in power, and, as usual, denouncing the National Policy of tariff protection to Canadian manufacturing industries as detrimental to the true interests of Canada. In its issue of June 19 last, speaking of "Canada's Full Grown Industries," it said:—

The official returns of Canadian development in manufacturing industries during the past five years must be highly gratifying not only to the manufacturers as a class and an organization, but to all classes and interests in the Dominion. A general increase of about 33 per cent. in the period covered by the comparative figures of the report shows that manufacturing enterprise has taken full advantage of the excellent opportunities provided by our general development, abundant natural wealth, and reasonable fiscal policy. This success must be doubly gratifying to the Liberal statesmen, who, in the face of predicitons of disaster, and in spite of persistent attacks and condemnations by those who did not recognize the favors thrust upon them, relieved the pressure of extreme protection and provided opportunities for the untrammeled play of natural economic forces. It is impossible to say how far the development of the past few years is due to the relief afforded by the British preference and the general revision in which the extreme obstructive features of the National Policy were eliminated. It is certain that Canada has always possessed the elements of abundant success in natural wealth, productive soil, and in an active, enterprising and industrious people. This fact sustains the belief that the long and discouraging period of comparative stagnation was due to the obstruction of unwise fiscal laws. . . .

The entire output of our manufacturing industries has increased from $481,053,375 in 1900 to $715,035,965 in 1905, a gain of $233,982,590. This growth shows that Canadian industry is no longer in a state of infancy, but has reached full manhood, and is equipped for the battle of life. It also goes to show that the policy of pampering would have tended to perpetuate the infantile condition. A policy calculated to enable the industries to survive by their own strength and their own merits is incomparably preferable to one likely to perpetuate a condition of dependance. The Liberal policy has given Canadian industries a chance to show and to learn their strength. It has relieved them of unnecessary burdens, and in the opportunities which have come with this relief they have learned their ability to survive and prosper without a weakening measure of artificial aid. Our leading industries have safely passed the troublesome and uncertain period of infancy. Their phenomenal success is not the result of unhealthy forcing, but of natural and substantial growth. With a careful avoidance of past mistakes and a firm refusal to burden all for the help of any, this gratifying progress should continue into the indefinite future, and every step in advance should be made a preparation for further progress.

Some time ago Rev. Mr. Jasper, a celebrated divine, of Richmond, Va., delivered a lecture in which he contended that "the sun do move," but The Globe ignores the fact that the civilized world has been moving along with remarkable celerity for say ever since 1897, when the present government came into power, and attributes all the good things that have occurred everywhere, particularly in Canada, to the divine and benign sway instituted by the said government.

If the facts which The Globe gathers from the census bulletins were verified, however, it would have found out, as Tennyson puts it, that "a lie that is all a lie may be met and fought with outright; but a lie that is half a truth is a harder matter to fight." Of course the expenditure of hundreds of millions of dollars on railroads, canals, public buildings, and public works of various kinds, calls for activity in all directions, and it would be surprising if some of our manufacturing industries were not sharers in the exhiliration. Canada, indeed, has always possessed the elements of abundant success in natural wealth, productive soil, and in active, enterprising, intelligent, industrious people, but it is remarkable that these valuable qualifications were never developed and brought into activity until Sir Wilfrid Laurier discovered that Canada was a nation. In the opinion of many, Sir Wilfrid has had no more to do with the prosperity of Canada than the fly on the wheel so often alluded to by another Canadian statesman.

As far as the government has been able to do so, and as The Globe always advises, the policy of "free trade as it exists in England" has been applied in Canada ; and although the census bulletins show larger increase in value of Canadian manufacturing industries in the last few years, it is a fact that can be proven by the bulletins that in the five years—1900-1905—one third of these industries in the latter year gave employment to more than 28,000 fewer Canadian work people than in 1900: and that of all the manufacturing centers in Canada, enumerated in the census bulletins, in one fifth of them the value of their manufactured products in 1905 was

actually less than five years before; and yet The Globe says that Canadian industry has reached full manhood, and is equipped for the battle of life. How does The Globe explain the anomaly?

"It is impossible to say," says The Globe, "how far the development of the past few years is due to the relief afforded by the British preference and the general revision in which the extreme obstructive features of the National Policy were eliminated." Admitting that it is no relief to be in debt: that if one is in debt it is better that it be owed at home than abroad; that it is better to sell out surplus products at home than abroad; that the home market should be cultivated as much as possible, and that we should not go abroad for things that can be made in Canada, just as good and just as cheap, we show to The Globe that during the five years included in the census bulletin the value of goods dutiable entered for consumption and the duty paid thereon, and the value of domestic goods exported were as follows:—

| Year. | Duitable Imports. | Duty Paid. | Domestic Exports |
|---|---|---|---|
| 1901..... | $115,574,658 | $29,106,979 | $177,431,386 |
| 1902..... | 127,955,254 | 32,425,532 | 196,019,763 |
| 1903..... | 143,839,632 | 37,110,354 | 214,401,674 |
| 1904..... | 156,108,453 | 40,954,349 | 198,414,439 |
| 1905..... | 157,164,975 | 42,024,339 | 190,854,946 |
| | $700,642,972 | $181,621,553 | $977,122,208 |

| | |
|---|---|
| Value of free goods entered in same year. | $432,295,848 |
| Value of dutiable goods..... | 700,642,972 |
| Duty paid..... | 181,621,553 |
| Total cost of imports..... | $1,314,560,373 |
| Value of exports..... | 977,122,208 |
| Adverse balance 5 years..... | $337,438,165 |
| Adverse balance per year..... | 67,487,633 |

The Globe says that the peculiar showing indicates a "phenomenal success" of the country and is "not the result of unhealthy forcing." During the same five years included in the census bulletin, Canada imported foreign merchandise that cost $1,314,560,373, and the value of all the merchandise of home production that she had to export with which to pay the foreigner was $977,122,208, an average of $67,487,633 per year. Where is the money to come from?

## PROTECTION IN AUSTRALIA.

Speaking of the new Australian tariff the Toronto Globe says:

Premier Deakin, of Australia, who made, off hand, a tariff for the British Empire, has not achieved an encouraging measure of success in the far simpler task of making a tariff for the Australian Commonwealth. He apparently holds the old National Policy view that imports are bad, and that no evil results can possibly follow the taxation, restriction, or suppression of them. Convinced as he seems to be that the chief essential to Australia's success is a high tariff wall, he has built one according to specifications. There is a British preference, but the wall is so high that the slightest depressions are of little or no advantage to the British producer, and are of an equally small relief to the people of Australia. He has given every interest in Austraia "adequate" protection, which means all the protection it felt inclined to ask. But we must not laugh at Australia, because a majority in the Dominion were fooled by the same kind of lame logic for several years. . . . We can sympathize with our sister colony, for in the days of our economic innocence we blundered into a similar trap. It took us many years to extricate ourselves for those who gained, or thought they gained by the mistake organized to perpetuate it. Australia may have a similar experience, and may learn in the most costly school that fiscal blunders are much more easily made than rectified. When the prosperity the tariff is expected to create fails to appear, the Australians may make the mistake of raising the duties higher and higher. But some day they will learn their lesson as we did, and then they will begin to recover from the effects of their mistake.

Such is the sophistry The Globe dishes out, hoping that the people of Canada will accept it as wisdom. At the Imperial conference in London last summer, Premier Deakin, after much study thought out a scheme looking to the better solidifying of the Empire, the main feature of which was inter-Imperial preferential trade. In the opinion of many of the representatives from different parts of the Empire the scheme was entirely feasible, but Mr. Campbell Bannerman, the British Premier, would not listen to it, and insultingly rejected it. Mr. Deakin's proposition was in the interest of a United Em-Empire, all parts of which which are now self-governing, with the exception of Great Britain, have and practise protection, and his scheme was to create a fiscal policy that would make a harmonious and solid whole as applied to the empire and against the rest of the world.

The rejection by Mr. Campbell-Bannerman of Mr. Deakin's scheme, while it defeated the scheme for the solidification of the empire, did not—could not quench the desire and determination of the other members of the empire to establish and maintain protection, hence the tariff as we now have it in Australia.

It is evident that Mr. Deakin holds to the old National Policy of protection to local manufacturing industries, same as we had it in Canada in the days of Sir John A. Macdonald, and all protectionists in Canada congratulate Australia and wish it every success under the regime of Mr. Deakin.

Canada in her halycon days of industrial prosperity under the National Policy, nor now as to that matter, never considered that there was anything bad about it, or that any evil could result therefrom, or that any unnecessary taxation or undue restriction of trade could possibly result from its observance. Nor has such ever been the case. Canada's National Policy resulted in the multiplication of tall factory chimneys throughout the land, and in giving profitable employment to her artisans and workmen in the production of necessaries that otherwise would have been produced in other countries, giving similar employment there. Under the National Policy Canada built railroads, dug and deepened and improved canals, erected public buildings in every part of the country and lifted itself from almost obscurity to the high elevation it now holds. No wonder that Mr. Deakin, seeing that the chief element to Canada's success

was a high tariff, has constructed a similar one for his country.

The Globe says that "in the Australia tariff there is a British preference, but the wall is so high that the slightest depressions are of little or no advantage to the British producers." Why should there be? Why should Mr. Deakin include in his tariff any concessions to British producers that are not shown to the producers of Canada or of any other country? Mr. Deakin's tariff was made to benefit Australia. It's rates are placed at just the height he thinks will benefit the people of his country, and he is wise in ignoring the wishes of other people in the matter. He don't have to. It is no unkind or unfriendly act to ignore them. No other self-respecting country does. He says to the world, "if you want to sell your products in Australia—there is the base you have to consider." If the United States, or Germany, or France or any other country wish to sell goods in Australia, they all have to consider the terms of the Australian law—and every important country on the earth trades largely with Australia. But The Globe complains that the preference that Australia actually shows to Great Britain "is of no advantage to British producers." Is it a fact, as The Globe seems to intimate, that British producers are entirely unable to compete in any of the markets of the world on equal terms with the United States, Germany, France and other countries? But such seems to be the fact.

It is a thing that no fellow has yet found out why The Globe is so solicitious for the world-wide establishment of free trade. Absolutely no commercial country in the world practices free trade—not even Great Britain. According to The Globe's free trade idea, Ireland should be even more prosperous than Britain. It is a large and fertile island. It has large and safe harbors, noble rivers and unbounded water powers. Her poor, when employed and properly fed, are the most able-bodied and laborious of mankind. Ireland has had perfect free trade for many years with the greatest and richest nation on earth. but what is Ireland's condition to-day? Who and what is responsible for it? What has free trade done for the manufacturing industries of Ireland? For a century Ireland has had perfect free trade with Britain, with which steamboats and railroads now most closely connect her. We ask The Globe what has free trade done for Ireland? For many years Ireland's manufactures were systematically discouraged, while England's were at the same time protected and cherished. British colonies, and even England and Scotland were protected against Irish manufactures. "Ireland," said Dean Swift, "is the only kingdom I ever heard or read of which was denied the liberty of exporting their native commodities and manufactures wherever they pleased, except the countries at war with their own prince or state; yet this privilege, by the superiority of mere power, is refused to us in the most momentous parts of commerce." In his writings Swift bewails in a hundred places the importation of English manufactures, and the consequent absence of Irish ones, as "the plague and curse of Ireland." Ireland is an integral part of the British kingdom, but the old injustice is perpetuated. She does not, even at this time, to any great extent, make the thousands of things her necessity calls for, for it is cheaper to buy them from England, ready made. Because of her oppression she does not love her oppressor. Because of her poverty she suffers, and so she will continue in her raggedness and wretchedness.

The thinking men of Canada, Australia and other countries know what protection has done for England, and they know what free trade has done for Ireland. "Imperial unity" is a pleasant phrase, but fiscal independence is a sweeter and more enduring one, and Mr. Deakin has chosen that good part for his country that shall not be taken from it.

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### CANADA BUYING DIAMOMDS ON CREDIT.

Canada is now passing through a very tight money experience, that condition being the dominating influence in trade. Stringency has existed for many months, due no doubt to the great development of the country, particularly the West, which has been progressing at a most remarkable rate for the past five years. Expenditures of money attendant upon the building of railroads and the opening up of new country, together with the demands made by the natural business expansion, have been enormous; the moving of the crops, both of last year and this, has proved a serious problem; and there has been much speculation in land, all of which makes it certain that an easy money market will not be a prevalent condition for some time to come. Industrial activity has followed the general prosperity, and manufacturers in many branches of trade find difficulty in taking care of the business in hand or in immediate prospect. Labor is more or less scarce, and is well paid. The question is "Is the situation a desirable one? Who is responsible for it?"

A statement given out by the Finance Department at Ottawa shows that the total gross debt of the Dominion as of July 1, 1907, to be $380,652,856, and the total assets to be $127,650,989, leaving a total net debt to be $253,001,867. This large amount due abroad must be paid out of the earnings of the people, and the indebtedness is accumulating much faster than the value of the products of the country shipped abroad with which the debt is to be paid. Where is the money to come from with which this vast debt is to be paid?

A poet has said—

> He who builds without the means to pay,
> Provides a home from which to run away.

Of course it is desirable to have railroads, canals, public buildings, etc., but it is not good management to go far beyond our means in building them; and Canada has gone and is going to extremes of expense not at all justified by her present or prospective income.

It is the pride and boast of the government that Canada is a nation, and therefore she is justified in going to any expense to prove that fact, and expansion of foreign trade is considered the correct way of proving it. The idea seems to be that our necessities must be procured abroad instead of at home, and therefore the duties

upon foreign goods are put at such low rates that Canadian manufacturers, who are compelled to pay dearly for labor as well as for raw materials, find themselves unable to successfully compete with foreign manufacturers who have the advantage of much cheaper labor and materials. In 1906 the value of the imports of merchandise into Canada exceeded the exports by $76,710,048, and the question is, How is it to be paid? The money to pay for what we buy abroad comes from what we sell abroad.

