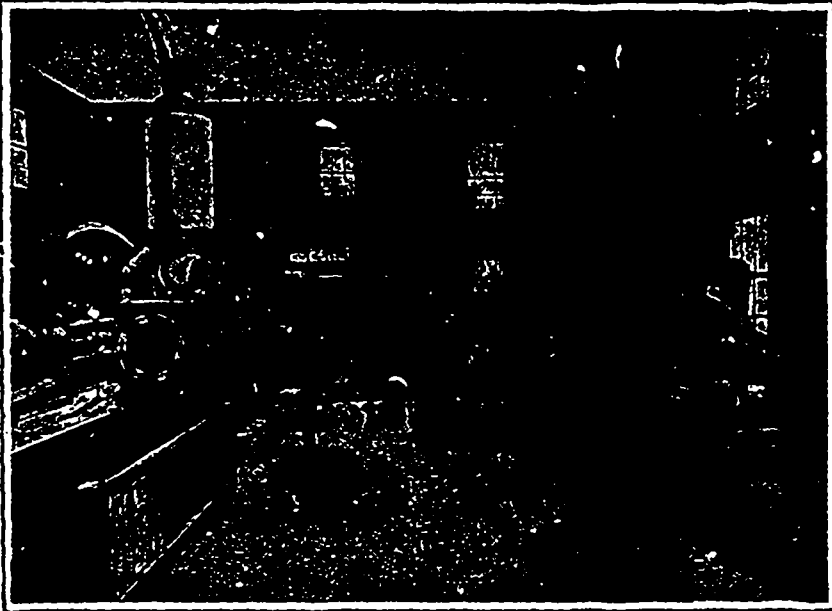




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# Goldie Corliss Installations

The accompanying illustration shows the power plant of the G.P. & N. and P. & B. St. Ry. at PRESTON, ONT.

Equipped with one **CROSS COMPOUND GOLDIE CORLISS ENGINE**, 20 and 40 x 36, and one **HEAVY DUTY WHEELOCK**, Belt Drive.

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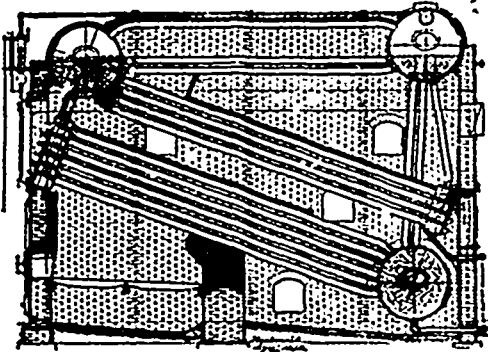
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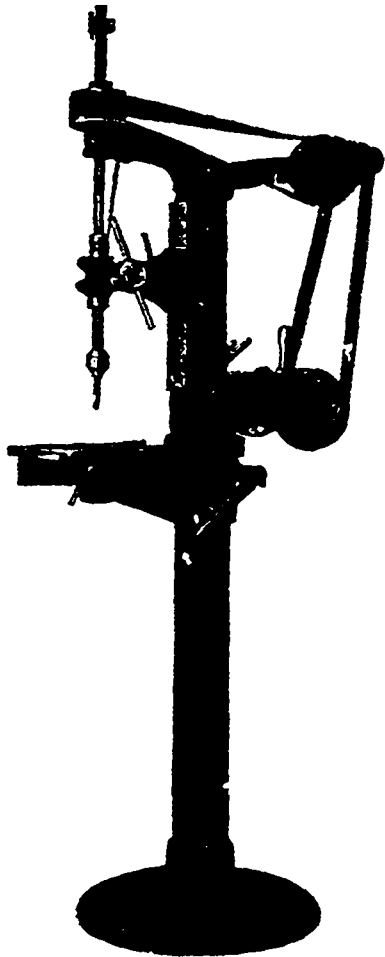


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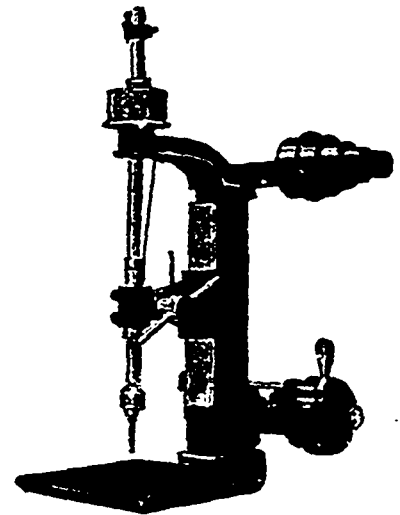


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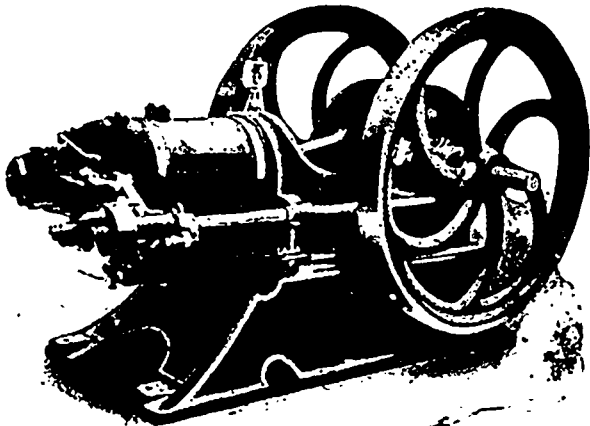


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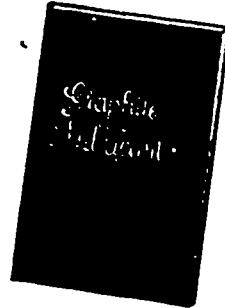
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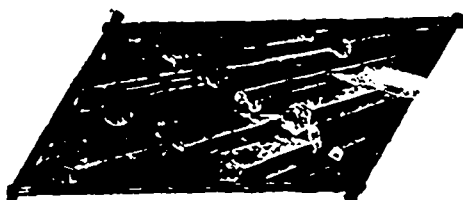
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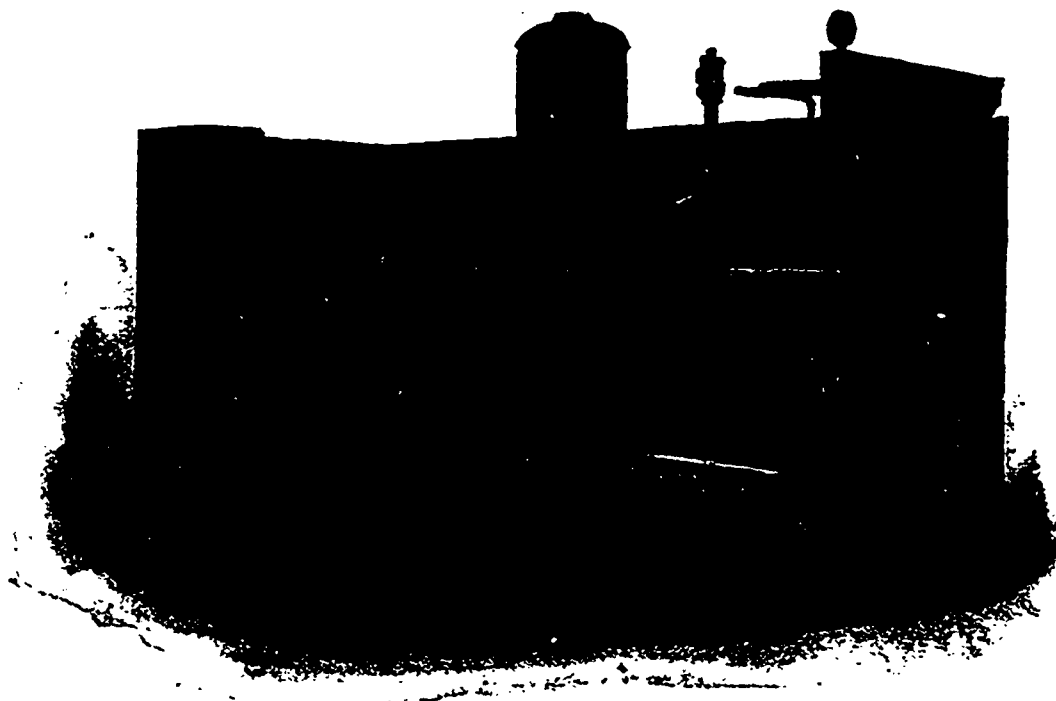
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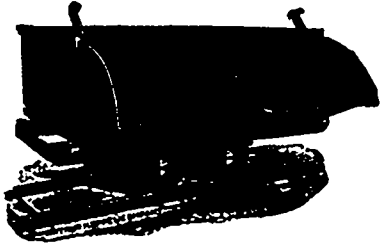
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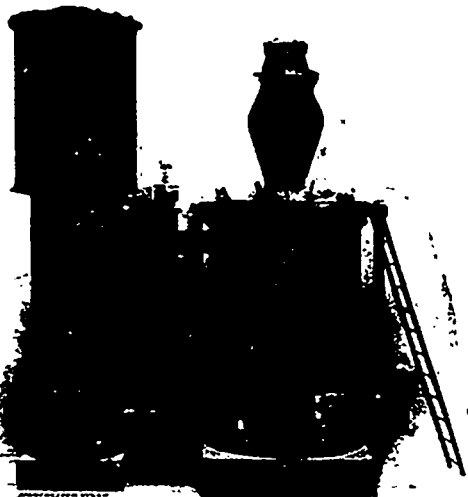
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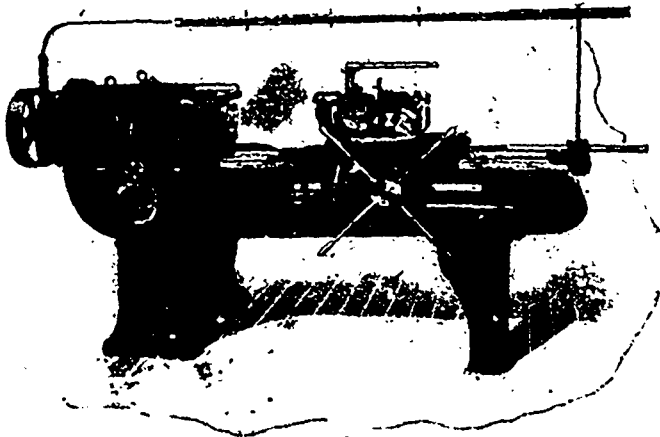
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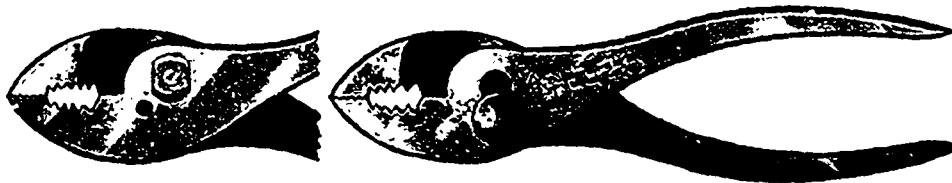
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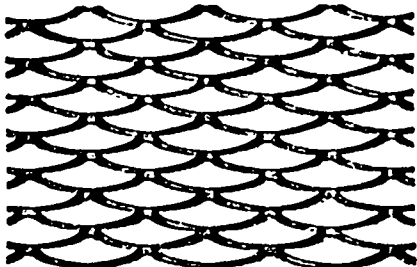