In recent issues of this journal has been published copious extracts from bulletins being sent out by the Dominion Census Bureau, having reference to the manufacturing industries of Canada; and at the recent convention of the Canadian Manufacturers' Association Mr. Archibald Blue, chief officer of the Bureau, delivered an address showing that "The Twentieth Century Belongs to Canada" in which he compared the industrial and manufacturing conditions of the country as they existed at the beginning of the century with what they were five years later. He repeated many of the facts produced in the bulletins issued by his Bureau and reproduced in these pages, but not all of them. In one bulletin was given the names of over 200 different industries, a comparison being made of the conditions prevailing in 1900 and in 1905; but Mr. Blue did not point out that of the different industries enumerated, one item showed a decline in the number of wage earners employed in them amounting to 28,031 persons. In 1900 there were 190,174 employes in those industries, and in 1905 there were but 162,143. According to the bulletins there were in 1905 47,452 more wage earners than in 1900, a general gain of 47,452 employes, but neither Mr. Blue nor his bulletin mentioned the fact that in certain industries there was a loss of 28,031.

Another bulletin made reference to the value of the manufactured products of 211 Canadian cities and towns having a population of 1,500 and over in 1900, this comparison being with 1905; but no attention was called to the fact that according to the bulletin, out of the 211 towns named, 41 showed a decrease in value of manufactures produced. Those losing centres of Twentieth Century industry constitute about 20 per cent. of the industrial centres enumerated.

A loss of employment of 28,031 Canadian workmen is one item of the enumerated industries of the country; and a less production in 1905 than in 1900 in one fifth of the industrial cities and towns in Canada in the same years are circumstances that afford no cause of hilarity, and no congratulations to those who administer the financial policy of Canada.

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The manufacturers demand a tariff high enough to keep out the yankees. The employees are moving the courts to keep the manufacturers from bringing in the Yankees.—The Globe.

Canadian manufacturers demand and must have a tariff high enough to keep out foreign goods such as can be produced at home even if it must be as high as Haman's gallows; and to enable them to produce the goods to the best advantage, restrictions upon the introduction of skilled labor must be removed.

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## THE IMPORTANCE OF CREDITS AND COLLECTIONS.

It is in periods like the present that the average business man gives to the financing of his business the attention it deserves, the reason generally being that the trouble of making collections forces his personal attention to this department.

The following articles from one of the oldest firms in the leather business in Canada are therefore timely as well as of great importance. They contain hard, sound common sense, which many business men would do well to give heed to, if they would avoid some of the most serious pitfalls in business:

### THE DISPENSING OF CREDIT.

From a manufacturers' standpoint the buying of the raw material, at the lowest possible price, the manipulation and the care required to bring the manufactured article to a state of perfection and the selling of it at a living profit, are all main factors in the conduct of a large business, but the care required, in the dispensing of credit, and the collection of accounts is a most highly important matter which many principals do not, but should give more personal care to.

### WHEN CREDIT BECOMES A LOAN.

Did it ever occur to some that every merchant who sells upon credit, is a partner with the buyer to the amount of the sale, during the period elapsing until payment is made and as such, has a right to know the financial standing of his debtor. This partnership is rarely recognized by either party to the sale, but every man should regard a time sale as a money loan. One would not care to ask the manufacturer or jobber for a loan of money equal to the value of the bills he buys from time to time, but he does the equivalent when he asks the manufacturer to extend his credit beyond the time set for payment, for if the buyer was to go to his banker and borrow money necessary to pay for the goods, on the same time, he would not only have to pay interest but a premium besides, and if he did not meet the obligation at maturity, he would have to give some substantial proof that the account was a safe one and pay interest for the extended time.

Does the travelling salesman ever realize when accepting an order for a bill of goods, which he has sold upon credit, that he is virtually lending the customer his employer's money, equal to the value of the goods for the time that shall elapse before payment is made? And on the other hand does the buyer realize, that in asking for credit, be it only for ten days, he is asking the seller the favor of a cash loan for this period?

A realization of this actual relationship, between buyer and seller would lead to a greater self respect and firmness on the part of the seller and what is more important, fewer losses would be made. At the same time the attitude of the buyer towards the seller would be vastly improved by a recognition of this homely truth.

# A Modern Drop Forge Plant.

NEW PLANT OF CANADIAN BILLINGS & SPENCER, LIMITED, WELLAND, ONT., FIRST OF ITS KIND IN THIS COUNTRY.

Up to the present time consumers of drop forgings in Canada have been entirely dependent for their product on manufacturers in other countries, except in a few instances where work of this kind was done for their own requirements. Many who recall, with feelings none too pleasant, vexatious delays in securing proper drop forgings, and in some instances failure to have orders filled, owing to the great home demand, particularly in the United States, will receive with corresponding satisfaction the announcement that a drop forge plant, embodying the latest known features in this line, has been established in Canada and is now in running order.

About eighteen months ago negotiations in this direction were commenced, resulting in the organization of Canadian Billings & Spencer, Limited, in affiliation with the Billings & Spencer Co., of Hartford, Conn.

Natural gas and electricity both play an important part in the manufacture of drop forgings in this, the first plant to be constructed in Canada solely for this purpose. All heating will be done by natural gas, both as regards fuel for the furnaces and heating the buildings. All machinery in the plant will be run by electricity.

After spending some time investigating the merits and advantages of various localities and looking into the situation thoroughly, it was decided to locate in Welland, Ont., for three reasons: First, the availability of cheap electrical energy, which is obtained from the Ontario Power Co., at Niagara Falls, whose power house is situated at the foot of the Canadian Horseshoe Fall, a few miles away. Second, the natural gas which can be had in abundance, being brought from the gas fields three miles from the town. Being entirely free from sulphur, it is less injurious to steel than any other heat. Third, the best possible transportation facilities, including connection with six railway trunk lines, and the advantages of direct water route afforded by the Welland Canal. These important considerations led to negotiations being opened up between the officers of Canadian Billings & Spencer, Limited, and the municipality of Welland regarding the establishment of a plant there, and culminating in an agreement between the two.

Concessions granted by the town of Welland included a free site of twelve acres of land and a fixed assessment of $5,000 for ten years.

In April work was commenced on the erection of the plant, which comprises at the present time five buildings of brick and reinforced concrete, including forge shop and shear house, machine shop, transformer house and office. On October 1 the initial order was turned out, the beginning of an output that is bound to find its way into every industrial section of the Dominion.

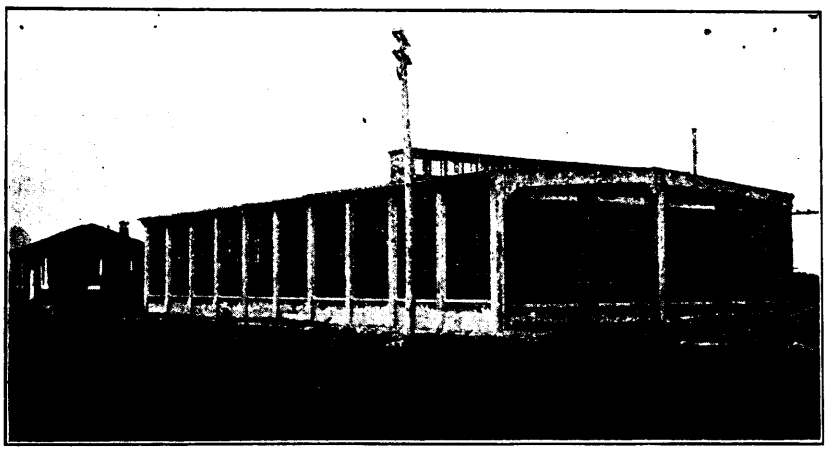

FIG. 1--PLANT OF CANADIAN BILLINGS AND SPENCER LTD—OFFICE AND MACHINE SHOP.

### CONCRETE CONSTRUCTION.

As the plant was to be modern in every respect it was decided to construct the buildings of reinforced concrete and brick. The main buildings embody the Kahn system, and have concrete roof, making them absolutely fireproof. The roof coverings are of asphalt and gravel, to make them waterproof. Forge shop is 125 by 70 feet and 30 feet high, the roof being supported by substantial columns placed on heavy foundations. To allow for future extension one end is temporary, being built of corrugated sheet iron. Along both sides is a succession of sliding doors. These doors slide upward ten feet in grooves built in the concrete columns. When these are all opened almost the entire sides for ten feet upwards are exposed to the open air. This, with the end windows, and windows in the lantern roof, provide circulation and keep the air free from fumes, smoke or gases of any kind. The windows work on pivots and are all controllable from below.

The machine shop is of similar construction, being 125 by 50 feet and 20 feet high. This building has a concrete floor well supported to carry all the machine tools required. On the sides are curtain walls 3½ feet high, and from this point to the roof the walls on the four sides are windows containing double paned glass, which facilitates heating.

The transformer house is solid brick 25 feet square. The office building is of solid brick 36 by 40 feet, one story, divided into two private offices and a main office.

### ELECTRIC OPERATION.

The transformer house contains three transformers manufactured by the Pittsburg Transformer Co., Pittsburg, Pa., which are the property of the Falls Power Co., from whom the energy is received. The electrical power brought from the transformer secondary at 220 volts, whence it is carried to the various buildings for power and lighting.

### PROCESS OF MANUFACTURE.

Raw material is brought in on the company's private siding and unloaded at the shear house, which adjoins the forge building and is 30 by 60 feet. This building contains racks for the storage of raw material, which includes all sizes and qualities of steel, iron,

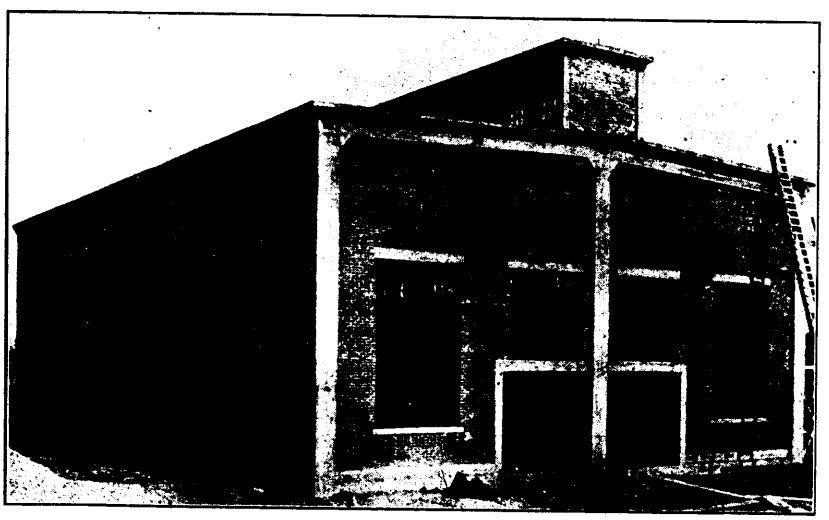

FIG. 2—PLANT OF CANADIAN BILLINGS AND SPENCER LTD—FORGING DEPARTMENT.

copper and bronze. The most notable feature of the shear house is the huge shear, weighing 65,000 pounds, manufactured by the United Engineering Foundry Co., of Pittsburg, Pa., and purchased through the Canadian Fairbanks Co. It is direct connected to a 50 h.p. Westinghouse induction motor. The knives on the shear are 24 inch, and will cut a bar of cold steel five inches square. The flywheel is 84 inches in diameter, and the main pin is of forged steel 10 inches in diameter. It occupies floor space of 8 by 18 feet. This machine is the latest type of shear manufactured. Here the steel is cut into the required lengths and passed on in tracked trucks into the forge shop.

In the forge shop are installed 17 forges, all using natural gas. Fifteen 115 feet long, 10 feet wide and 12 feet deep, and requiring in its construction 500 tons of stone alone.

Three lines of four-inch shafting are installed and all run from one 80 h.p. General Electric induction motor placed above the level of the shafting. The power is turned off or on by means of a Dodge friction clutch pulley. Canadian Fairbanks hangers are used to support the shafting and Dodge split pulleys for connection with the various machines.

This shop contains the latest process for treating steel to avoid brittle spots where the temper needs to be very even, as is the case with automobile crank shafts, etc. This is accomplished by means of natural gas, water and cold air blast.

Any forgings requiring machining are taken to the machine shop. This shop is one of the brightest in the country. It is equipped with a complement of the most modern and up-to-date machine tools obtainable. These include planers, shapers, lathes, drills, milling machines, die sinking machines, automatic grinders, etc. The machinery in this building is driven by a 25 h.p. General Electric induction motor. It is lighted by incandescent lamps and heated by a natural gas furnace.

When running its full capacity this model plant will employ one hundred and fifty men, and is destined to exert an influence on Canadian industry as well as be a boon to the manufacturing development of Welland. They will manufacture all styles and kinds of machine wrenches, crank shafts, automobile forgings, gun forgings, copper commutator segments, lathe dogs, eye bolts, turn buckles, small parts for locomotives and cars and all kinds of machinery parts, whether of steel, iron, copper or bronze. Besides controlling all their patents for Canada, the Canadian company will have the benefit of the great experience gained by the Hartford company, who were established in the year 1869, and have been possibly the most successful concern of its kind in the United States. Mr. C. G. Billings, President of the American company, is the originator of the type of drop hammer now universally used.

The officers of the company are: President, F. C. Billings, of Hartford, Conn.; Vice-President, W. H. Comstock, Brockville, Ont.; Directors, Robert Bowie and John M. Gill, of Brockville.

FIG. 3—PLANT OF CANADIAN BILLINGS AND SPENCER LTD—ONE OF THE ROWS OF DROP HAMMERS IN THE FORGING DEPARTMENT.

drop hammers, which are manufactured by The Billings & Spencer Co., Hartford, are installed, with drops ranging from 400 pounds to 2,500 pounds, enabling them to handle any size or kind of drop forging required.

The metal to be forged is heated in the furnaces to the proper heat, depending upon the material used. It is then placed underneath the hammer over the lower half of a pair of steel dies, the upper one being contained in the drop, being half of the die and containing an exact impression of one-half of the article to be forged. Thus at one blow the forging is made practically to size, requiring very little machine work to finish it. A photograph is reproduced showing one of the rows of drop hammers. These hammers are placed on a solid reinforced concrete foundation, The plant was constructed under the supervision of J. Gill Gardner, who will continue as Managing Director.