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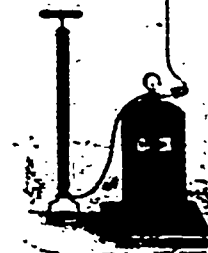
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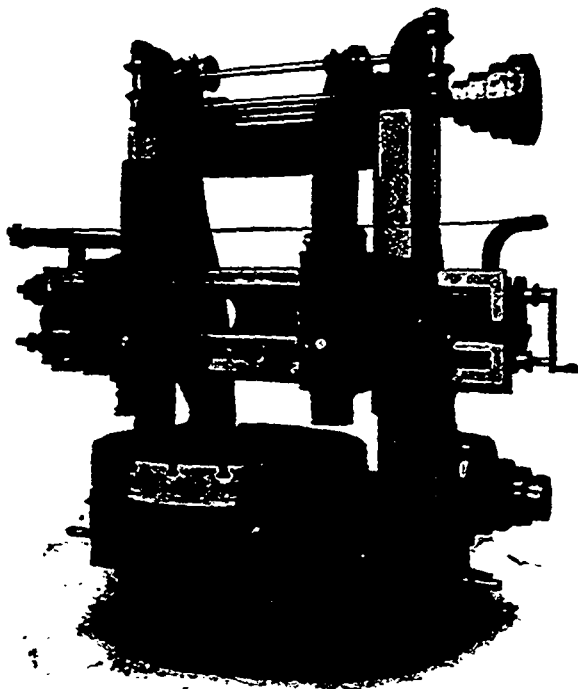
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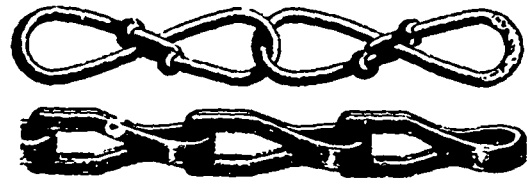
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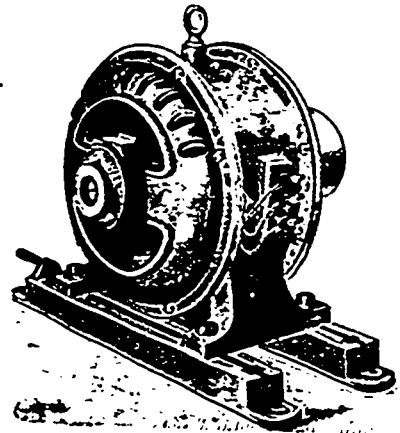
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"Referring to 4 "Diamond" High Speed Drills recently purchased through your Philadelphia representative, would advise that same have more than met our expectations. We are drilling on an automatic 6-spindle upright drill press, ten thousand (10,000) wheels per day, each casting having a hole  $\frac{3}{4}$ " x 1" deep.

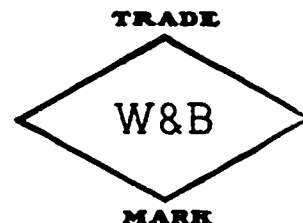
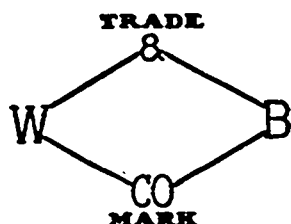
We do not find it necessary to grind the drills more than once an hour, and in that time we drill one thousand (1,000) castings. We have drilled one hundred thousand (100,000) castings with one dozen drills, using about one and one half inches of the twist, same being too short for further use.

We trust this information will prove to be of interest to you, and with best wishes we remain."

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### UNJUST FREIGHT RATES ON BUILDING MATERIALS.

The railways of Canada have acted in most arbitrary and unwarranted manner in advancing the freight rates on brick and other building material at a time when there is depression in the building trades and when the cost of labor, an important factor in the cost of rail transportation, is lower than it has been for some years.

The Executive Committee of the Canadian Clay Products Manufacturers' Association, at its meeting a few weeks ago, took up this question, embodying the objections of brick manufacturers to the advanced rates in the resolution published in a recent issue of this publication, a copy of which was sent to the railways interested.

The resolution also drew attention to the fact that serious discrimination in rates is made, in that at least one company has a lower rate for a haul of forty miles than many other companies have to pay for half that distance.

The resolution asked for relief from the increased rates and from the discrimination referred to, but to date the railways have taken no action. It is probable that the matter will be placed before the Dominion Board of Railway Commissioners by members of the Executive Committee of the C.C.P.M.A.

### AN ARGUMENT FOR MUNICIPAL OWNERSHIP.

A year ago the Orangemen of Toronto, who usually hold a monster parade on July 12, came into conflict with the Toronto Street Railway, the result being that the car service was blocked at several points where the procession crossed the street car tracks.

This year, according to R. J. Fleming, manager of the company, the street railway got even. The Orangemen

took every precaution to avoid interfering with the street car service: in fact, the procession had passed every line in the city but one when some rowdies blocked that line. Acting under orders issued before the procession, the street railway officials shut off all power, thus tying up the car service in every section of the city, for nearly two hours.

As this action was taken between noon and two o'clock on Saturday, it interfered with the plans of almost every family in the city. Men were hours late in getting home to dinner and consequently lost a valuable portion of the Saturday afternoon holiday. Thousands of people, hurrying to train or boat, were compelled to walk for miles, or run the serious chance of missing them, though tickets were already purchased and luncheons prepared. Business men were compelled to break engagements.

All this may serve to demonstrate what R. J. Fleming has striven to prove, that he is dictator of street railway affairs in Toronto. But it is also an argument in favor of municipal ownership which years of specious reasoning cannot overcome.

### THE FRIENDS OF TECHNICAL EDUCATION.

There is no class in the community more loyal in their support and advocacy of technical education than the manufacturer.

The hard headed, self made "captain of industry" may not have been able to devote several years of his youth to securing technical training such as is now available for young men, but he has learned the value to his industry of the technical expert—the draughtsman, the designer, the chemist, etc. Years of study of his own business and observation—more or less distant—of that of his competitors have convinced him that success lies to a large extent in securing economy of production. He has also learned that to secure greatest efficiency the productive work of his factory or mill must be specialized, while to secure accuracy of design, the great essential to economy of production, technical experts are necessary in many departments.

The manufacturer, however, in fact, demands more technical education than is available in Canada to-day. He has learned that his superintendent, his foremen, and his workmen generally do better work when they understand the mechanical principles underlying the task they are engaged on. In every department of his work the difficulty is to get men to take the position of responsibility, men who have technical training as well as practical knowledge of the work to be done.

The demand to-day is for more technical schools where at least an elementary knowledge of chemistry, mechanics, etc., can be obtained by those not able to devote the years necessary for technical training in one of the large universities.

### THE INFLUENCE OF FAVORABLE PUBLICITY.

Few business men were surprised when news came from Denver, Col. that William Jennings Bryan had received the Democratic nomination for the Presidency

of the United States on the first ballot of the party convention.

For years Bryan has been before the public of the United States. He has recognized the value and importance of publicity to a man seeking public honors of office and has, in one way or another, kept his name and his personality before the people of the United States.