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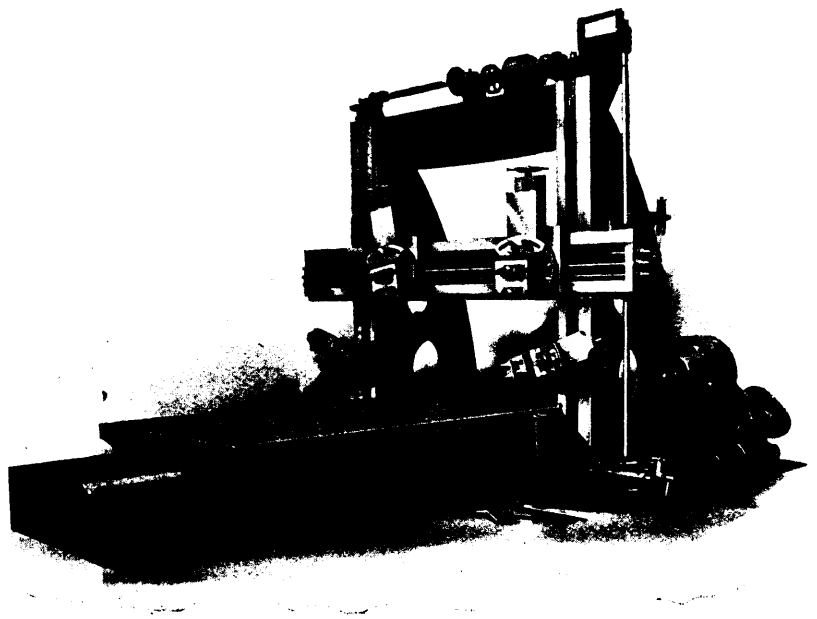
The Dominion Wire Mfg. Co., Montreal, are installing a 75,000 gallon gravity tank on steel structure with underground mains for fire protection for their premises, the work being done by the H. G. Vogel Co., Montreal. The test of a water fire curtain placed on the building of the Finley, Smith Co., 26 St. Helen St., Montreal by the H. G. Vogel Co. took place on Nov. 12, in the presence of officers of the Canadian Fire Underwriters' Association, the result being entirely successful.

## A Monster Bertram Planer.

The largest planer ever built in Canada, and the only one of its kind ever produced in this country, has recently been turned out at the works of John Bertram & Sons Co., ure all that was expected of it. A unique feature of this planer apart from its enormous dimensions is the method of drive, pneumatic friction clutches being employed Limited, Dundas, Ont. It has been installed in the Canadian Westinghous Co. for some weeks and is performing in an eminent measto operate the reverse. The capacity of the machine is 120 in. by 120 in. by 20 ft. It is driven by a 50 h.p. direct current type S Canadian Westinghouse motor. The working surface of the table is 8 ft. 8 in. by 20 ft., the top surface of which is prepared with three T slots for bolting work. It rests on one V and one flat surface each 12 in. wide. The track centres are 64 in. apart. The bed of this planer is 32 ft. long in one piece. The housings have 20 in. face and 84 in. depth where bolted to the bed. The cross rail is 30 in. deep, raised and lowered by a 7½ h.p. Westinghouse motor. It has two saddles with swivelling tool slides, having automatic and positive tool relief, each having feeds independent of the other. They also have power traverse by separate 3 h.p. Westinghouse motors attached directly to the cross rail and in gauging the feed screw and rod. Each housing is fitted with a side head having hand and power vertical and horizontal feeds, also quick power vertical traverse by a 3 h.p. motor attached directly to the housing with side head to lower below surface of table. The table rack is a steel forging of 3 in. pitch and 15 in. space.

One of the peneumatic clutches has a constant speed return of 80 ft. per minute. The other gives cutting speeds by change gear of 25, 30, 35 and 40 ft. per minute. The dimensions of this machine, which is built on such a liberal scale are interesting. The height over all when the heads are at the highest point is 18 ft. 8 in., the surface of the table being three feet from the floor. The extreme length with table extended is 43 ft. and the width 21 ft. The machine com plete weighs 190,000 lbs., or almost 100 tons.

The cutting capacity of this machine is four cuts 1½ in. deep in cast iron with ⅛ in. feed.



THE LARGEST PLANER EVER BUILT IN CANADA—BUILT BY JOHN BERTRAM & SONS CO., DUNDAS, ONT.

## Seven Ton Auto Truck.

The modern development in city freight haulage is shown in the adoption of heavy auto trucks by large concerns having heavy haulage. The one illustrated herewith is used by Francis Hyde & Co., of Montreal, the cut showing the heavy load that may be carried by it. This firm has enjoyed a full share of the prosperity resulting from the unusual activity in the building trades during the past two years.

Founded in 1892, the business was taken over by the present management about a year ago. Apparently good results have followed the change. In cement, they have eliminated all doubtful brands previously imported, and confined their sales to International Brands, manufactured at Hull, Que, and Ironclad, made at Glens Falls, N.Y. Some of the contracts secured during the past year, were the requirements of the department of Railways and Canals, of the department of Marine and Fisheries, the requirements of the Harbor Commissioners of Montreal, and of Peter Lyall & Sons, Montreal. They also supplied 50,000 barrels of Ironclad for use on the Quebec, Montreal & Southern Railway. They are also sole agents in Canada for Lafarge non-staining cement, which is used to good advantage in the manufacture of non-staining cement stone. Several car loads of this have been sent to Winnipeg for distribution in the West.

Francis Hyde & Co. also lay claim to being among the leading fire brick houses of Canada, not only as regards quantity, but also in quality. They are Canadian agents of the Harbison-Walker Refractories Co., of Pittsburg, whose output of 7,500,000 bricks per day places them in the foremost ranks of fire brick manufacturers. As heretofore, the Kirkwood fire brick will continue to be their leader in the Scotch brands, where a medium priced brick is required. They have a brick for each special purpose, and no one brick is sold with the recommendation that it is suitable for all purposes.

The cut shown is that of a seven ton auto truck of 45 h.p., which is used by the firm in connection with their teams, for delivering their goods.

Mr. W. J. King, the present manager, has formerly occupied the positions of general storekeeper of the Dominion Iron & Steel Co., and superintendent of the American Abbatoir Co.


SEVEN TON AUTO TRUCK USED BY F. HYDE & CO., MONTREAL.

### WOMEN AS ENGINEERS—NEVER.

"No, ladies will never become great engineers," firmly remarked the engineer of a steamboat to one of the passengers of the male persuasion. "Once," he went on, "a lady engaged me in conversation; she asked me a marvelous lot of questions, and as she was nice looking and very pleasant I answered as many as my poor, weak brain could grasp. Then I opened up and told her just where the steam entered the engines through the stop-valve, went through the cylinders, how it escaped, and how it was that the pressure on the piston was conveyed to the crank-shaft which turned the wheels that propelled the ship through the water. She listened intently to it all, and when I had concluded she turned to me with a beaming face and said: 'Now, what is the object of the boiler?' "

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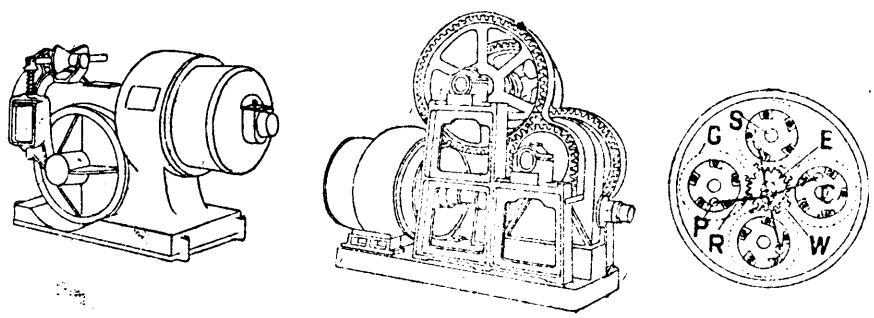
The assets of the Quebec Spice Mills Co., Quebec city, are to be sold on the 20th inst.

# Modern Methods of Driving Machinery.

## The Mechanism of Power Transmission from Electric Motors

By Wilfrid L. Spence, A.M.Inst.C.E., M.I.Mech.E.*

Much has been written about the geometry of worm gearing, but very little indeed that is helpful in determining actual dimensions for any given duty. Probably more worm gears are used for electric lifts and hoists than for any other single purpose, an application to which they are particularly well suited on account of compactness and noiseless operation; in many situations, too, the right angle transmission lends itself to a more favorable general arrangement than either the straight line or parallel shaft one. Fig. 1 (Laurence Scott), than which it would be almost impossible to conceive a more compact and purposeful disposition of motor and worm gear, or one more completely accessible, is an example of special motor construction which is justified only by a large output of duplicates, and by the saving of material over the corresponding arrangement with standard motor and standard worm gear.




Gearing for Electric Drive.

Beyond considerations of space and silent running, however, the idea that worm gear is self-sustaining is at the root of its almost universal adoption for electric lifts. With this object it is, in most cases, made in a thoroughly inefficient form, a single thread worm of relatively large diameter meshing not infrequently with a cast-iron wheel. When so made, and while new, it is self-sustaining, but so soon as the wheel has come to a good surface it loses this power and will quite generally run back. Depending on internal losses to facilitate stopping, the gear is accompanied by inadequate brakes, and as time goes on it becomes increasingly difficult to stop exactly at the floor levels. All this, in the author's opinion, is wrong. The gear should be regarded as a power transmitting mechanism, being made as efficient as possible for that purpose alone, and entirely independent brakes, adequate for their own purpose, with appropriate safety devices, should be the security for satisfactory performance and for the prevention of accidents.

Apart from the electric lifts, about which there may be difference of opinion, all other worm gears should certainly be as efficient as possible. Contributing to high efficiency are—multiple thread worm of high angle (small pitch diameter in relation to lead) steel worm hardened and ground, ball thrust bearing, phosphor bronze wheel rim running in an oil bath, and self-lubricating worm wheel shaft bearings. All these features are embodied in the gear shown by Fig. 2 (the author), which is a combination of variable speed motor, worm gear and alternative spur gears for a special purpose, of which nine were installed originally and six subsequently, so they may be considered to have been successful. Seeing that specific data of worm gears in constant (i.e., non-intermittent) use are not very plentiful, they are given for this mechanism as follows:—

Motor: 23-h.p. at 215-r.p.m. to 28-h.p. at 860-r.p.m.

Worm: triple thread, 1¼ in. pitch, 3¾ in. lead, 3¾ in. pitch diameter.

Wheel: phosphor bronze, 58 teeth, 1¼ in. pitch, 3½ in. face, 23 in. pitch diameter.

Another constant service gear (in use for nearly ten years) of which the author has data is:—

Motor: 14-h.p. 700 r.p.m.

Worm: double thread, 1⅛ in. pitch, 2¼ in. lead, 2¾ in. pitch diameter.

Wheel: phosphor bronze, 78 teeth, 1⅛ in. pitch, 2½ in face, 28 in. pitch diameter.

The designer of worm gears will find that in each of these successful examples the worm is of substantially smaller dimensions than are currently supposed to be necessary, the actual end thrust being more than double the Bruce rating, even for 100 deg. F rise, with a soft steel worm.

The views of three prominent makers of worm gear, each quoting a 30-h.p. transmission (10 per cent. occasional overload), reducing from 800 to 31-r.p.m., are shown below:—

| | A. | B. | C. |
|---|---|---|---|
| Worm; double thread hardened and polished. | 2 in. pitch<br>4 in. lead<br>4½ in. pitch diameter | 1¾ in. pitch<br>3½ in. lead<br>— | 1¾ in. pitch.<br>3½ in. lead.<br>— |
| Wheel; phosphor bronze rim, cast iron centre. | 51 teeth<br>4½ in. face<br>32¼ in. pitch diameter | 50 teeth<br>—<br>28 in. pitch diameter. | 49 teeth.<br>—<br>27⅜ in. pitch. diameter. |
| Price, complete | £200 | £42 | £37. |

The author's specification for the same would be:—Worm: triple thread, 1⅜ in. pitch, 4⅛ in. lead, 4 in. pitch diameter. Wheel: phosphor bronze, 77 teeth, 1⅜ in. pitch, 3½ in. face, 33.7 in. pitch diameter; and a fair price would be, say, £55.

It will thus be seen that for a moderate reduction (25.8 to 1) good worm gear is less expensive than any of the planetary (or proprietary) gears for the same duty.

### Variable Speed Drives.

In the great majority of cases, the requirements of the variable speed can be satisfactorily met, without extravagant capital outlay, by a 3 to 1 speed range compensated direct-current shunt motor, with or without additional change gearing. (There are other efficient electrical methods of obtaining variable speed with direct-current motors, but these do not fall within the scope of the present paper.) On a poly-phase supply there is no efficient method of obtaining a continuous variation of motor speed, and all changes must be mechanically provided.

There is on the market, but not yet in extensive use, a very interesting, true variable speed gear. The interest arises from two causes; it is, so far as the author knows, the only positive variable speed gear in existence, and it is on exactly the lines that everyone first sketches out and then abandons as hopeless for the purpose.

The principle of the Newman gear is shown diagrammatically by Fig. 3 (Johnson and Phillips). On the end of the constant speed driving shaft a variable-throw eccentric of path E is fixed. This is not attached to, and is not in the same plane as, the driven wheel W. Connected to the variable eccentric E, are four arms or rods R, driving on to pins P, in the silent roller clutches C. Each of the four clutches oscillates on a stud S, fixed in the casing, and is surrounded by a gear wheel G. The four gears mesh with the common driven wheel W, fixed on the variable speed shaft. The action will be perfectly apparent, and it need only be mentioned that before one clutch has released, the next clutch has taken up the driving, and therefore the motion of the variable speed shaft is continuous. The ratio of reduction is from infinity downwards, i.e., with constant speed on the primary shafts, the secondary one may be stopped altogether, or run at any speed up to the highest, which is usually about one-third or one-fourth of the constant speed.

This device has been running for a long time on the inventor's motor car, and for shorter periods on other applications, one being of 50-h.p. capacity. If it will stand constant use, it should prove of very considerable service.

### Motor Location.

The motor should be placed well above the floor level, so as to be inspected and cleaned easily, without crawling or lying down; it is a less serious fault to be too high than too low. On the other hand, the height above the base should not be such as to induce vibration. All good motor armatures are symmetrically built, except as regards keying details; most are in fair

*Paper read before the Institution of Engineers and Shipbuilders in Scotland.

static balance, but no standard motors are dynamically balanced, hence only slow-speed machines are safe high up. Generally, motors should not be placed on top of any machine or tool unless it is rooted, so to speak, to the ground. If the machine stands on a stool or cabinet pedestal, it is not a good subject for a motor so placed. The motor should not take up, or prevent from being otherwise used, more floor space than its own area. All standard motors may equally well be fixed to a horizontal, inclined, or vertical surface, the inverted position (ceiling) is not a particularly good one.

### Direct-Coupled Drives.

Direct-coupled drives are to be preferred to all others whenever practicable. They frequently involve a somewhat more costly motor, occasionally a less costly one; but, always economizing in current consumption, their adoption becomes more advantageous as the period of operation is lengthened. Imperfection of alignment is not a bar to direct connection. There are flexible couplings admitting of slight deflection from the straight line, and others suitable for coupling non-intersecting shafts separated by a short and variable distance between centre lines.

### Belt Drives.

Apart from their general application, which need not be discussed, belt drives are to be preferred to any form of strictly positive connection between constant speed motors and fly wheel operated machinery. A belt drive should not be accepted, as the transmission from an electric motor, on any new tool of the heavy manufactureing (as distinguished from the jobbing) class.

### Flywheel Drives.

A fly-wheel is quite useless with a constant speed motor positively connected to its load. Its utility can be partially restored by a flexible (spring-cushioned) coupling between the motor and the consuming device. Where the full advantage of a fly-wheel is desired, the motor should have the speed characteristics of an over-compounded direct-current machine, the speed falling, say 25 per cent. between no load and full load.

### Single Reduction Spur Gear Drives.

Single reduction spur gear (raw hide pinion and cast-iron wheel), admitting of the use of normal speed motors, and regularly purchasable with the motor, is to be regarded as the standard gear transmission for ratios up to 5 or 6, and, in extreme cases, with specially heavy steel patterns, 7 to 1.

### Idler Spur Gear Drives.

The idler gear (cast-iron pinion, raw hide idler and cast-iron wheel), is a substitute for plain S.R. gear when the distance between centres is too great for the latter. With a steel pinion it may be used for ratios up to 9 to 1. The idler spur transmission is to be preferred to a chain drive (unless with spring wheel), if the load is highly irregular.

### Chain Drives.

Chain gear is ordinarily applicable under the same conditions as the last named, but only for ratios up to 5 or 6 to 1. In addition, the silent chain is advantageously employed—(a) where the distance between centres is less than, or may be reduced below, that necessary for spur gear; and (b) where sufficiently large pulleys cannot be used for belt driving. The chain speed should not exceed 1,200 feet per minute.

### Double Reduction Spur Gear Drives.

For ratios up to about 30 to 1, and where space is not of much account, double reduction spur gear is applicable. Where space is limited, the special straight line form is appropriate.

### Treble Reduction Spur Gear Drives.

As treble reduction spur gear necessarily takes up much space, and is costly, it should never be decided upon without at least considering possible alternatives. It is applicable for reductions between, say, 40 and 150 to 1.

### Planetary Gear Drives.

Where extreme compactness with total enclosure of the mechanism is desirable one or other of the planetary gears may be used; simple for reductions up to 20 to 1, and compound for very high reductions.

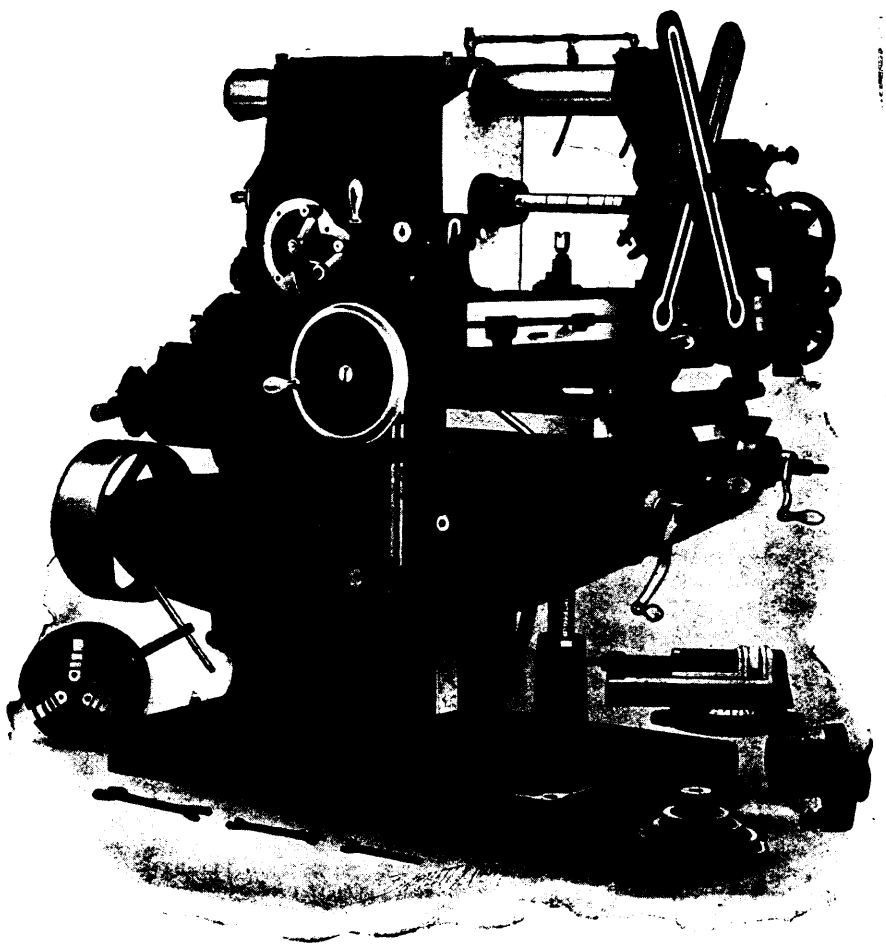
### Worm Gear Drives.

Where silent running free from vibration is desired, where total enclosure is an advantage, and where a right angle transmission is permissable, there is nothing to equal worm gear. The efficiency for moderate reductions may be high, and the cost lower than that of special gears. Worm gear should not ordinarily be employed for reductions less than 10 or 12 to 1. At 15 or 20 to 1 it shows to best advantage in respect of combined efficiency and dimensions or cost; above 25 or 30 to 1, either efficiency or cost must be sacrificed in comparison with other transmissions.

## The Universal Milling Machine.

The accompanying cuts represent a Kearney & Trecker No. 2 B. Universal milling machine, now being placed on the Canadian market, by the A. R. Williams Machinery Co., Toronto. This machine has been designed so that the power comes through a belt direct from the line shaft pulley, no countershaft being used. This is one of the new features of the machine and makes it possible to get the machine in operation quickly and does away with trouble incident to friction pulleys and elaborate overhead works.

When motor drive is wanted it is substituted in place of the pulley bracket and forms a harmonious design. It is possible to make the change at any time.



No. 2 B Universal Milling Machine.

The speed changes are obtainable entirely by gearing that is enclosed within the frame of the machine which is made oil tight, the bottom forming a reservoir for machine oil that is pumped to the top and distributed to all gears and bearings in such a way as to keep them flooded with oil. This pump is of simple, spur-gear construction and not likely to get out of order by accident or wear as it pumps only clean oil. Running as it does at a constant speed it supplies a uniform quantity of oil at all times, which is directed by suitable channels in the frame of the machine to the places where it is needed.

Automatic cross, vertical and table feed is regularly supplied on all machines, whether ordered or not, and fixed stops are provided at the end of the stroke on all feeds to prevent

accident. Adjustable stops are also supplied to rip the eed at any point desired. The fixed stops are intended to be immovable, so that the operator cannot accidentally omit them. No two feeds can be engaged at the same time.

The Universal Milling machine for tool room work is quite largely employed in milling steel and a large percentage of this is tool steel. The supplying of a sufficient quantity of lard oil or other cutting lubricant to keep the cutters cool is of the greatest importance and increases immensely the output of the milling machine. For this reason all machines, whether ordered or not, are fitted with pump rather than wait for it to be specially ordered.

The feed is driven by a constant speed shaft and is independent of the spindle speeds. The feed can be manipulated in combination with the spindle speeds to fractional degree. Vertical spindle and automatic rotary table can be furnished if desired.

The cut with rotary table shows how you may use this milling machine for the same purpose or which you use a large gear cutter. Index rotary table is made of ample strength so that gears of large diameter and large pitch can be cut to advantage. The indexing plate interchanges with the dividing centres. Accurate divisions can be made to one minute of arc. Rotary table has power feed for circular milling, and in connection with the vertical spindle attachment furnishes all the conveniences that can be found in a first class vertical spindle milling machine.

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The Lakefield Portland Cement Co. expect to have their new plant at Point aux Trembles, Que., in operation within a month.

# Wood-Working Machinery Plant Nearing Completion.

Berlin Machine Works, Limited, of Hamilton, Ontario, who broke ground for their new plant, the largest devoted to the manufacture of wood-working machinery, will have the buildings now under course of construction, completed and occupied by November 30, and by January 1st a force of 150 men will be at work.

The company purchased twenty acres of land lying at the intersection of the Grand Trunk main line to Buffalo and the T.H. & B. railway tracks, and have constructed 1¼ miles of their own tracks, giving them connection with every railroad in Canada.

The plant, which at present includes machine shop, foundry and power house, has been constructed under the supervision of Mr. G. W. Robinson, secretary and resident manager. It will be run by electricity, motor drive being employed, and lighted by Cooper-Hewitt and Nernst lamps, while natural gas will be used for babbiting and tempering furnaces.

Berlin machine Works, Limited, will manufacture a complete line of sizers, planers, matchers, surfacers, moulders, stickers, band re-saws, saws and sanders.

The machine shop is of brick and steel on concrete foundations, 308x200, with saw-tooth roof construction, The machinery will be driven by electric power in sections. It contains a gallery 200x48 feet, used exclusively for a tool room. Orders have been placed for over 70 machine tools which will be run by motors of Westinghouse type from 5 to 75 h.p. capacity. Two Pawling & Harnischfeger 10 ton electric travelling cranes are being installed. This building alone will employ 500 men without further additions.

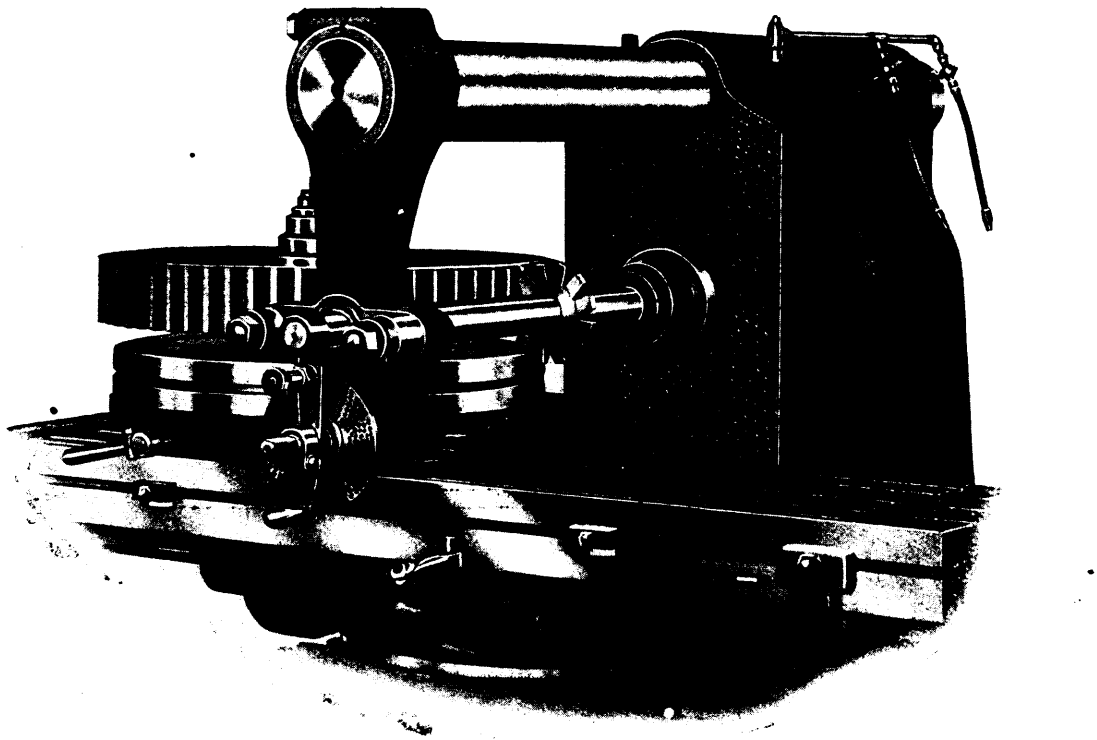
The foundry is 200x72 feet, of the same construction as the machine shop and has a capacity of 30 tons and upwards per day. A gallery of reinforced concrete with a carrying capacity of 500 pounds per square foot is situated along back of the cupolas for the purpose of storing sand and coke. The Kahn system of reinforced concrete is used in this construction.

Castings for all machines manufactured in the plant will be made here from the smallest to the largest. The foundry is equipped with Whiting and Newton cupolas and Roots blowers. The Sly system of tumbling barrels and dust collector and a Pawling & Harnischfeger 15 ton electric travelling crane. The building is also equipped with about twenty independent jib cranes for the purpose of handling small work and the setting of cores, etc. About 150 men will be employed in this building.

The power house is 90x50 feet, of brick and steel construction and will contain the steam heating plant, Westinghouse motor generators, Cataract Power transformers and Curtis air compressor. The Weber Steel Concrete Chimney Co. are erecting a concrete stack 116 feet in height.

Plans for pattern storage, pattern shop and chemical laboratory have been completed and work on these buildings will start in the early spring.

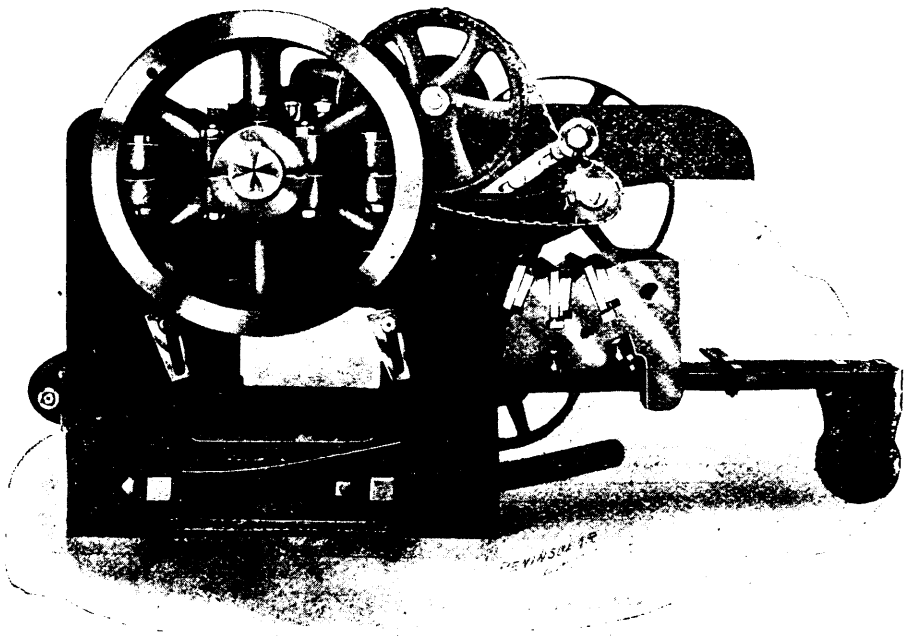
Their present address is 402 Bank of Hamilton Building.