He has, through his lectures and addresses, through his own newspaper and through interviews and letters published in newspapers of every section of his country, kept his name constantly before the great public of the United States, until it is now safe to say that every voter in that country feels that he knows and understands the man Bryan.

Every business man who has built up a national enterprise has, like Bryan, learned the value of favorable publicity and constant effort has been made to keep the good points of the business or of its product constantly before the public it is appealing to.

One concern puts up the highest office building in the world and through the general attention paid to it in the public press, wins universal publicity and prestige, while another company erects a model factory near Niagara Falls and by its entertainment of a constant stream of visitors, sends forth a veritable stream of advertising agents. This may be freak advertising, but it serves the purpose of securing favorable publicity.

It has, however, been proven by long experience of a countless number of business men that for them the one channel through which to seek publicity is the advertisement.

For "the beer that made Milwaukee famous," for "the paint that covers the earth," for shaving soap and talcum powder, for breakfast foods and for the thousand and one household and toilet articles which appeal to the general

public the popular magazine serves the purposes with greatest efficiency.

For the departmental or mail order store with bargain sales to attract immediate attention, and for the patent medicine which the magazines refuse to advertise the daily paper has been found most productive.

For the majority of advertisers, however, none of these media serve the end desired. It has been proven beyond question that for manufacturers or merchants who desire to reach certain classes of business men the paper of general distribution has too much waste circulation, that for such concerns it is necessary to use publications which appeal directly to the class of buyers that the advertiser wishes to reach.

One result of this condition has been that business houses which are little known to the general public have been able to secure publicity from one end of Canada to the other among the buyers of their product: where such publicity is of practical benefit to them. A manufacturer of machinery, for instance, may never be heard of in the daily press, yet he may keep his name constantly before those who buy or operate such machines as he makes and sells.

Another development of this general recognition of a fundamental principle in business, the elimination of waste, is the rapid growth of specialized publications. Advertising experts have learned and casual advertisers are quickly learning that the more "specialized" a paper is, the more directly it reaches a certain class of buyers, the more exclusively it is devoted to their service, the more valuable it is to the advertisers who want to reach such buyers. Also, the more important the class of buyer, the more potent the paper as an advertising medium.

## Editorial Opinions From Our Exchanges

### FIRE PROTECTION IN MILLS.

We have referred several times in these columns to the enormous losses which this country sustains annually from that destructive element, fire, and the crudeness and incompetency of the agencies employed in many instances for its prevention.

There is scarcely a subject of more vital concern to our textile manufacturing plants than this one. The cost of fire insurance is a direct yearly tax on a building and its occupants, and it becomes, therefore, the duty of those responsible for the design of a building to so plan it that this tax may be the smallest possible in order that the fixed charges attendant upon the maintenance of the plant may be reduced to a minimum, and often this can be accomplished without any appreciable increase in the cost of the building itself. The continuing succession of heavy fire losses throughout each year is but the penalty which this country is paying for the erection of light, cheap and poorly designed buildings.

If owners and engineers would confer with the insurance companies before their plans were so far advanced that they could not avail themselves of the many valuable lessons gained by the experience of these concerns, all of which would be freely given, they would do well. But they often hesitate to do this until it is too late, greatly to their own detriment.

It is certainly desirable that those who are about to erect manufacturing establishments, or owners of existing ones, who are desirous of equipping them to accord with the standards of these companies, give these matters careful consideration. Individuals and the public, as a whole, are often slow in adopting needed remedies and in reforming methods. The consequence is that factory properties, mercantile buildings and tenements are still being built which are often veritable fire traps, and the loss of life, as well as the loss of property, is appalling. Even when buildings are of incombustible material or of other good types, consideration has not been given to

the need of separating one floor from another or providing adequate means for the extinguishment of fire. Where the walls are incombustible and window openings adequately protected, the possibility of a single fire wrecking an entire plant is ordinarily avoided; but cases may be cited where a needed fire wall has been omitted for no other reason than to save the cost of the wall itself.

The fire curtain is adapted for use in large roofs over areas which now cannot be otherwise subdivided. It is installed between the sections of a sprinkler system that the heads either side may be fed by independent risers. These curtains, with the assistance of the fire apparatus, will prevent a fire extending rapidly through a roof, and in addition the heat from a fire is confined to smaller area, thus opening a less number of sprinklers, which prevents overtaxing the water supply and at the same time lessens the damage by water.

Such matters as these, relating to improved construction and fire protection, are bound to engage the consideration of up-to-date mill men more and more. They cannot too quickly avail themselves of the many recognized advantages offered them for the protection of manufacturing property, and the consequent reduction in the cost of fire insurance.—Fibre and Fabric.

#### A SERMON FROM "SYSTEM."

"Suppose that to-morrow some strong, brainy man were to sit in your chair, take your place and continue your work.

"Could he do anything that you are not doing?

"Could he better your work in any way?

"You know that a good man would make some improvements on the work you are doing.

"What are they?"—System.

Does that make any of us wince? Can we confidently say that if a strong man were to take our place to-morrow that he could do nothing to advance our work; to either improve its quality or increase its quantity?

It is a demonstrated fact that greater speed can be made by racers when they are paced. This fact is not without significance. Daily routine has a certain deadening effect, one is prone to relax even unconsciously. But we cannot always excuse ourselves by the plea of "unconsciousness." Have we not sometimes said, "Oh, that is good enough." This is weakness and its evils are many.

When we are lax, careless, or neglectful, we cheat our employer. We not only cheat him in the sense that we do not reimburse him with our best service in return for what he pays us, but we cheat doubly by occupying a place that a stronger man should have. But be assured that we cannot cheat our employer without cheating ourselves. This is not a copy book maxim, it is an inexorable law. Consider a minute.

To do less than our best tends to mental disintegration, just as lack of exercise tends to physical disintegration. It makes it harder to cope with the next problem or difficulty we may meet. To do less than our best means that our standard efficiency will never be advanced—

always to do our best means increasing our capacity for still better work. And let the truism be here repeated that we never stand still, we either advance or recede. And it depends entirely upon ourselves. Further, like water, we inevitably find our own level.—Graphite.

#### HOW MUCH "BLUFF" IS JUSTIFIED ?

An engineer who had had limited experience in steam-electric plants was offered a position in a street-railway power house as chief engineer. The plant was not large and the chief requirement was to see that the men did their work and kept the engines and boilers in condition for safe and efficient operation. As a matter of fact, the duties required were much the same as those he was accustomed to. After due consideration, however, the position was refused, solely because the work was slightly different from his former work and he felt that he would not be justified in shouldering the responsibility.

Aside from the correctness of this engineer's summing up of his ability, or competency, would he have been justified in assuming charge of the plant, when his doing so might have resulted in wrecked machinery? Or, should he have taken a chance, assuming that by using every-day common sense the plant could be operated without mishap until he became better equipped to cope with the exigencies which might arise? Too much confidence in oneself may bring disaster, while not enough may result in personal failure; there have been more failures due to lack of confidence, however, than can be traced to over confidence.

In another instance an engineer of limited experience had an opportunity to become chief engineer of an electric light plant. He decided to accept the position, taking the stand that all of the ills to which the electric light plant is heir probably would not appear at one time, and each could be taken care of as it came up. The engineer made good, and has since been put in charge of considerably larger and more complicated plants. Was this engineer justified in taking a position which he knew he was not thoroughly competent to fill at the outset?

Another instance is that of an ambitious engineer who wished to become a boiler inspector. He had a limited knowledge of matters pertaining to such a position. For instance, in writing to Power he professed ignorance as to the method employed by boiler inspectors in determining the allowable steam pressure to be carried by any particular boiler. He did not know whether it is essential to know the age of the boiler, type of stays and method of riveting the joints. He applied to Power for help in this matter. By this time the would-be inspector will have been through an examination. Whether he passed successfully we do not know. The question is: Was this man justified in seeking the appointment? In such a position an incompetent man can bring about disaster. Permitting a boiler to carry an excessive pressure through ignorance of the method employed in determining the safe pressure spells disaster. Permitting an engineer to operate a boiler in an unsafe condition means the same thing.

How far is a man justified in going? Should he seek personal advancement at the possible cost of injury to others?—Power.

# Equipment of the Physics Building University of Toronto

A DESCRIPTION OF THE POWER PLANT, WRITTEN FOR THE CANADIAN MANUFACTURER BY H. L. GRIFFIN.

The equipment of the new Physics Building of the University of Toronto, which was formally opened at the beginning of the last academic year, is now being completed.

One of the most interesting features of the equipment, from a power user's standpoint, is the power house. This is situated at the south west angle of the Main Building and from it is supplied electric current for lighting, in addition to the Physics Building itself, the Convocation Hall and the Examination Hall, also for experimental purposes in the Physics Building, while these buildings are all heated by exhaust steam from the engines.

The equipment for the purpose is modern and complete throughout.

permitted by the construction of the vertical engines. Other features are of much interest.

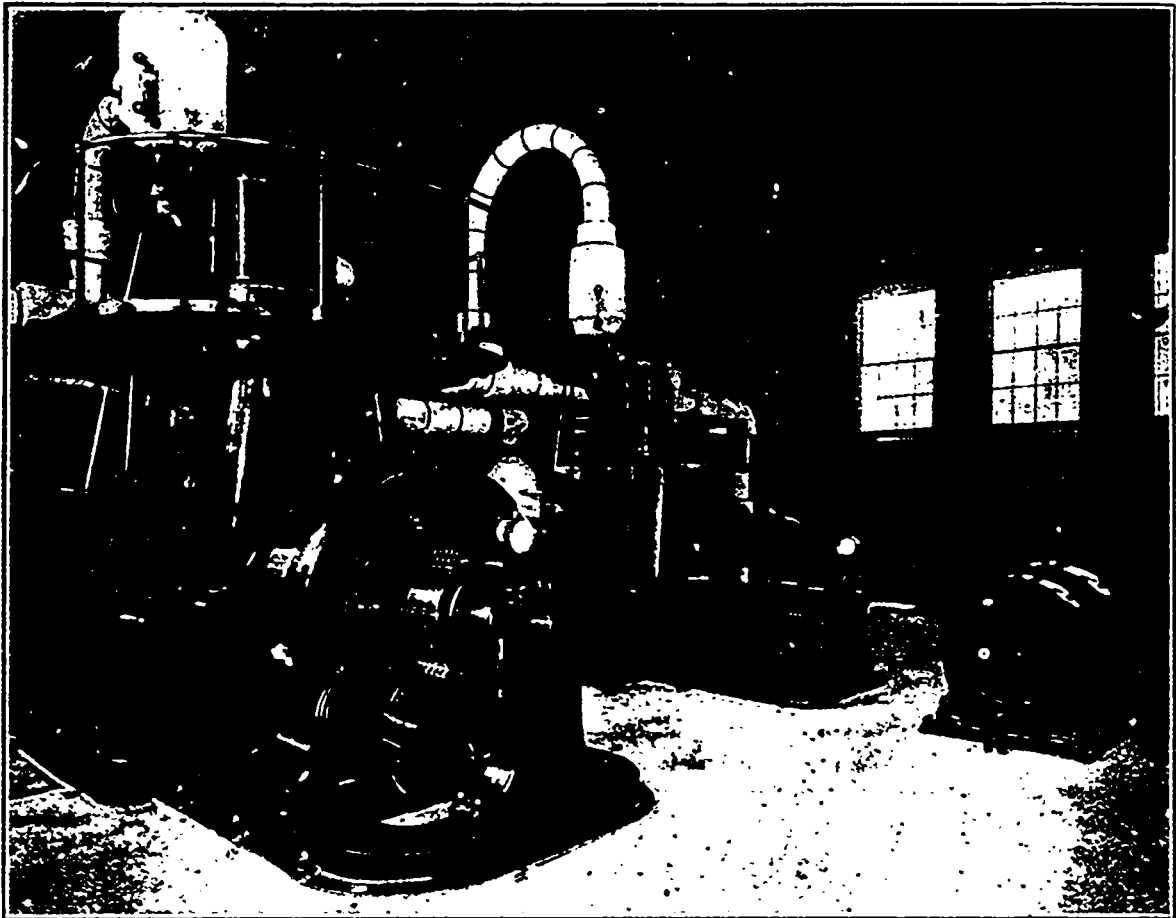
Oiling is accomplished by means of Richardson lubricators. From a well in the base of the engine oil is forced by a pump to all the bearings, a double system of pipes being provided, to guard against any emergency. By means of drip pipes oil is brought back to the well, and after being filtered, is used over again.

The governor employed on these engines is deserving of attention. It is placed in the fly wheel of the engine and is attached directly to the valve driving mechanism. A governor on an engine such as this is called on for a great deal of service, as the load on the electric

engines, detecting instantly any tendency to race.

The engines, according to the system of the Robb-Armstrong Co., are built on the interchangeable plan, any part being easily replaced.

Besides the two generators already mentioned, there is a motor generator set. This consists of a 30 k.w., 125 volt generator on the same bed and shaft with a 45 h.p. 500 volt motor, running at a speed of 850 revolutions per minute. It is meant to take current at 500 volts from the wires of the Toronto Electric Light & Power Co., and deliver it reduced to 125 volts, for experimental generators. The set will be employed when for



POWER EQUIPMENT OF PHYSICS BUILDING—GENERAL VIEW OF ENGINES AND GENERATORS

As will be seen from the accompanying illustration, the plant consists of two sets of machinery. The larger consists of a 100 k.w. Westinghouse direct current generator of 125 volts and 800 amperes, running 250 r.p.m., operated by a 15x14 Robb-Armstrong engine of the vertical, centre crank enclosed type. The smaller consists of a 50 k.w. direct current generator at 125 volts and 400 amperes, running at 275 r.p.m., operated by a 12x10 Robb-Armstrong engine of the same type as the larger one.

A striking fact in the arrangement of the equipment is the economy of floor space

generators varies. It must be sensitive, and at the same time powerful.

The Robb-Armstrong-Sweet governor, which is attached to these engines, has but one spring, a flat one. This spring carries the one weight, and takes up the strain due to centrifugal force, so the suspension pin, which carries the eccentric is subject only to the strain of driving the valve gear.

High range thermometers attached to the engines test the degree of superheating of the steam as it is delivered.

Tachometers of the Shæffer-Budenburg make (Foxboro, Mass.) indicate the speed of

any reason it is desired to operate the main generating plants. This generator, like the other electrical equipment, is the work of the Canadian Westinghouse Co. of Hamilton.

Similarly, the buildings may be lighted, when expedient, by current from the Electric Light Co.'s wires.

The switchboard consists of seven panels, 32 inches wide and 90 inches high of blue Vermont marble, and is equipped with a very complete set of instruments. There are two generator panels, equipped with automatic circuit breakers, ammeters, voltmeters, air switches, field discharge switches, etc. and one



motor generator panel for the 100 k.w. equipped with ammeters for motor and generator, voltmeter, main generator switch, circuit breakers for generator and motor, starting rheostat for motor; five load, or feeder panels, each equipped with necessary ammeters, circuit breakers and switches. Thompson recording wattmeters are supplied on feeder panel for Convocation Hall.

A separate switchboard controls the heating apparatus of the group of buildings. Exhaust steam from the engines is used for heating, with an automatic regulating plant, the work of the Johnson Service Co. of Toronto. Three panels of the board are taken up with the compressed air driven regulators. Two contain low pressure steam gauges, made by the Bennett & Wright Co. of Toronto. Three others control the motors for driving fans in the ventilating system. These are equipped with instruments made by the Weston Electrical Co.

In the same room there are an air compressor and a vacuum pump. Each of these is connected by piping with the laboratories

## The Superintendent and His Pay

By JOHN J. MORONEY IN BRICK.

I believe I can say without hesitation, after a long acquaintance with conditions on hundreds of brickyards in all parts of the country, that first-class brickyard superintendents and head burners are the poorest paid in proportion to their responsibilities, and their actual value to their employers, of any skilled labor in any industry that I am familiar with. I know of only a half-dozen in the country that are getting \$3,500 a year or upwards; while the majority are doing high-class work for \$1,800 a year, or even less.

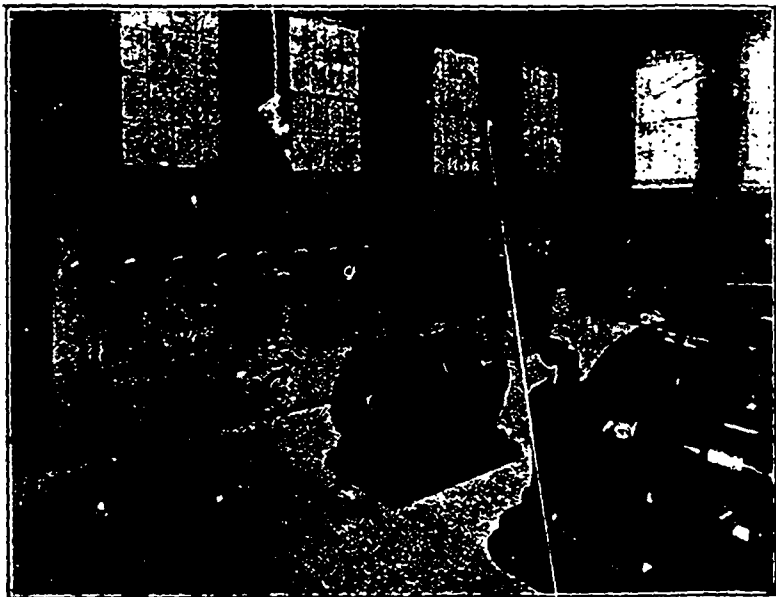
As is well known in the trade, I have been in the brick field for many years, and have organized many companies for making all kinds and classes of brick, and I will say frankly that the success of any and all such companies has depended more upon the man in charge of the plant than on any machinery that I or anyone else could furnish, or any

fabulous amount to pay to anyone; not realizing that it means all the difference between success and failure on the plant, and between a good profit or a big loss on their investment. They do not stop to figure that a first-class brickyard superintendent is not made in a day, but is the product of years of experience on many different clays, and under many different conditions; and that this experience is something which cannot be learned from books, but only from hard knocks, and by years of work from the clay bank up. In addition to the hard work and the practical experience, it takes a great deal of intelligence and common sense, and a faculty for handling men and getting the best work out of them, that is born and not made.