UNIVERSAL MILLING MACHINE CUTTING LARGE GEAR.

### THE NEW "GIANT" PAPER CUTTER.

A new line of cutters for rags and other paper and glue stock, rubber scrap, etc., called the "Giant" cutter, is being placed on the Canadian market by the Waterous Engine Co., Brantford, Ont. The illustration shows the "Giant" triplex cutter, No. 11. This machine has bed and base in one very heavy casting ensuring strength and solidity.



THE "GIANT" TRIPLEX PAPER CUTTER.

The shaft is of the best hammered steel. The cylinder, also of steel, is fitted with three 17½ inch revolving knives secured in place by wedge bolts. The cradle holding the three lower bed knives, while very strong, is easily rolled out for changing knives, as shown in illustration. When in position for work it is substantially and firmly held against the under side of the bed.

An excellent feature is the construction providing against a large piece of iron or other hard material getting into the cutter. If this happens the cradle is released and dropped by the breaking of two cheap castings.

This cutter weighs about four tons, is of from 16 to 20 h.p. and a capacity of about 3,300 lbs. per hour. It occupies 74x70 inches floor space.

Other sizes from 12 inch knives up are also being put on the market by the Waterous Engine Co.

### WATCH WELLAND GROW.

The advertising committee of the Board of Trade, Welland, Canada, have published a brochure, dealing with the advantages of Welland as a manufacturing centre, that is a credit to the compiler, the publisher and to the town itself. The attractive cover design contains the heading "Watch Welland Grow," which is the slogan of its enterprising Board of Trade and public spirited citizens, and a foot title "A Little Book About the Best Town in Canada for Manufacturers." It describes the wonderful growth of Welland during the past year with an increase in population of 70 per cent. and in assessment of 90 per cent., a truly remarkable showing. The explanation given for this is that Welland has the cheapest transportation, the cheapest natural gas, the cheapest electrical power and the best sites and land values. Some of the new industries are illustrated showing them to be of the most modern design. A map giving the location of the town and its railway connections is included together with a table showing costs, compiled by an American, important to manufacturers such as electric power, gas, transportation, taxes, etc., in Welland and other Canadian inustrial centres all of which are advantageous to Welland. This booklet is one of the most attractive pieces of municipal literature yet issued by a Canadian municipality.

## Hamilton Steel and Iron Furnace Blown In.

The new furnace of the Hamilton Steel & Iron Co.'s plant is now in full operation. The fires were lighted under it at 10.45 Friday night and the first iron was run off Saturday night. To-day the furnace is on its regular run and is working satisfactorily. New furnaces do not always work well at first and it is not infrequent that the first new lots of iron are lost. The management of the local concern is therefore much elated over the success.

COST OVER HALF A MILLION.

The new furnace was installed at a cost of something more than half a million dollars and more than doubles the Hamilton Steel & Iron Co.'s capacity for turning out iron. The old furnace has a capacity of 200 tons of foundry iron a day, while the capacity of the new one is 300 to s of foundry iron or 400 tons of basic iron, used in the manufacture of steel. The total capacity of the plant own is 500 tons of foundry iron per day. The increased production of pig iron means that the company will be able to turn out much more steel than in the past should there be a demand for it, and it will be able to keep its steel plant working to capacity.

MORE MEN EMPLOYED.

The location of the second furnace here will be a good thing for Hamilton, for it will mean the employment of a large number of additional men. Although the furnace is equipped with all sorts of modern labor saving devices for handling ore, pig iron, etc., there are now employed at the works about 100 extra men. Not so many will be required when everything gets running smoothly, but the force will be much larger than it was before. —Hamilton Spectator.

### TEN YEARS STEADY GROWTH.

The development of the metal working trades in Canada is shown in many ways. One of the proofs is the rapid building up of wide reaching business by several enterprising manufacturers' agents, who cater to this line.

In ten years, Mr. Alex. Gibb, St. John Street, Montreal, has established one of the strongest connections of this kind in Canada.

About twenty-five years ago Mr. Gibb came to Montreal from Scotland, and, after working for a short time with the Grand Trunk Railway, became secretary to Mr.

MR. ALEXANDER GIBB, MONTREAL.

James Crathern, wholesale hardware merchant, Montreal.

In the fifteen years he was in this position he built up such an excellent connection that when the Gilbertson Galvanized Sheet Co., of Wales, sought a Canadian agent ten years ago, he secured the agency. This, with minor agencies, sufficed for a start. Since, he has added several popular lines, including that of J. Beardshaw & Son, Limited, of Sheffield, tool steels and high speed drills, and the Standard Chain Co., Pittsburg, who are now erecting a plant in Sarnia, with Mr. Gibb as vice-president of the Canadian company, also the Meaford Wheelbarrow Co., of which he is director.

The secret of Mr. Gibb's success in building up such a splendid business and success lies largely in his keen study of conditions in the hardware trade, his untiring energy and aggressive sales method and the reputation he has won for "straight" business methods.

# The Convention at Ottawa

THE CANADIAN CLAY PRODUCTS MANUFACTURERS' CONVENTION LIKELY TO BE A BIG SUCCESS.

From present indications the sixth annual convention of the Canadian Clay Products Manufacturers, in Goldsmiths Hall, 115 Sparks Street, Ottawa, on the 19th, 20th, and 21st inst. will be the most important gathering of the kind yet held in Canada.

In the first place a warm welcome is assured visiting delegates. A reception committee has been organized at Ottawa, a member of which will be on duty at each of the following hotels: the Russell, the Grand Union, the Windsor and the Brunswick. Arrangements have been made to supply delegates and visitors with tickets for the galleries for both houses of Parliament. The reception committee have other plans of entertainment, also, for they suggest to every clay-worker that he come early and

JOHN C. MILLER
President C.C.P.M.A.

register and receive his badge, tickets to the theatre, tickets to the house of Parliament, invitations to the banquet and other entertainments, which the people of Ottawa at large, and the brick makers of the city are providing for them. A committee of ladies will be on hand to welcome the wives, sisters and daughters of the conventioners, and we are assured that they will be thoroughly looked after by the committee appointed for the purpose.

The convention program is sufficient excuse for an enterprising clay-worker to cross the continent to attend this convention. It is as follows:

TUESDAY, NOVEMBER 19.

8.30 a.m. Reception and registration, at 115 Sparks Street.

2.00 p.m. Welcome to city, by Mayor and Minister of Agriculture.

2.30 p.m. President's annual address. Reports of secretary-treasurer, and committees.

3.00 p.m. "Impressions of Brick Plants," J. J. Bell, mineralogist, University of Toronto, Toronto.

4.30 p.m. "Local Association sand Their Uses," W. H. Craig, Supply Co., of Ottawa, Limited, Ottawa.

8.00 p.m. Theatre party.

WEDNESDAY, NOVEMBER 20.

9.00 a.m. Drive around city and brick plants.

2.00 p.m. "Simple Devices for Regulating Temperature, and Their Influence on Flashed Ware," M. B. Baker, School of Mining, Kingston, Ont.

4.30 p.m. Election of officers and committees for ensuing year.

8.30 p.m. Banquet at Russell House.

THURSDAY, NOVEMBER 21.

9.00 a.m. "Control of Heat in Kilns," Ellis Lovejoy, E. M., Richardson & Lovejoy Engineering Co., Columbus, Ohio.

11.00 a.m. "Mining and Preparation of Material," John B. Miller, superintendent Don Valley Brick Works, Toronto.

2.00 p.m. "Tile Drainage and its Needs," J. H. Grisdale, B. Agr., Ottawa.

4.00 p.m. Question Drawer.

5.30 p.m. Adjournment and Auld Lang Syne.

For the convention railway rates will be the same as usual one fare and one-third on the certificate plan, within the lines controlled by the Eastern Canada Passenger Association, that is, all railways between Windsor and Fort William, Ont., in the West, and Halifax, N.S., in the East. West of these points the annual fall and winter excursions to the East will be on, and it is therefore unnecessary to make arrangements with lines covering the western country. In procuring tickets on the certificate plan, it is necessary to buy an ordinary single-fare ticket to Ottawa, taking also a standard certificate from the agent at your home. This must be left with the secretary immediately upon your arrival, to be signed and viseed by the proper parties, when it will be good for return-fare at one-third the usual rate.

The announcement of this convention sent out by President Miller and Secretary Bechtel, concludes as follows:

"Every manufacturer of clay wares, whether of brick, tile, sewer pipe, terra cotta or pottery, should attend this convention. It will pay him in dollars and cents, as no matter how familiar he is with his business, he will learn something that will save labor, decrease the cost of manufacture, or better his wares. If you are not a member of the association, come and join. The fee is only $2.00 per annum. If you are a member do not neglect to come to this convention. It is possible that the list which the secretary has, does not include the names of all of the trade, therefore if your neighbor does not receive a notice, hand him yours, and send to the secretary for another. Write to the secretary, C. H. Bechtel, Waterloo, Ont., for all points *re* the convention you are not sure on, and he will do his best to put you right."

# Mechanical Versus Hand Work.

BY W. H. ALSLIP, ALSLIP BRICK TILE & LUMBER CO., WINNIPEG, MANITOBA.

In the city of Pittsburg, sixty years ago, my father, then a boy, made a brick by hand; the only mechanical appliances, if they may be so called, were a spade, wheelbarrow, table, bow and two two-brick molds. A brief description of a gang making hand-made brick with these mechanical helps may be of interest to some of our younger brothers who have installed an up-to-date plant equipped with all the latest appliances and have never known the hardships of a hand yard. The owner of a hand yard, after determining the amount of brick he wished to make, would start in the fall by weathering his clay. This process many of our manufacturers follow to-day. To weather the clay the bank was undermined and caved down, then cast over with a spade and left to freeze and thaw until spring. This reduces all the lumps and puts the clay in condition to be tempered with the least amount of labor, which was very necessary, as you will see later on.

In the spring the gang, consisting of four men and a boy, were hired by the month without board. The moulder received thirty-five dollars, the three men twenty-six dollars each and the boy fifteen dollars. This made a daily wage of four dollars and eighty-five cents per day for the gang.

Thirty-two hundred brick was a day's work for this gang, who took the clay from the weathered pile and made it into brick, which they stored in the shed built for that purpose. The clay was taken from the weathered pile with a spade and cast into a pile called the soak pile, where water was added and then it was left to soak over night.

Next morning the clay was slashed out or tempered with a spade until in proper shape for the moulder. It was then loaded on an old-fashioned wheel-barrow, where the man carried most of the load by the aid of a strap over his shoulders, to the moulder's table located on the drying floor, where he would again, by the use of his spade, deposit the clay on the table which had been sanded to keep it from sticking.

The moulder with his hands cut a clod from the clay and, after giving it a roll on the table, drove it into the mould, which had been wetted and sanded and placed before him by the off-bearer. The surplus clay, called caps, was cut off the top of the mold with a bow and wire and the caps thrown back onto the table. The off-bearer took the mold and dumped the brick on the floor or ground, which had been leveled off to receive them. The bricks were next edged and hacked and when dry enough were wheeled to the storage shed where they were kept until one hundred thousand or more were made. Then the making was stopped and the kiln filled and burned. This was hand-work brick making as my father knew it when a boy. On a hand yard to-day a striker will mold 8,000 bricks in a day. His clay is ground by h.p., otherwise he has little advantage over his father of sixty years ago.

Hand-work in the brick yard, like the stage

coach, will soon be a thing of the past. It has filled its mission and, while some of the work in a modern yard is done by hand, the ratio is about the same as the amount of mechanical appliances was in the yard I have just described. Mechanical-made ware, where the workmen have only to look after the machines through most of the stages of its manufacture, is a blessing to mankind. Much of the drudgery of the hand yard is eliminated. The workman after his day's work, returns to his family with some spirit left in him, which makes life what it should be, well worth living.

The age when men object to machinery lessening the labor required to produce the necessities and luxuries, which even the man who labors expects and should enjoy, is passing away.

To-day a man who discovers or invents anything which is a benefit to mankind, is looked upon as a public benefactor; our laws are framed and passed to encourage and protect him in his work. The result of this policy is that the clayworker of to-day has at his command machinery that relieves him of much of the heavy manual labor which was necessary in our father's time.

Looking back through the ages we see many of our great benefactors who, after years of toil and study, invented great labor-saving machines, which, when introduced, brought only persecution and condemnation.

Each year marks improvements in equipment, from the clay bank or mine to the delivered ware. With all this advance in improved machinery we still face the problem of how and where we can procure the labor necessary to produce the quality, quantity and kinds of goods, required to keep up with the urgent demands that our country, in this era of prosperity, places upon us.

The manufacturer is looking to the machinery man and inventors for improved methods, which will enable him to produce not only more and better ware, but make it at less cost. Manufacturers have closed their books for the year of 1906 and find their porfits much less than for 1905. They have analyzed their cost accounts and find that nearly everything that enters into the cost of the manufactured ware has advanced in price, while the sales price has remained about the same. The manager is convinced that he must do something to protect his profits and first turns to the most natural remedy, which is to raise the selling price. After careful investigation he decides that this will not be wise, as structural steel, cast concrete, sand-lime and sand-cement brick are in the field and are ready to fill the place of clay brick if given the chance. The only other remedy is to produce the brick at a less cost. This is what every progressive brickmaker of to-day has been and is trying to do. He is looking for machinery that will make more and better brick at a less cost. He is installing the best machinery, adopting the latest methods and equipping his plant with the best his means will afford.

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H. G. Vogel Co., St. George St., Montreal, have the contract for a complete sprinkler system in the new Mark Workman building on St. Catherine St., Montreal, four stories and basement. Also a system of water curtains for outside protection.