The superintendent who keeps the plant in continuous operation from whistle to whistle; who stops the stops, and keeps the material moving from the clay bank to the market in the most economical manner, is the man who will make money for the stockholders. Such a man anticipates the small matters that are likely to cause delays in the run, does his repair work after hours, and watches his kilns and drier nights, no matter how much assistance he may have; so that, his work is really never done, and he is "always on the job." Such a man does not look with suspicion on all new devices and labor-saving appliances for the yard; nor does he consider the machinery man as his natural enemy, or as a pirate and a robber. He studies carefully the principle of every new device to improve his product, or cheapen its cost, and if apparently a correct principle, and the device is suitable for his work at a reasonable price, he gives it a trial. He appreciates that we are all studying to improve the product, and decrease the cost of production. Such a man figures and thinks, as well as works, and he reads the trade journals to keep posted on what others are doing. As a result, he succeeds, and the plant succeeds.

For instance, I have seen such a man take hold of a run-down yard, with an old-time equipment, that had been a grief to the stockholders for years, and increase its output 40 per cent. in the first season's run, without spending any material sum for new equipment, the improvement being almost altogether in the management. In the particular instance that I have in mind, the superintendent took a contract from the discouraged stockholders to furnish them the brick made and burned, ready for the market, at a certain sum per thousand, which would leave them a good balance on the right side of the ledger. They were glad enough to get it, but when they learned toward the end of the contract that the superintendent was making \$500 to \$600 a month on his contract, they refused to renew it at its expiration, thinking they had learned enough to do the same thing themselves with a cheap man, and save all this profit; but they soon found themselves back in the same old hole again.

On the other hand, I have seen a number of plants with the finest kind of material for high grade brick, with the best machinery equipment that could be obtained, with a first-class layout, and a market that was calling loudly for brick at good prices, put



POWER EQUIPMENT OF PHYSICS BUILDING—VIEW OF SWITCHBOARD

of the Physics Building. The air compressor is made by the Canadian Westinghouse Co., while the motor, rated at a single h.p., for driving the vacuum pump, is the work of Allis-Chalmers Bullock Co., Limited, Montreal.

The engine room is equipped with a traveling crane, by the Dominion Bridge Co., Montreal.

The boiler room is on the same level as the engine room and occupies the west half of the building. There are two Babcock & Wilcox, (Montreal) boilers 18 feet long, to work under a pressure of 145 pounds of superheated steam. Rising ground at the rear of the building permits coal to be dumped into the bins, on the boiler room level.

Ashes are carried to the upper level by an endless chain conveyor. This is driven by a small motor, made by the Canadian General Electric Co., and installed by the Federal Electrical Construction Co.

process of manufacture. In fact, it is a common saying among we machinery men that we can build machines, but we cannot build brains to operate them with; and we have often wished we could send out a box of brains with each carload of machinery. We have to depend on the superintendent to furnish the brains, however, and so do the owners of the plant.

Many times, after all the organization work on a new company has been done, and the machinery contract signed, the question of superintendent has come up; and when I tell the stockholders that for a good superintendent for a medium-sized plant they should pay \$150 to \$200 per month salary, they are scared green, and want to know if I cannot get them a good enough man to start with at \$75. Often these companies are organized in small towns, where salaries are low, and living cheap, and the amount of money I mentioned looks to them like a

into the hands of a know-it-all superintendent, and get into a bad financial hole before the end of the first season; a hole that they have found it hard to get out of in spite of material, market and machinery. Such things as this are unfortunately common enough in all manufacturing industries, and they prove that the highest salary ever paid to a superintendent is cheap if he makes good; as when he makes good, he always brings to the company a good deal more than the amount of his salary.

Now, after years of experience, covering almost every state in the Union, I can only say: "The Lord deliver the brickyard owner and the brick machinery man from the 'smart Alec' superintendent, who knows it all; the clump superintendent, who knows nothing; the lazy superintendent, who thinks everything is too much trouble; the bigoted superintendent, who cannot be taught new methods, and the ignorant superintendent, who has not had the necessary experience, and condemns every innovation

without looking into it." Such men have no right to be in business that requires as much experience, thought, intelligence and hard work as a modern brick works. It would be far cheaper to pay such a man his wages and let him go fishing, if you must keep him on the pay roll.

All that I have said about the superintendent applies equally to the burner, who is paid even less. The best materials and machine, and the best yard management, cannot produce good results if the brick are not properly burned. You can make brick or any other clay product, and if your ware is spoiled before reaching the kiln it can be worked over; but if it is spoiled in the kiln there is no remedy. It is a dead loss of time, fuel, labor and money.

Therefore, if you have a good superintendent and burner, it will pay you well to pay them well. Give them a good percentage of what they make for you, and treat them kindly, as they are human. They will then stick to you and the plant, and make you money.

## Dangers in Lubricating Oils

EDITOR CANADIAN MANUFACTURER:

Dear Sir,—My attention has been drawn to an article reprinted in your issue of June 19 from the American Miller. In this article attention is called, "To the fact that there is danger in lubricating oils and that there is apparently little or no check on the sale of rank frauds to the public as lubricants." The article also says, "That many of the flour mill fires, the cause of which is reported as 'unknown' are due to spontaneous combustion, due to lubricating oil, has been the conviction of flour mill mutual insurance men for years." The eminently proper conclusion reached in the article is, to further quote, "There is no question that something should be done to put the question of selling lubricants on a higher basis, where the stuff should be sold for what it is and true to name; but how can such a thing be brought about?"

I am glad to be able to tell you that relief from this great trouble is in sight, for both the millers and the insurance companies, and it has come through one of the recent marvelous discoveries in connection with the electric furnace work of Niagara. In the article, to which, it has been my pleasure to refer, you point out that only animal and vegetable oil will produce spontaneous combustion, and that mineral oils, which are the products of petroleum, will not take fire spontaneously. However, your conclusion is that, "There is danger from fire in all classes of oils."

Now the possible modern step in advance, to which I desire to direct the attention of yourself and readers, comes as the result of the manufacture in Niagara Falls of Acheson-graphite, a product that meets all requirements of lubrication, and which is now being introduced to the industrial world. Acheson-graphite, "Grade 1340," is a disintegrated, extremely unctuous product, and is the purest and best graphite for lubricating purposes ever put upon the market. It is recognized that it stands without a peer as a solid lubricant, but while the discovery of the manufacture of this graphite means much to industry, it is more interesting still to know that Mr. Edward Goodrich

Acheson, who only recently was awarded the Rumford medal by the American Academy of Arts and Sciences for his electric furnace work, has invented a process, which is now in successful application here, whereby Acheson-graphite is deflocculated, in which condition he causes it to remain suspended in oil and water for lubricating purposes. Deflocculated Acheson-graphite in water has been given the name "Aquadag," while deflocculated Acheson-graphite in oil has been named "Oildag."

It is to this "Oildag" product to which I direct your special attention as offering a remedy for the dangers you so wisely point out as arising about flour mills. Oildag is put up in a paste form, in tubes sufficient to charge 1, 5 or 10 gallons of mineral oil, and where it is used as a charge for this specified quantity of mineral oil, the graphite remains suspended in the oil. Through its use, protection and relief will come to flour mill operators and owners, from the fact that where an oil containing animal fat is employed the deflocculated Acheson-graphite will not remain suspended but will settle out of the oil immediately, announcing that the oil employed may be looked upon as dangerous for flour mill lubrication. We must admit that these things are truly marvelous. In its deflocculated condition this Acheson-graphite, guaranteed at least 99 per cent. pure, will readily pass through the finest filter paper, when suspended in water, the deflocculation practically reducing it to the molecular condition, and thus it will not clog oil cups.

It should be recognized that in this new lubricant, the mineral oil employed is simply used as a carrier to take the deflocculated Acheson-graphite to the point where the lubrication is desired, and the graphite itself becomes a lubricant of far more and lasting value than oil. A true lubricant is a body that will subdivide so that all movement will be within itself and not between it and the adjacent metals. Acheson-graphite meets this requirement, and is of a nature that permits of slipping within its own mass without an expenditure of energy that will

produce high temperature. When graphite as pure as Acheson-graphite is introduced to bearings between metal surfaces it acts practically as the equivalent to a film of oil, having, however, the advantage over oil in that it will not permit of the metal coming in contact with heavy pressure, as is the case when a film of oil breaks, the importance and great value of which is apparent to all familiar with the service that must be rendered by a perfect lubricant.

In the past, many efforts have been made to improve oils by the addition of graphite resulting largely in failures. These failures are readily understood when we take into consideration the fact that, up to the time previous to the manufacture of unctuous Acheson-graphite, no graphite was to be obtained that did not carry at least 3 1/2 per cent. impurity, this impurity consisting of talc, mica, clay, silica, etc. While an impurity of 3 1/2 per cent. impresses one as being small, we would not for a moment think of adding to 96 1/2 pounds of oil 3 1/2 pounds of such impurity and consider it a lubricant.

I think THE CANADIAN MANUFACTURER performs a valuable service to the flour mill and insurance interest when it joins with the American Miller in taking such a pronounced stand in regard to placing the selling and use of lubricants on a higher and more safe basis. This generation has been taught the use of oil for lubrication purposes, but there is much to indicate that future lubrication will largely be accomplished through the application of unctuous graphite of the high and truly wonderful purity only obtained through electric furnace science and practice, for it has long been apparent that natural or flake graphites, made by the hit-and-miss process of nature, do not respond to the needs of man and industry in the field of lubrication.

Very truly yours,

O. E. DUNLAP,

Secretary International Acheson Graphite Co.

Niagara Falls, July 9, 1908.

### PERMANENT EXHIBITION OF BUILDERS' AND CONTRACTOR'S SUPPLIES AT MONTREAL.

The establishment in the near future of a permanent exhibition of building supplies of all kinds at Montreal is now definitely announced by the Montreal Builders Exchange.

The directors of the Builders' Exchange, according to the announcement, have secured 6,000 square feet of floor space in the new Power Building, on Craig Street. This building, which also contains the head offices of the Montreal Light, Heat & Power Co., was completed last year, and is one of the best examples of up-to-date fire-proof office building construction in Montreal.

Following the lines of the successful permanent exhibitions in Philadelphia, Cleveland, Pittsburg and Baltimore, it is proposed to have exhibited everything pertaining to building, so as to give the owners and prospective builders, as well as the architect and contractor the best possible opportunity to familiarize themselves with the best and most up-to-date materials and methods.

Under the auspices of the Montreal Builders' Exchange, and in charge of their engineering secretary, Mr. J. H. Lauer, the success of this enterprise is assured from the start.

# Electricity as a Power for Clayworkers.

By LAMBERT HAIGH, AT THE NATIONAL BRICK MANUFACTURERS' ASSOCIATION.

Your honorable secretary has requested me to read a paper on "Electricity as a Power for Clayworkers." I might add that I have been engaged in the electrical and brick business for nearly ten years, the larger portion of the time in the electrical business, and your secretary, knowing this, has seized the opportunity of placing my name on the program for a paper.

This is my first appearance at one of these conventions, but I hope it will not be the last, and if I can give you any hint on the subject which will be of benefit to you in any way, I shall be quite satisfied.

I do not intend to go into the design of electrical apparatus very deeply, but to try and show wherein clayworkers can use electricity to advantage. All are aware that the greatest cost of our brick plants is taken by salaries, employees wages, and fuel used in the different branches of this business, and even though we do not require the power that a large steel works does, we must not overlook the fact that it is to our advantage to bring down, to as low a figure as possible, the cost of running our plant and to do that is to have the most economical method of driving.

At the present day, steel works, cement works, cotton factories, and a large number of other industries, have adopted the electric drive instead of the mechanical drive, and have proven it to be quite a success, and, in looking over the method of driving our brick machinery, I find that a brick plant is about one of the best plants for economical driving by electric drive that is to be found. This is on account of having to have, with mechanical transmission, such a large amount of shafting, due to the machinery and other appliances being so widely separated. It is this great amount of shafting which is the cause of our large friction losses in the mechanical transmission. I am sorry I have no results of tests showing the exact amount of friction losses in a brick plant, but various tests which have been taken of other kinds of plant show losses to be on an average of 50 per cent., and this figure is also a very conservative one for a brick works, for it is only where we have the advantage of short shaftings and proper alignment of shaftings and bearings, and great attention given to the bearings, that we can get below that figure, and in most of the brick plants we do not get much below that.

It is not my intention to dwell on the friction losses of the mechanical drive, as most of you are fully aware of these losses, but to show you where we can advantageously use the electric drive.

## ON A BASIS OF 200 H.P.

We will take for supposition that we require 200 h.p. to drive our brick machinery. The largest motors would be those for the brick machine, pug mill, pans and presses, and at the present day electrical manufacturers have brought the electrical machinery up to such a high state of excellency, that they would guarantee 90 per cent. efficiency for

motors of a h.p. that we would require for those machines. For the smaller motors for conveyors, etc., we would get 82 per cent. efficiency, and motors for pumps and blowers 86 per cent. efficiency, making an over-all efficiency of 86 per cent. This means to get 200 h.p. work out of our motors, we would require 233 h.p. at the motor terminals, and, allowing two per cent. loss in line to the various machines required to be run, our generator would have to give out 238 h.p., or equal to 180 kilowatts. Any electrical company would guarantee us an efficiency of at least 90 per cent. for a generator of that capacity, which shows our engine would have to develop 265 h.p., being a loss of 25 per cent., or an over-all efficiency of 75 per cent. This is placing everything at a moderate efficiency, and I do not doubt but what this could be somewhat improved upon, but it is leaving all the plant direct motor driven. I find, on closer observation, that it is necessary in some plants to have some shafting. Take a plant which has a large number of pans for grinding shale or granulators for clay, then it is advisable to have our motor direct coupled or belted to a counter shaft, and to run those pans or granulators from that shaft. This will increase our losses, due to the friction of that shafting, and will increase our h.p. output from the engine, making it approximately 290 h.p. instead of 265 h.p. This is quite a saving compared to the h.p. our engine would have to give out, if we had the mechanical drive and if we lose our transmission losses in the mechanical drive as low as 40 per cent., it is in this case a loss of 53 h.p. greater than the loss by electric drive. Assuming it requires five pounds of coal per h.p. per hour, which is a low estimate for the average noncondensing steam engine in a brick plant, it is a saving of 265 pounds of coal per hour, or 2,650 pounds of coal for a ten-hour day.

In most brickyards our losses are that of the average shafting transmission, 50 per cent., and if we assume the same amount of coal per h.p. as before, we would require to get 200 h.p. work out of our machinery, 6,000 pounds of coal more than we would require by the electric drive. This is losing everything on the machinery being run continuously at full load, which is generally done in most of our up-to-date plants. For the benefit of those whose plants require only about 100 h.p. in shafting transmission, the electrical apparatus required would be rather less efficient than the larger apparatus, but 80 h.p. with the electrical drive would be all that is necessary, a saving compared to the shafting transmission of 900 pounds of coal per day.

This, I think, is well worth investigating, as the electrical companies would guarantee to us the efficiencies previously mentioned. The writer himself has tested a large number of motors which have shown high efficiencies, and most of the motors required in a fairly large sized brick works would be large enough to demand a good efficiency. Let us look into the other advantages to be gained by using electricity.

## ADVANTAGES OF ELECTRICITY.

No. 1.—Maintenance. The cost of maintenance is brought down to as low a figure as it is possible to get, and will prove quite a saving compared to that of the shafting transmission. This is easily seen by having done away with a large amount of shafting and belts which are always needing repairs and renewals, and which, if not kept in good condition, increase the friction losses to a large extent, and which, I pointed out before in this paper, would increase to a large extent our coal consumption. I might also say we have practically no danger of shutdown through breaking or slipping belts, and a decrease of the danger of belt driving to all men working near the machines is greatly eliminated, and this also adds to the comfort and appearance of the plant, in general.

No. 2.—The ability to shut down any part of the plant without interfering with any other is of great advantage. This is due to the subdivision of the applied power, which is very applicable in a brick works, as all motors required are of a fairly large size and group driving can not be successfully used, and if any machine breaks down, or any motor burns out—for the electric motor is not quite infallible in this respect—we have, by subdividing our power, in no way interfered with the working of any part of the plant, and this leads me to again mention our friction losses.

Suppose we have to shut down our brick machine, pug mill or presses for repairs or alterations. In the present condition with shafting transmission, we simply throw our belt on a loose pulley, but we have not stopped the belt or shafting, which shows us our losses are constant, just as long as the engine is running; whereas if we had electric power, when we shut down any machine, we cut off all power required for that machine, which shows that the loss in this method is a percentage of actual power used.

No. 3.—The cost of running, which, in the mechanical drive, is seldom thought of, can easily be found out in the electric drive. A few inexpensive instruments placed on a small switchboard will show us just how much power any certain machine is taking at any time, and records of same can be kept for future reference; or, if it is desired, all the power can be recorded on the same instruments, thus making it easy to determine the cost of running by the amount of coal consumed, compared to the electrical units shown on the instruments. If anything goes wrong with any machine, this can easily be found out by the abnormal load shown on these instruments.

No. 4.—Electric drive has great flexibility for extending the plant without any alteration whatever to the existing machinery, and in conveniently and economically supplying any amount of power to any part of the plant. There are instances of this in our brick works, many having to have another engine put in to run various machines, such as a blower for utilizing waste heat from the kiln for drying purposes. A few are using blowers for draught for the kiln instead of a chimney, and, as quite a number of clay







# Controlling the Burning of Clay Products.

PAPER READ BY W. D. RICHARDSON, OF THE RICHARDSON-LOVEJOY ENGINEERING CO., COLUMBUS, O., BEFORE THE CANADIAN CLAY PRODUCTS MANUFACTURERS ASSOCIATION.

CONTINUED FROM JUNE 19.

The method of ascertaining the character of the combustion in the furnaces, the deficiency or excess of air in the kiln, is by analyzing the gases escaping from the kiln. There are two well known types of apparatus that are practical for use on a brick yard. The Orsat apparatus, in the form most suitable for kiln work, consists of a gas-measuring tube or burette and three absorption flasks. A sample of the kiln gas or flue gas having been taken, it is first conducted into the flask containing a solution of caustic potash, which absorbs the carbonic acid. The decrease in volume of the gas as shown by the measuring tube is the amount of carbonic acid, ( $C O_2$ ). The gas is then admitted to the second flask, containing pyrogallic acid, which absorbs the oxygen. The loss in volume of the gas is the oxygen. Next the gas is admitted to the third flask containing

such an analysis can be made in 15 to 20 minutes. For studying the combustion of fuels and for ascertaining whether the kiln gases are oxidizing or reducing, these gas analyses are most instructive and essential for controlling the burning.