# Effloresence (Whitewash) of Brick

From Paper by J. C. Jones, Champaign, Ill., in Bulletin Sent out by University of Illinois.

*(Continued from issue of October 4th).*

Means of Prevention.

The principal causes of the kiln and dryer white lie, then, in the sulphates and carbonates of the clay, and in the sulphurous gases in the kiln. The remedies, therefore, must be applied with this in view.

The following means of prevention are suggested:

1. Use the clay before the soluble salts form, i.e., unweathered.

2. Remove the soluble salts entirely from the clay, i.e., weather it thoroughly, this causing the washing out of the salt.

3. Transform the soluble salts to a harmless form by precipitation.

4. Prevent the concentration of the salts on the surface of the brick by rapid firing.

5. Remove the whitewash in the kiln by means of a reducing flame.

6. Coat the brick with some combustible substance that will remove the whitewash as it burns off.



1. Since the sulphates in the clay nearly always result from the weathering of its pyrite, it is often possible to avoid the whitewash simply by using the clay fresh from the bank, rejecting that which has been exposed to the weather any length of time. This is only possible with clays that lie below the permanent water level. This use of the fresh clay, however, leaves the pyrite in the clay, and as has been shown, it will sooner or later come out as efflorescence on the walls. While the manufacturer is thus enabled to produce a clean brick, he is simply passing the trouble on to the user of his wares.

2. Since the whitewashing salts are all soluble or can be rendered so by weathering, it is possible to remove them entirely by exposing the clay to the action of the air, rain and frost as long as is necessary. As the action is slow and will not penetrate the clay unaided, the clay should be spread in thin layers and worked over occasionally. As the object is to remove the salts entirely, the ground upon which the clay is spread should slope enough to thoroughly drain the water away from the clay after it has done its work. This process not only removes the whitewashing salts, but also increases the plasticity of the clay. The process takes several months and is too expensive on that account for most brick plants.

It is possible to remove those soluble salts already formed in the clay by washing it. In using this process it must be borne in mind that the object is to remove the impurities and soluble salts and consequently a good supply of water must be at hand. In one case, at least, the water was being used over and over again until gypsum crystals of good size could be found quite plentifully in the storage tank of the washer. As in the process of weathering, the washing not only removes the salts but gives a more homogenous and better product. Its only disadvantage is the increased cost which need not be large if a good supply of water is to be had.

3. The method in most common use to transform the soluble into insoluble sulphates is to mix small amounts of barium carbonate or chloride with the clay. When either of these salts are introduced into the clay containing soluble sulphates the barium combines with the sulphur and forms barium sulphate, one of the most insoluble compounds known.

$$BaCo_3 + CaSO^4 = BaSO^4 + CaCo^3$$
$$BaCl_2 + CaSO^4 = BaSO^4 + CaCl^2$$

As the barium sulphate is very insoluble and is not decomposed during the burning the sulphur is firmly locked in the interior of the brick as long as the brick endures.

Barium carbonate is also a very insoluble compound and must be ground finely and very thoroughly mixed with the clay to accomplish the end that is sought. A German writer recommends that it be ground in a tube mill together with fine sand, which has the effect of soon reducing it to the very fine powder that is wanted. The correct amount, which necessitates a chemical analysis for its determination, is then added to the clay as it enters the pug mill. The carbonate is perfectly safe to use, as neither an excess of the barium nor the calcium carbonate formed will cause efflorescence. Its success depends on the thoroughness with which it is ground and mixed with the clay.

The chloride, on the other hand, is soluble and consequently does not need much care in grinding and mixing. As it is soluble, it is rather dangerous to use, for any excess is carried to the surface of the brick and forms there a whitewash with the sulphur in the kiln gases. Its by-product, calcium chloride, is also soluble and is liable to form whitewash in the same way. The Germans frequently use both the carbonate and chloride, adding enough of the chloride to overcome most of the whitewash and depending on the carbonate to take care of whatever whitewashing salts remain.

4. It is often possible when clay shows a tendency to whitewash, to hold the whitewash inside the brick by drying as quickly as possible. The mechanics of this is simple, and depends on the property of capillary tubes.

A simple experiment suggested by Dr. Lincoln of this University will make this clear to any one who will try it. If a strip of filter paper be hung with one end in a solution

of potassium permanganate, as the solution ascends the paper it will soon be noticed that the water is travelling faster than the permanganate. The clear strip of the water will grow broader until the top of the paper is reached. This is due to the fact that the wet paper has a stronger attraction for the salt than the water, and consequently the salt cannot travel until enough of it is attached to the fibres of the paper to allow the water to draw the salt higher. Just why this should be is not known, but it is the phenomenon chemists have named absorption. So when the brick is dried quickly the water is evaporated before the salt reaches the surface in sufficient quantities to cause trouble. When the clay will not permit of rapid drying this method cannot be used.

5. The sulphates once formed cannot be decomposed or removed in an oxidizing flame at any temperature ordinarily reached in the kiln. In a reducing flame the sulphates are reduced at temperatures of 1,000o C. to sulphides. The bases enter into combination with the silicates of the brick, while the sulphur is driven off with the gases. By use of this principle it is possible to drive off the whitewash by finishing the burn under reducing conditions. This has the disadvantage of darkening the color of the brick and also causing the slagging of the iron into a ferrous silicate thus starting fusion prematurely.

## Some Special Machine Tools.

A number of machine tools new to the Canadian trade are being placed on the market by the A. R. Williams Machinery Co., of Toronto. These include an improved Landis bolt cutter, a Cochrane-Bly metal sawing machine, the diamond turret head and an entirely new specialty and a milling machine containing improvements both radical and important to milling machine practice.

### Diamond Turret Head.

This device converts the drill piers into a multiple spindle machine with all the advantages secured by a specially designed turret drill press. Used in the tail stock spindle of an engine lathe or other lathe all the advantages of a turret lathe are secured for many operations as shown in illustration. It may be used in the head stock spindle of a lathe to perform many important operations.

In many other machines this attachment can be used to advantage, such as boring, drilling and milling machines of standard and special types. In other words, it forms a magazine of tools that can be used on any machine spindle whether the spindle rotates or is stationary.

Threads in the holes it has drilled, either by using a reversing tapping attachment inserted in one of its sockets, or by using it in a drill press having gears for reversing the motion of its spindle. The clutches that operate the different tool sockets are so made that they will drive equally well in either direction.

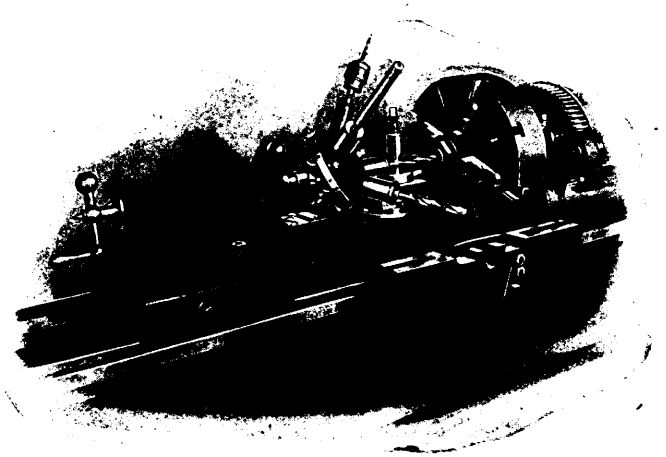
One of its most important advantages is that when mounted on a rotating spindle, as in a drill press, the different drills or tools can be shifted into working position without stopping the machine. Also with any one of the tools at work, the other tools may be changed or removed for grinding, while the machine is in operation.

The construction of the turret head is simple. The turret, carrying four or six tool sockets "E" (Fig. 1), rotates upon the cover at "A" bringing the different tools successively into position for operation. The cover is mounted rotatively upon the shank "C," by means of which the turret head is attached to the spindle of a drill press or other machine. The nuts at "B" must be kept so adjusted that the turret will turn easily upon the cover, without lost motion at the joint "A."

By means of the clutch lever "H," and clutches concealed within the turret, the socket "E" is attached to the shank "C." With the same motion of the clutch lever the lock pin "G" is pressed into place which locks the turret and cover together, thus holding the socket and tool in rigid alignment with the shank. The clutch lever latch "J" serves to keep the clutch in or out of mesh, and the turret locked or unlocked as may be wished.

By means of the adjusting nut "D" end motion caused by wear of the clutch mechanism is taken up; thus holding the drill or tool rigidly and preventing its jumping ahead into the work. The adjusting nut itself is kept from moving when once set, by the lock bolt "F" engaging one of the slots in its periphery.

When the turret head is mounted in a rotating spindle, the shank and socket both rotate. Since the turret and cover are both mounted upon these, the entire turret head will rotate unless prevented. The force acting to cause this rotation is small, being only the friction caused by its own weight upon the running parts. To prevent the turret head from thus rotating or swinging around, the light rod "K" (Fig. 1) is screwed into a boss cast on the cover as shown, and is permitted to rest against any convenient object. When attached to a stationary spindle, as in the tail stock of a lathe, a pin is put through the adjusting nut and shank as shown at "L" (see Fig. 2) and "D" (see Fig. 1). This makes the turret head serve as an ordinary stationary turret. The tool that is in operation is the only one that is in positive mechanical contact with the rotating machine spindle. All of the other tools are at rest, and can be removed, replaced with other tools or examined and handled by the operator without danger of injury. There is nothing complicated about the operation of this device.



Diamond Turret Head.

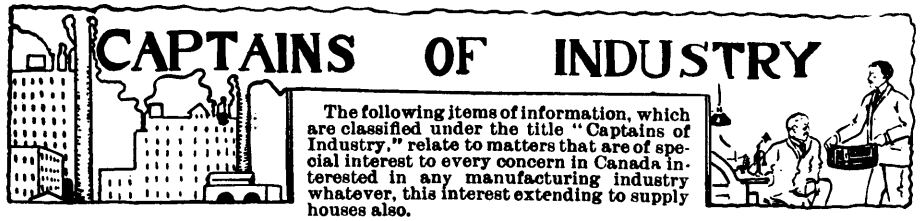
### THE FIRST WIRELESS TRANSATLANTIC DESPATCH.

On October 17 the system of wireless transatlantic communication passed from its experimental stage, and for the first time in the history of the world messages were transmitted to and received from England commercially. The formal opening of the station at Port Morien, C.B., was attended by no special function, nor was there any actual demonstration made in the test of the service.

It is almost six years since the magic whisper from Marconi's tower was heard across the Atlantic, and prompted a panicky action by a cable company to prohibit operations in Newfoundland. The inventor's success began with the twentieth century, for it was in January, 1901, that he signalled a message from the Isle of Wight to the Lizard at Cornwall, a distance of 183 miles. This result justified the erection of a high-power station at Poldhu, in Cornwall, for signalling across the Atlantic. In December of the same year he received a message at a temporary station near St. John's, Newfoundland. This opened the eyes of the world to a vision of new possibilities, and every move and achievement of the Chevalier and other inventors in the same field have been watched by all nations with the keenest interest.

Since that time efforts have steadily been directed toward perfecting the mechanism and establishing the system on a commercial basis, and the caution and care which have marked the inventor's course justify the public in accepting his announced ability to handle commercial business.

The Dominion Heating & Ventilating Co., Limited, of Hespeler, Ont., have recently installed apparatus in the plant of Samuel Watson, Orillia, Ont., the Amalgamated Oil Co., Petrolea, and the Schafer Brick Co., of Breslaw, Ont. Their brick drying outfits are meeting with considerable favor by the trade as well as brick cars and racks, transfers turn tables and steel plate dump cars. Their contracts include everything from the smallest to the largest possible installations.




The Western Central Construction Co., Toronto, have been incorporated with a capital of $350,000, to carry on a contracting and constructing business. The provisional directors include A. T. Drummond, H. M. Mowat and H. W. Shapley, Toronto.

The St. Lawrence Power Co., a Canadian concern with a plant at Mille Roches, Ont., and the Long Sault Development Co., an American corporation, have asked permission to construct a dam below Barnhart Island and to make other alterations in the St. Lawrence channel. Their final capacity for power is not stated, but the Canadian power house is laid out for 50,000 h.p., whereas only 1,250 is produced at present. The idea is to furnish power for industries from Cornwall to Brockville, Ont., and perhaps further. The American company will spend $15,000,000, the Canadian $5,000,000, having already an investment of $1,000,000.

The Salatone Co., Toronto, have been incorporated with a capital of $40,000 to manufacture a medical compound known as Salatone, drugs, chemicals, etc. The provisional directors include H. V. Kahle, A. C. Heighington and T. W. Lawson, Toronto.

The ratepayers of Campbellford, Ont., voted favorably on a by-law to expend $50,000 to develop a municipal electric power plant at Middle Falls.

The Chatham, Wallaceburg & Lake Erie Railway Co., Chatham, Ont., have decided to cross the Michigan Central Railroad tracks at Charing Cross, Ont., by means of a subway.

The Public Works Department, Ottawa have awarded the contract to Kastrer & Porter, Wiarton, Ont., for the construction of the new dock at Colborne, Ont.

Cobalt Superior Mining Corporation, Toronto, have been incorporated with a captial of $1,000,000 to carry on a mining, milling and reduction business. The provisional directors include A. W. Draper, N. J. Smith and H. Pratt, Toronto.

The Canadian Concrete Machinery Co., Toronto, have been incorporated with a capital of $20,000, to manufacture cement and concrete machinery, etc. The provisional directors include W. C. Cork, G. T. Elder and T. A. E. World, Toronto.

The city of Port Arthur, Ont., have instructed Messrs. Smith, Kerry & Chace, to draw up plans for the development of 30,00 h.p. on Dog Lake at Silver Falls,about twenty-five miles from city.

The Toronto Brass Mills, Limited, Toronto, have been incorporated with a capital of $500,000, to carry on a smelting, casting, forging and galvanizing business. The provisional directors include A. E. J. Blackman, A. Munro, and J. E. Fennell, Toronto.

The premises of the New Carlton Hotel, Yonge Street, Toronto, were damaged by fire recently. Loss about $2,000.

The American Abell Engine & Thresher Machine Co., Toronto, are considering the erection of a branch in Calgary, Alta.

The grist mill, planing mill and cheese factory of W. H. Bartholomew, and the premises of the Methodist church, Vanessa, Brant County, Ont., were destroyed by fire recently. Loss about $12,000.