For ascertaining whether the firing is being done economically, a more simple apparatus is that devised by Dr. Cramer, of the "Tonindustrie-Zeitung," Berlin. This apparatus is based upon the fact that the carbonic acid in the flue gases bears a direct ratio to the amount of air used. When bituminous coal is used, the carbonic acid should be about 16 per cent. of the volume of the flue gases, though it is considered in practice that 15 per cent. of  $C O_2$  is good operation. If there is less than this quantity too much air is being admitted to the furnace. If anthracite coal or coke is used, the percentage of  $C O_2$  should run considerable

carbonic acid in the gases indicated by the lines radiating from the zero point.

The intersections of these radial lines with the vertical lines, representing the difference in temperature of the air entering the furnace and of the gases emerging from the kiln, give the per cents of heat loss as ordinates.

For instance, if the per cent. of  $C O_2$  in the kiln gases is found to be 8, and the difference in temperature between the air entering the furnace and that of the hot gases escaping from the kiln is 700 deg. (1292 F.), about 57 per cent. of the fuel is lost. If the per cent. of  $C O_2$  is 16, which is near to perfect combustion with average bituminous coal, the loss of fuel is 29 per cent., the temperature difference being the same. This loss is due to the high temperature of the escaping gases and is unavoidable. Hence, the preventable loss in the first case is 57 minus 29, or 28 per cent. In many cases on brick kilns, it will be found that the per cent. of  $C O_2$  is as low as 6, which means a still greater loss of fuel.

There are now on the market a number of  $C O_2$  recorders that automatically sample the flue gases and determine and record the per cent. of  $C O_2$ , making an analysis and record every three or four minutes.

## MEASUREMENT OF KILN TEMPERATURES.

Since many clays will not stand heating up too rapidly without damage to the ware, especially during the early stages of the burning, and since there is generally a well defined limit of heat resistance for each clay, beyond which the temperature cannot be safely carried, and since economy of fuel, time and labor require that there should be definite, steady progress in the burning from beginning to end, it is evident that frequent or constant measurement of the kiln temperatures is an important means of controlling the burning. This measurement of temperatures should begin soon after the fires are started and should continue until firing has ceased and the kiln is burned. It is not practical to use a single instrument for measuring the temperature from beginning to end. During the watersmoking period there should be used special mercury thermometers, known among clayworkers as

## WATERSMOKING THERMOMETERS.

These thermometers are of two forms, both of which are often used on the same kiln at the same time, one in the top of the kiln and one in the bottom, though the latter may also be used in the top. These thermometers usually have a scale about 12 inches long, graduated from 100 to 600 deg. F. What is called the armored thermometer consists of a solid glass thermometer with scale etched on the glass, packed in a metal case with asbestos wool. The case has ends pointed and a ring at the top for a chain. The thermometer can be used in the top of the kiln or can be lowered to the bottom. For a time at least, a watersmoking thermometer should be used in the bottom of the kiln as well as at the top. The watersmoking of a kiln or chamber cannot be complete until a tempera-

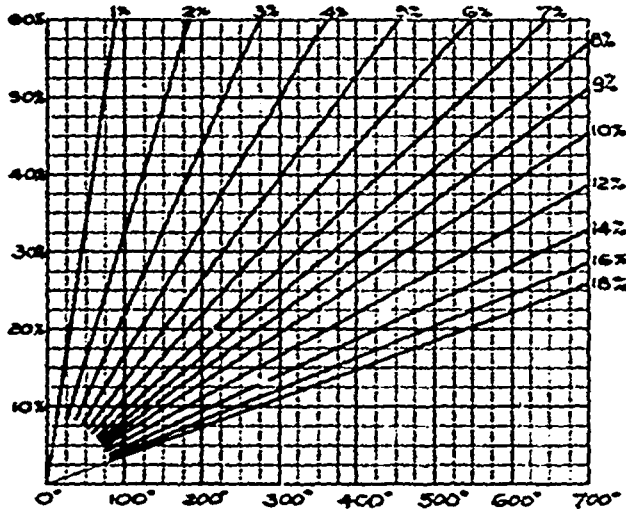


CHART No. 5.

a cupric chloride solution, which absorbs the carbon monoxide. The decrease in volume of the gas is the carbon monoxide,  $C O$ .

The gas that is left remaining in the burette is the nitrogen, which represents 79 per cent. of the air admitted to the kiln, and some water vapor. From such an analysis the following conclusions can be drawn.

1. If there is a considerable quantity of  $C O$  present, not enough air was admitted to the fuel in the furnaces and the combustion was incomplete. Partial combustion to  $C O$  produces less than one third of the heat that is yielded by complete combustion to  $C O_2$ .

2. If oxygen is present and  $C O$  wanting, the combustion was complete, though an excess of air was admitted, which cools down the gases unnecessarily.

3. If besides an appreciable amount of  $C O$ , oxygen is also present, it shows either that in consequence of too low a temperature in the furnace there was incomplete combustion, or that there entered the kiln later, air that took no part in the combustion.

After some practice with this apparatus,

higher. Burning pure carbon, under perfect conditions, the percentage of  $C O_2$  should be 21.

The Cramer apparatus consists of a flask, into the stopper of which is a burette graduated to 1-10 per cent. The burette is filled with caustic-soda solution. The gas is conducted into the flask by means of a suction bulb. When the stopcock in the burette is opened, as much caustic soda runs into the flask as there is carbonic acid in the gas, the reading being taken in per cent. directly from the scale. This is a cheap and thoroughly practical apparatus and should be in use upon every clay working plant. Used in connection with the draft gage, there could be saved an enormous quantity of coal every year.

There are two methods of calculating the economy of combustion or the loss of fuel, from the percentage of  $C O$  in the flue gases, to explain which would take us beyond the limits of this paper. In chart No. 5 is represented graphically the heat loss (into the stack). The left-hand numbers denote the per cent. of loss which correspond to the

# A New Power in the Canadian Trade

Announcement has been made that one of the largest factors in the Clay working industry of the United States has fully completed plans whereby they will prosecute to the fullest extent a systematic and effective campaign for the Canadian Clay Crafter's business.

This campaign was inaugurated some little time ago by the appointment of direct representatives in the Canadian field. This representation embodies the highest class of Canadian men who are thoroughly familiar with the products of the company in each of its details, and furthermore, being of Canadian birth and familiar with the nature of the average Canadian, are fully

conversant with the material and people with whom they have to deal. The products represented are of the highest class being made to-day and are made by the C. W. Raymond Company, Dayton, Ohio, U. S. A. who are the largest exclusive builders of Clay Working Machinery in the world. While Canadian clay crafters have a considerable knowledge of this company's products, still a better acquaintance will be of mutual benefit to both, and it is to this end that the C. W. Raymond Company have laid their plans.

The C. W. Raymond Company have been exclusive in this line of business for nearly thirty years

and have many successful plants on this side of the border. Their manufacture consists of everything required by the clay crafter from handling the clay from the bank, until the brick are delivered into the kiln, and that for either soft mud, stiff plastic, or dry press process.

The appended list of publications on this page will give a slight insight into the machinery manufactured. However, it would be advisable for every Canadian clay crafter to have in his files, a copy of the Raynoud catalog and as many of the Exhibits as may from time to time interest him, to use for reference if not for actual purchasing. The company issues a general catalog; however, special and later construction is shown on the exhibit sheets.

We issue the following Publications, which may be obtained upon application to our Publicity Department

(a) GENERAL CATALOG. (b) CATALOG OF DRAWINGS AND SPECIFICATIONS. (c) "SMILES."

EXHIBITS:

- 2040—9ft. Heavy Duty Dry Pan.
- 2042—No. 2 Rotary Automatic Cutting Table.
- 2044—"999" Brick Machine.
- 2045—Perfection Hand Represses.
- 2046—Clay Conveyors.
- 2047—Four Roll Crushers.
- 2049—Niagara Hollow Ware Machine.
- 2052—Victor Repress.
- 2053—Granulators and Bevel Geared Pug Mills.
- 2055—Clay Elevating Machinery.
- 2056—Portable track.
- 2060—Roofing Tile Designa.
- 2061—Dry Presses and Dry Press Machinery.
- 2062—Automatic Tile Cutter.
- 2063—System of Open Air Drying.
- 2069—Peerless Smooth Roll Crusher.
- 2070—No. 3 Brick and Tile Machine.

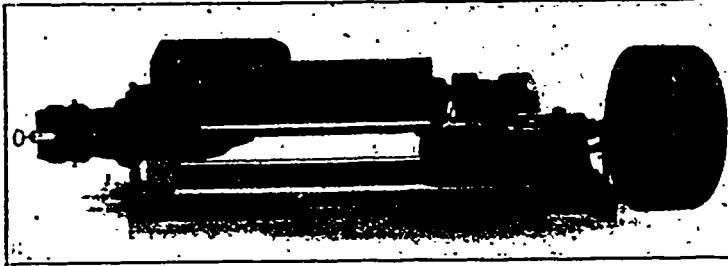
- 2071—Standard Pug Mills.
- 2072—Single Geared Pug Mills.
- 2075—Semi-Automatic Cutter.
- 2077—Radiated Heat Dryer.
- 2078—Soft Mud Machinery.
- 2079—Belt Apron Type Clay Elevator.
- 2080—"555" Brick Machine.
- 2081—Automatic Wet Pan Emptier.
- 2082—Piano Wire Screens.
- 2083—No. 1 Automatic Cutter.
- 2084—Dryer Cars.
- 2085—No. 3 Hand Dry Press.
- 2086—Automatic End Cutter.
- 2087—"777" Brick Machine.
- 2088—Hoisting Apparatus.
- 2089—No. 2 Combination Brick Machine.