The Automatic Grain Shocker Machine Co., Hamilton, Ont., have been incorporated with a capital of $100,000, to manufacture farm machinery, agricultural implements, grain shockers, vehicles, etc. The provisional directors include C. T. Grantham, A. Zimmerman and J. A. Turner, Hamilton, Ont.

The Canada Brick Fields, Limited, London, Ont., have been incorporated with a capital of $100,000, to manufacture brick, tile, earthenware, etc. The provisional directors include J. L. Thomas, P. W. D. Broderick and C. B. Edwards, London, Ont.

The premises of the Canadian Co-Operative Concern, Hamilton, Ont., were damaged by fire recently. Loss about $15,000.

Crawford Mining Co., Toronto, have been incorporated with a capital of $600,000, to carry on a mining, milling and reduction business. The provisional directors include D. H. Hulbert and D. F. Hulbert, Toronto.

The National Light & Mfg. Co., London, Ont., have been incorporated with a capital of $50,000, to manufacture lighting and heating appliances, etc. The provisional directors include S. T. Husband, A. J. Mill and J. Lowe, London, Ont.

The stave and heading mill of the John Greenless Heading Co., Forest, Ont., was destroyed by fire November 3. Loss about $6,000.

The Dominion Government will build a canal around the Long Soo Rapids on Rainy River which will give a clear waterway from Kenora to Fort Frances, Ont., for two hundred miles. The estimated cost is $500,000.

The Adelaide Mining Co., Napanee, Ont., have been incorporated with a capital of $1,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. P. Vrooman, C. M. Warner and W. S. Herrington, Napanee, Ont.

The premises of the Tudhope Carriage Co., Orillia, Ont., were slightly damaged by fire November 4.

The storehouse and stables of the Toronto Electric Light Co. on the Esplanade, Toronto, were destroyed by fire November 1. Loss about $5,000.

The new Catholic church being erected at Fort William, Ont., was destroyed by fire November 2. Loss about $10,000.

The flour mill of Messrs. Gould Bros., Uxbridge, Ont., was destroyed by fire November 3.

The Brophey Umbrella & Suspender Co., Toronto, have been incorporated with a capital of $50,000, to manufacture umbrellas, parasols,, suspenders, etc. The provisional directors include W. A. Brophey, L. Harkness and W. M. Douglas, Toronto.

The Soss Invisible Hinge Co., Toronto, have been incorporated with a capital of $40,000, to manufacture invisible hinges, hardware, etc. The provisional directors include J. Soss, New York City, S. King and J. L. Galloway, Toronto.

The premises of the World Furnishing Co., Orillia, Ont., were damaged by fire November 4. Loss about $2,500.

The flour mill of L. T. Purdy, Magnetawan, Ont., was destroyed by fire recently. Loss about $7,000.

The Toronto Iron Works, Toronto, have been incorporated with a capital of $40,000 to manufacture tools, machines, boilers, engines, pumping machinery, motors, castings, etc. The provisional directors include J. H. Malone, W. A. Manion and A. L. Ellsworth, Toronto.

The Seine River Lumber Co., Toronto, have been incorporated with a capital of $300,000 to manufacture lumber, timber, etc. The provisional directors include J. S. Lovell, W. Bain and R. Gowans, Toronto.

The premises of the Fort William Hardware Co., Fort William, Ont., were damaged by fire November 1. Loss about $5,000.

J. A. Blair, London, Ont., has offered $20,000 towards the erection of the proposed isolation hospital there.

A new police court building will be erected at Port Arthur, Ont., at a cost of about $11,225.

The Bank of Hamilton will erect a new building at the corner of Ossington Avenue and College Street, Toronto, at a cost of about $25,000.

Four new factory inspectors whose appointment was announced a few days ago were Robert Hungerford, Toronto; Henry Clark, London; Frederick Kelloud, Hamilton, and Stephen J. Mallion, Stratford, Ont. They will receive a salary of $1,100 each. There are now ten factory inspectors for the province.

The Rex Argent Mines Co., Latchford, Ont., have been incorporated with a capital of $100,000, to carry on a mining, milling and reduction business. The provisional directors include W. H. Jeffery, W. K. McNeill and J. A. Rowland, Cobalt, Ont.

It is probable that work will be commenced shortly on the construction of the Toronto and Niagara Railway and transmission line between Falls View and a point on the Niagara, St. Catharines and Toronto Railway near Stamford Station.

The congregation of the Charlotte Street Methodist church, Peterboro, Ont., will erect a new edifice at a cost of about $30,000.

The Hamilton Bridge Works Co., Hamilton, Ont., have been awarded the contract for the construction of the Glen bridge in Brant County. The contract price was $13,500.

The Electrical Ore Finding Co., Toronto, have been incorporated with a capital of $1,000,000, to carry on a mining, milling and reduction business. The provisional directors include A. T. Struthers, C. E. Stonehouse and L. Davis, Toronto.

The planing mill of the Evans Co., Sudbury, Ont., was destroyed by fire November 6. Loss about $50,000.

E. D. Warren, of the Lake Superior Corporation, and J. Penman, of Anderson Bros. & Co., Toron o, are endeavoring to interest the business men of Saul. Ste. Marie, Ont., in the proposed smelter of the Canada Smelting & Refining Co. This company purpose erecting a plant with a daily capacity of 150 tons and with a concentrating mill of 100 tons capacity.

The Night Hawk Lake Mining Co., Toronto, have been incorporated with a capital of $70,000, to carry on a mining, milling and reduction business. The provisional directors include J. A. Hughes, C. H. Atkinson and P. J. Russell, Toronto.

The Shuttleworth Chemical Co., Toronto, will erect a building at a cost of about $25,000.

The Century Telephone Co. will transfer their Canadain branch from Toronto to Bridgeburg, Ont.

The Industrial and Technical Press, Toronto, have been incorporated with a capital of $100,000, to carry on a printing and publishing business and to manufacture paper, envelopes, cardboard, etc. The provisional directors include E. V. O'Sullivan, J. M. Ferguson and J. E. Day, Toronto.

The Rideau Foundry & Malleable Castings Co., Smith's Falls, Ont., recently opened their new plant.

The Wilcox Mfg. Co., Chelsea Green, London, Ont., have commenced the erection of their new factory, 125x110 feet.

Messrs. McKeough & Trotter, Chatham, Ont., are erecting a machine shop in the rear of their premises, 100x40 feet.

The Glenn Stove & Furnace Co., Toronto, have been incorporated with a capital of $50,000 to manufacture stoves, furnaces, plumber's supplies. The provisional directors include W. G. Glenn, Toronto, J. C. Spence, London, Ont., and J. M, Quaker, Owen Sound, Ont.

The premises of the Hotel Du Canada, Ottawa, were damaged by fir November 8. Loss about $4,500.

The Pigeon River Lumber Co., Port Arthur, Ont., are turning out five hundred grain doors a day for the Canadian Pacific Railway Co.

The Peterboro Lock Co., Peterboro Ont., will erect an addition to their premises.

The Schierholtz Furniture Co., New Hamburg, Ont., have been incorporated with a capital of $50,000 to manufacture furniture, mattresses, springs, carpets, rugs, etc. The provisional directors include G. Rebelski, New Hamburg, Ont., W. Leaper, Berlin, Ont., and V. Wenzel, Waterloo, Ont.

The Dunnville Consolidated Telephone Co., Dunnville, Ont., have purchased the equipment of the Bell Telephon Co. in Haldimand county, Ont., and surrounding districts.

The Colonial Engineering Co., Montreal, have been awarded the contract for the installation of a 75 h.p. Hornsby-Stockport gas engine in he plant of the Queen City Printing Ink Co., T ronto.

Messrs. B. Bell & Son Co., Toronto, have been incorporated with a capital of $200,000, to manufacture machinery, implements, etc. The provisional directors include S. H. Chapman, A. C. Morris and H. H. Hurd, Toronto.

E. J. Evans, Toronto, will erect a hotel at a cost of about $18,000.

The Canadian Birkbeck Investment & Savings Co., Toronto, will erect an office building at a cost of about $120,000.

The I.O.O.F. Lodge, of Hamilton, Ont., will impro e their hall at a cost of about $10,000.

A new Oddfellow's Hall will be erected at Niagara Falls, Ont., at a cost of about $25,000.

The International Harvester Co., Hamilton, Ont., are considering the erection of a distributing warehouse at Port Arthur, Ont.

The Canadian Cutlery Co., who were to have located a factory at Grimsby, Ont., have bought out the Weston Tool & Novelty Co., and have now in course of construction a large plant at Weston, Ont., to manufacture cutlery and other articles.

H. W. Petrie, Limited, Toronto, have been incorporated with a capital of $400,000, to manufacture machines, machinery supplies, etc. The provisional directors include A. Fasken, W. H. Syms, and A. T. Struthers, Toronto.

The Ridgew y Mining Co., Toronto, have been incorporated with a capital of $500,000 to carry o a mining, milling and reduction business. The provisional directors include E. Paulley, Huntsville, Ont., J. L. Buchner and G. McLeish, Toronto.

The Long Lake Gold Mining Co., Welland, Ont. have been incorporated with a capital of $1,000,000, to carry on a mining, milling and reduction business. The provisional directors include B. J. McCormick, H. A. Rose and L. C. Raymond, Welland, Ont.

Work has been commenced on the erection of the new Collegiate at Pic on, Ont. The estimated cost is $100,000.

J. J. Murray & Co., Cayuga, Ont., have been awarded the contract for the erection of the new gas pumping station and reservoir for the Dominion Gas Co., near Canfield, Ont. The contract price is $35,000.

The Power City Cobalt Mines Co., Toronto, have been incorporated with a capital of $1,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. Johnson, L. G. Brown, Niagara Falls, N.Y., and A. W. Smith North Tonawanda, N.Y.

The Gold Peak Mining Co., Larder Lake, Ont., have decided to install a 20 stamp mill on their property.

The Canadian Portland Cement Co., Welland, Ont., are installing four rotary kilns, 150 feet long.

The newly organized Dominion Tool Co., Peterboro, Ont., have purchased a site for their new factory.

Geo. White & Sons, London, Ont., are considering the removal of their plant to St. Catharines, Ont.

The Bell Furniture Co., Southampton, Ont., have been incorporated with a capital of $150,000 to manufacture furniture, etc. The provisional directors include T. Bell, H. O. Bell and C. M. Bell, Wingham, Ont.

Gold Consols, Limited, Toronto, have been incorporated with a capital of $1,500,000, to carry on a mining, milling and reduction business. The provisional directors include D. A. Rose, T. W. Rose and E. Gill s, Toronto.

The new power house of the Niagara, St Catharines & Toronto Railway Co., at Thorold, Ont., is now in course of construction. It will cost about $50,000, and will generate 1,500 h.p.

The Fleming Aerial Ladder Co. have submitted a proposition to the town of Barrie, Ont., for the erection of a plant there to cost about $26,000. They want the loan of $20,000, and a fixed assessment of $5,000.

A large number of the buildings of the Dominion Park, the great amusement place of Montreal, were destroyed by fire November 6. Loss about $200,000.

The premises of the Longue Point Parish Church, Longue Pointe, Que., were destroyed by fire November 7. Loss about $75,000.

The premises of the Brothers School, Chicoutimi, Que., were destroyed by fire recently. Loss about $3,000.

The plant of Blakeney & Co., Hull, Que., was destroyed by fire recently. Loss about $8,000.

The Robb Engineering Co., Amherst, N.S., have been awarded the contract for placing three new boilers in the wheel house of the Montreal waterworks.

The Bonner Leather Co., Limited, Montreal, will have their new factory in operation before the new year.

The new warehouse of the Massey-Harris Co., Limited, in Westmount, Que., will be ready for occupation within a month. The present premises on St. Paul St., Montreal, will be occupied by the Dodge Manufacturing Co., Limited.

The Aetna Machine Co., 214 St. James St., Montreal, have made arrangements with C. Richard & Co., Montreal, for the building of Eclipse band saws, of which the Aetna Co. hold the patents for Canada. The feature of this machine is the improved treadle, which eliminates dead centres and saves lost motion. It will appeal to all woodworking shops where power is not used.

The new building of the Otis Fensom Elevator Co., Limited, at 368 Notre Dame St. West, Montreal, will be completed by Jan. 1. The building is 58x40 ft., four stories and basement. It will be equipped with electric elevators. The upper stories will be used for light storage, and machine shop, the basement for heavy storage. A handsome suite of offices will occupy the ground floor. Hutchison & Wood, Montreal, are the architects, and C. E. Deakin is the contractor.

E. Leonard & Sons, London, Ont., recently installed a battery of five boilers, 200 h.p. each for the Grand Trunk car shops, Montreal.

The Canadian Economic Lubricant Co., Limited, 29 Wellington Street, Montreal, have commenced the refining of whale oils. We understand this is the first time whale oils have been refined in Canada.

The Farm Committee, Shawbridge, Que., are calling for tenders for an industrial school to be erected on the farm of the Boys' Home, Montreal.

The large tannery of Edmond Julian, Limoilou, Que., was destroyed by fire November 8. Loss about $25,000.

The new plant of the Wabesso Cotton Co., Three Rivers, Que., is rapidly nearing completion.

Messrs. Madden & Son, Quebec city, have been awarded the contract for the installation of the waterworks system for the village of Notre Dame, Que.

The premises of the Diamond Glass Works, Montreal, were damaged by fire November 3. Loss about $7,000.

The premises of the Constant Drug Co. and the Merchants Awning Co., Notre Dame St., Montreal, were damaged by fire November 4. Loss about $30,000.

The examining warehouse of the Custom House on McGill Street, Montreal, was damaged by fire November 1. Loss about $35,000.

Detonite Explosives, Montreal, have been incorporated with a capital of $150,000 to manufacture explosives, powder, ammunition, chemicals, etc. The charter members include J. H. Redpath, J. A. Mackay and W. Bovey, Montreal.

The Dominion Tag, Label & Ticket Co., Montreal, have been incorporated with a capital of $10,000, to manufacture boxes, tags, labels, stationery, etc. The charter members include R. E. Green, F. N. Seddall and T. G. Reid, Montreal.

The E. Dufault Milling Co., Ste. Helene, Bagot county, Que., have been incorporated with a capital of $20,000, to operate grist and saw mills, etc. The charter members include E. Dufault, G. E. Dufault and W. Dufault, Ste. Helene, Que.

The new building for the Montreal Sailors' Institute, Montreal, will cost about $60,000.

A large roller rink is being erected at St. Rock, Quebec city.

The Compagnie Action Societe Catholique, Quebec city, will erect a large printing office, at a cost of about $20,000.

Messrs. Simoneau & Dion have been awarded the contract for the erection of the new armoury and drill hall at Sherbrooke, Que., for the sum of $82,500.

Among the firms who have ordered pumps from The Smart-Turner Machine Co., Hamilton, Ont., are: The Brantford Roofing Co., Brantford; the Stemwinder Gold & Coal Mining Co., Fairview, B.C.; the Grand Trunk Railway system; the Beamsville Preserving Co., Beamsville, Ont.; the Canadian Asbestos Co., Montreal; the Sherlock Manning Organ Co., London, Ont.; the Intercolonial Railway, Montreal; Somerville, Limited, Toronto; the Helena Costume Co., London, Ont.; the Victoria Industrial School, Mimico.

St. John, N.B., is to have another steamship line to be known as the Scotia Steamship Co., and will operate a line of steamers between St. John, Halifax, Cuba and the principal Jamacian ports.

The Salisbury Cheese & Butter factory, Salisbury, near Moncton, N.B., was destroyed by fire November 7.

The Bank of Montreal are calling for tenders for the erection of a branch building at Moncton, N.B.

The Intercolonial Railway is to be double-tracked from Moncton to Painsec, N.B., at a cost of about $300,000.

The freight sheds of the Intercolonial Railway Co. at Campbellton, N.B., were destroyed by fire October 31. Loss about $30,000.

The Swedish Canadian Lumber Co., Nordin, N.B., have been incorporated with a capital of $750,000, to manufacture lumber, timber, etc. The provisional directors include O.W. Nordin and J. Ander, Nordin, N.B.

The Nepisiquit Lumber Co., Bathurst, N.B., have been incorporated with a capital of $100,000, to manufacture lumber, timber, shingles, laths, boats, vessels, ties, etc. The provisional directors include H. B. Curran, Bathurst, N.B., A. I. Trueman and F. E. Sayre, St. John, N.B.

The Woodstock Electric Railway, Light & Power Co., Woodstock, N.B., have for sale several direct current dynamos and motors and two Ideal engines. The plant has been changed to alternating current.

The Victor Woodworking Co., which went into liquidation some months ago, has been purchased by a new company composed of W. A. and F. Gilroy and McLellan Bros., of Springhill, N.S. The price was about $22,000. The new firm have taken possession of the plant and intend to spend $15,000 in further equipment of the factory.

Messrs. Chas. T. White & Son, East Apple River, N.S., have been incorporated with a capital of $100,000, to manufacture lumber, timber, vessels, scows, etc. The provisional directors include M. G. White, East Apple River, N.S., C. T. White and G. H. White, Sussex, N.B.

The Nova Scotia Telephone Co. have completed the purchase of the stock of the Central Telephone Co., who built and operated the line between Bridgewater and Middleton, N.S. The company intend reconstructing the line and will put in new poles and metallic circuit.

Geo. Perrier, Halifax, N.S., has been awarded the contract for the plumbing work in connection with the $30,000 fire station being erected in that city.

The premises of the West End Baptist church, Halifax, N.S., were destroyed by fire recently. Loss about $10,000.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., will erect a new 60 ton furnace this fall.

Messrs. Rhodes, Curry & Co., Amherst, N.S., have been awarded the contract to build 260 flat cars, 400 box cars, 25 refrigerator cars, and 4 conductors' cars for the Intercolonial Railway Co.

The Department of Marine and Fisheries, Ottawa, will shortly call for tenders for the construction of a large ice breaking steamer to be used in keeping the channel between Prince Edward Island and the mainland open in the winter time. The new steamer will cost about $600,000 and will be one of the largest and most powerful ice breakers in the world.

New telephone buildings are to be erected in Charlottetown, P.E.I., and a power plant and a complete equipment installed.

The Fairchild Co., Winnipeg, Man., will sell all interests to the John Deere Plow Co., of Moline, Ill., under a Dominion charter, with a capital of $1,000,000. The company will be known as the John Deere Plow Co., of Canada.

The North Star Lumber Co., Brandon, Man., have been incorporated with a capital of $500,000 to manufacture lumber, timber, implements, furniture, vehicles, etc. The provisional directors include J. Hanbury, Brandon, Man. W. J. Bettingen and A. Kelly, Winnipeg, Man.

The ratepayers of Brandon, Man., will vote on a by-law to provide for the acquiring of a large depot for the city crushing plant, dump and trenching machine.

It is expected that the grading on the extension of the Canadian Northern Railway from Rossburn to Russell, Man., a distance of twenty-five miles, will be ready for rails in the course of a few weeks.

The waterworks and lighting plant for Carman, Man., were completed recently.

The Canadian Northern Railway Co. will erect a new roundhouse at Virden, Man.

The Imperial Elevator Co., Winnipeg, Man., have changed their name to the Imperial Elevator & Lumber Co.

The Western Iron Works, Limited, Winnipeg, Man., have increased their capital to $300,000.

The municipality of Mossy River, Man., will erect a bridge near Winnipegosis, Man.

The Winnipeg Power Committee, Winnipeg, Man., will erect a new bridge there at a cost of about $40,000.

The Canadian Pacific Railway Co. are enlarging their roundhouse at Napinka, Man.

J. McDiarmid & Co., Winnipeg, Man., will commence at once the erection of the new union depot at Neepawa, Man.

A new court house will be erected at McDonald, Man.

The Windsor Hotel, Winnipeg, Man., will be enlarged at a cost of about $25,000.

The Ogilvie Milling Co. purpose establishing a branch at Saskatoon, Sask.

The Government and the Canadian Northern Railway Co. are building a traffic railway bridge at Prince Albert, Sask.

W. Harris & Son, Saskatoon, Sask., have secured a site in Asquith, Sask., and will commence at once the erection of a factory.

A Presbyterian church will be erected at Stettler, Sask., at a cost of about $2,500.

The barracks of the Royal Northwest Mounted Police at Lethbridge, Alta., will be enlarged at a cost of about $10,000.

Geo. Mounce, Avondale, N.S., has purchased the foundry of the Windsor Foundry Co., Windsor, N.S., for the sum of $18,000. Operations will commence immediately.

The congregation of St. Joseph's church, Sydney, N.S., will erect a new edifice, to replace the one recently destroyed by fire.

P. Burns, Medicine Hat, Alta., has been awarded the contract for the erection of the new armory building in that city at a cost of about $16,600.

The ratepayers of Rosthern, Sask., voted favorably on a by-law to raise $10,000 to provide for the finishing and furnishing of the new town hall now in course of erection.

Work has commenced on the new Canadian Pacific Railway Bridge at Lethbridge, Alta.

The city council, Edmonton, Alta., are considering a proposition to purchase the franchise of the Strathcona Street Railway

system as it is thought that the two systems can be operated more cheaply as one concern.

The ratepayers of Moose Jaw, Sask., will vote on a by-law to raise $90,000 for the extension of the electric light plant.

The Calgary Power & Transmission Co., Calgary, Alta., are making preparations to increase the electric power.

A branch of the Royal Bank of Canada will be opened in Regina shortly, making the tenth bank in that city.

The capital stock of the Prince Albert Lumber Co., Prince Albert, Sask., has been increased to $375,000.

J. Haussler, Harvey, N.D., is erecting a grain chopping mill, 40x26 feet, in Humboldt, Sask.

The Union Bank of Canada, have opened a branch at Cochrane, Alta.

Messrs. Matthew & McNaughton, Calgary, Alta., will erect a machine shop at a cost of about $6,000.

The Alberta Biscuit Co., Calgary, Alta., are considering the erection of a factory in Edmonton, Alta.

The Edmonton Produce Co., Edmonton, Alta., will erect a cold storage plant at a cost of about $50,000.

The Saskatoon, Saskatchewan, Peace River & Dawson Railway Co. will make application for power to construct a line of railway from Saskatoon, Sask., to Dawson City, Yukon Territory.

The Canadian Northern Railway Co. are preparing plans for the erection of a new station at New Westminster, B.C.

The North Pacific Lumber Co., Barnet, B.C., will erect a large mill on Burrard Inlet.

The Public Works Committee, Dawson, B.C., will appropriate about $140,000 this year for public roads and bridges.

The contractors have started the driving of tunnels on the main line of the Canadian Pacific Railway between Hector and Field, B.C.

The city council, Nelson, B.C., are considering the advisability of extending the electric light service to supply adjacent districts.

The Royal Bank of Canada have opened a branch at North Vancouver, B.C.

The ratepayers of Salmon Arm, B.C., voted favorably on a by-law to borrow $2,000 for school purposes.

The Southern Cross Mining & Smelting Co., Victoria, B.C., purpose erecting a new smelter at a cost of about $500,000.

The Hewitt Mining Co., Nelson, B.C., will erect an electro-cyanide plant in connection with the new mill they are erecting.

Work on the proposed railway from Port Simpson, B.C., to Fort Churchill on the Hudson Bay, will be commenced next spring.

The Canadian Pacific Railway Co. intend spending about $1,500,000 in the development of coal lands near Fernie and Hosmer, B.C.

The Fraser River Sawmills, Millside, B.C., will install a complete new mechanical equipment in the engine room and will increase the capacity of the plant to 250,000 feet of rough lumber per day. The cost will be about $100,000.

L. G. Wing, Vancouver, B.C., will erect a business block at a cost of about $80,000.

W. J. Cavanagh, Vancouver, B.C., will erect a large hotel at a cost of about $100,000.

The British Columbia Government intend erecting a provincial asylum at Coquitlam, B.C., at a cost of about $200,000.

The Canadian Pacific Railway Co. are building two new tunnels near Field, B.C., at a cost of about $1,000,000. One will be 3,400 and the other 3,800 feet long.

## THE CANADIAN APPRAISAL AND AUDIT CO., LIMITED.

The supplementary letters patent issued recently to the Canadian Appraisal Co., Limited, announce the arrival of a new competition into that useful and not too well filled field of accounting and auditing, which form so necessary a part of the commercial development of the country in these days where interests are so rapidly expanding and taking more and more the form of incorporated companies.

The new comer will be the more readily welcomed when it is remembered that Mr. Leonard W. Just, chartered accountant, of London, England, whose early training and experience has been gained in the well-known firm of Messrs. Price, Waterhouse & Co., of London and New York, is in charge of all the auditing and investigation work of the company.

When the Canadian Appraisal Co., Limited, was incorporated two years ago, valuations of manufacturing and other concerns alone was undertaken, and although this class of work had been long carried out in the United States, its value had scarcely been appreciated in this country.

Now, however, an expert valuation of its real estate, buildings, plant and tools has become a recognized necessity to any up-to-date manufacturing establishment as constituting a permanent independent record of assets for use in case of loss by fire, of sale, transfer or amalgamation.

The system that the Canadian Appraisal & Audit Co. have elaborated is highly technical and their staff are experts in their respective branches, and all the troublesome questions relating to depreciation of plant are solved in a scientific manner instead of in the rule-of-thumb style when left to bookkeepers.

An appraisal as prepared by these people shows item for item all that goes to constitute a plant, and the new and depreciated values involved.

## FREE ENGINEERING LIBRARY TO OPEN EVENINGS.

On and after Wednesday, November 6, 1907, the reference libraries of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the American Institute of Mining Engineers, 29 West 39 Street, New York, will be open evenings until nine o'clock on all week days except public holidays.

These libraries, constituting practically one library of engineering, situated near the New York Library, in the new headquarters of the Engineering Societies are available to members of the above societies, engineers, and the public generally, subject to proper regulations. Strangers are requested to bring letters of introduction from members or to secure cards from the secretaries of the respective societies.

## HENDRICK'S COMMERCIAL REGISTER.

The sixteenth annual edition of the Hendricks Commercial Register of the United States for buyers and sellers especially devoted to the interests of the architectural, mechanical, engineering, contracting, electrical, railroad, iron, steel, mining, mill quarrying, exporting and kindred industries, containing 1224 pages: price ten dollars: published annually by Samuel E. Hendricks Co., 74 Lafayette St., New York.

This book is a complete index of the industries mentioned and contains over 350,000 names and addresses and 15,000 business classifications. It serves as a buyer's reference for the architect, engineer, contractor, manufacturer, jobber, retailer, purchasing agent and for railroad machineshop, foundry, mill, factory, mine and plantation. The fifteenth annual edition required 62 pages to index its contents while the present edition requires seventy-six pages, showing the growth of the present volume over that of a year ago. As an illustration of the system of classification might be mentioned "machinists and founders": all firms who have a machine shop or foundry are classified under that heading for mailing purposes, then each firm is sub-classified under headings that cover every variety of its product. This makes the work very complete for both buying and selling.

This book is a valuable reference library for the fields it covers and any manufacturer in Canada interested in United States firms or desirous of obtaining classified lists will find it very complete.

## C. C. COUSINS OPENS PATENT OFFICE.

Mr. C. C. Cousins has opened offices at 506-507 New York Life Building, Montreal with a branch at 1006 F Street, Washington, D.C., for the transaction of a general patent business. A graduate of Richmond College, Richmond, Va., Mr. Cousins practised law for a number of years. For four and a half years he specialized in patent law in Washington, D.C., and for the past three years he has been managing solicitor for the well known firm of Marion & Marion. The Washington office is in charge of Mr. Gustave Ayers, a former associate of Mr. Cousins, and a recognized expert on metallurgical and thermodynamic subjects. Mr. Ayers was for some time patent office examiner at Washington.

## PERSONAL.

Mr. E. Hallman, who is well known to the machinery trade from his long connection with H. W. Petrie, Toronto, has just returned from a month's trip in Northern and Western Ontario. It included Fort William and Port Arthur, Sudbury, North Bay, the Soo and Cobalt. Mr. Hallman reports considerable activity in machinery lines in these places.

Petition for winding up order for the Canada Radiator Co., Limited, Lachine, Que., has been granted. A meeting of the creditors has been called for the 22nd inst.

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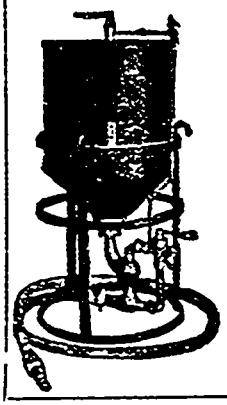

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# INDEX TO ADVERTISEMENTS (Continued).