# THE C. W. RAYMOND CO.

The Largest Exclusive Builders of Clay Working Machinery in the World

Dayton, Ohio, U. S. A.

Imperial Size Brick and Tile Machine



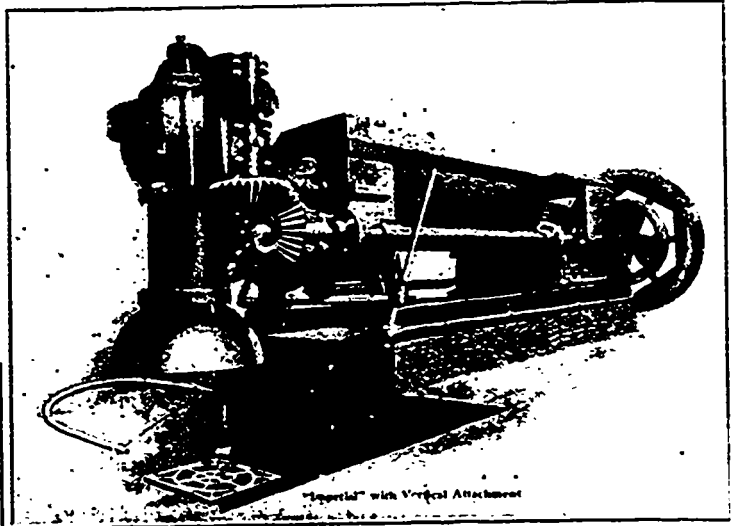
# The J. D. FATE COMPANY

Manufacturers of

## Clay-Working Machinery

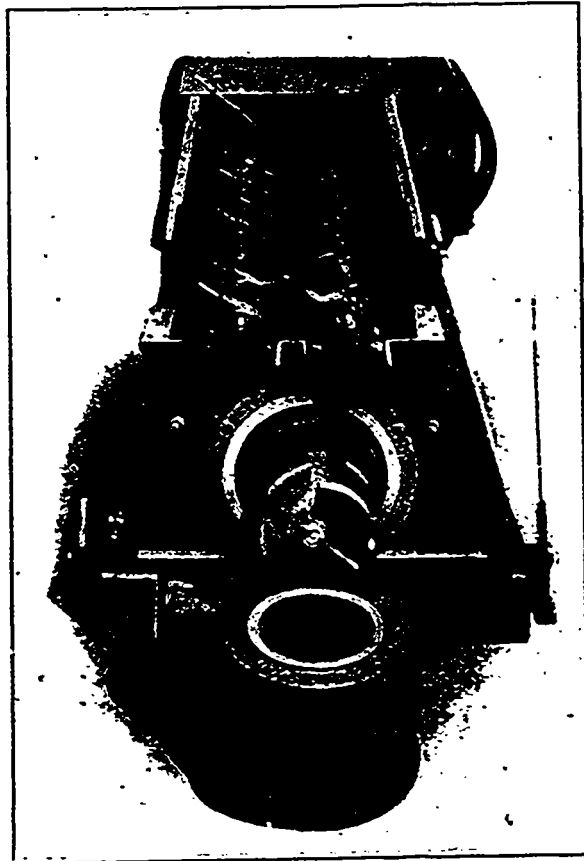
PLYMOUTH,  
OHIO,  
U.S.A.  
Richland County

It is universally conceded that the most practical type of Brick and Tile Machines are those in which are combined a thoroughly effective Pug Mill with a first-class Machine, and this is especially the case when the Pug Mill is of the double shaft type (see cut below). This is a good medium capacity Brick Machine and the best Tile Machine made anywhere in the world. The same type of machine is made larger and smaller to suit capacity wanted.

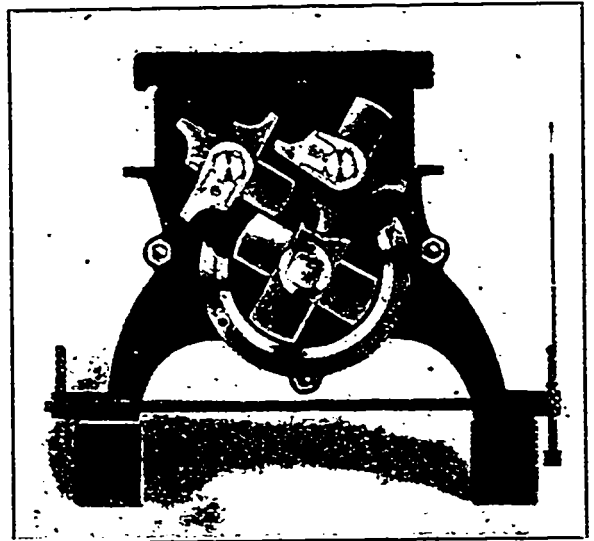


Imperial Machine with Vertical Attachment or making Large Tile

By placing this attachment on the Imperial Machine the larger sizes of tile can be made up to and including 24 inch. They are delivered vertically on pallets and so are kept in perfect shape.



This shows an interior view of all of the Combined machines, and gives an idea of the immense pugging capacity obtained by the use of the double shafts. It has been conclusively shown that more effective pugging is done with 8 feet of double shafts than with 16 feet of a single shaft.



This cut shows a cross-section of the Machine, where the clay passes from the pug mill to the auger cylinder. This arrangement of the knives keeps the clay constantly pushed down and prevents bridging and clogging.



# MACHINERY

That is  
**Strictly First-Class**  
**High Grade**  
 and  
**Up - to - Date**

This is what you want  
 Mr. Canadian Clay-Worker.

And we have only this kind  
 of Machinery to offer you.

Let us get together and do  
 some business.

Write us as to what you  
 need in this line and we will  
 gladly give you full informa-  
 tion about our Machinery and  
 why it is better than the best.

Throw out that little old  
 antiquated machine you have  
 been using and let us put you  
 in something that is modern,  
 something that will do you  
 better work and more work  
 and make you more money.

We build a full line of  
 Clay-Working Machinery  
 and can furnish you anything  
 you need in your factory.

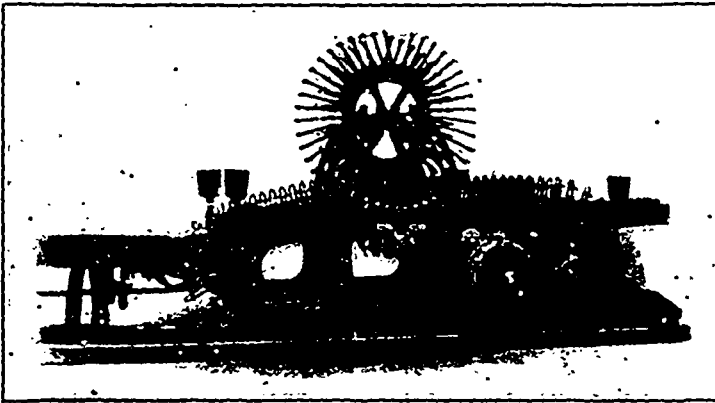
## The J. D. FATE COMPANY

PLYMOUTH,

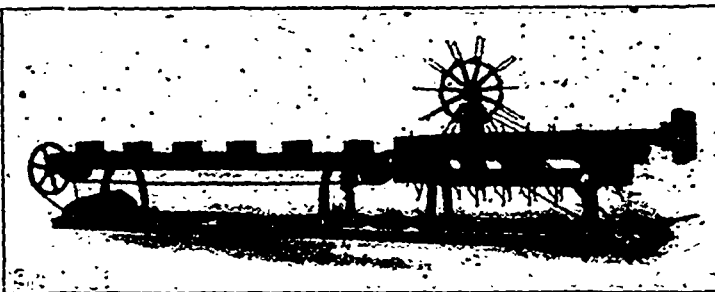
OHIO,

Richland County

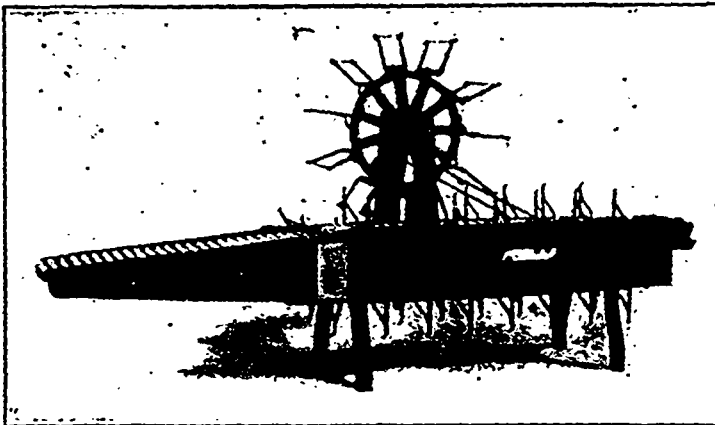
U.S.A.



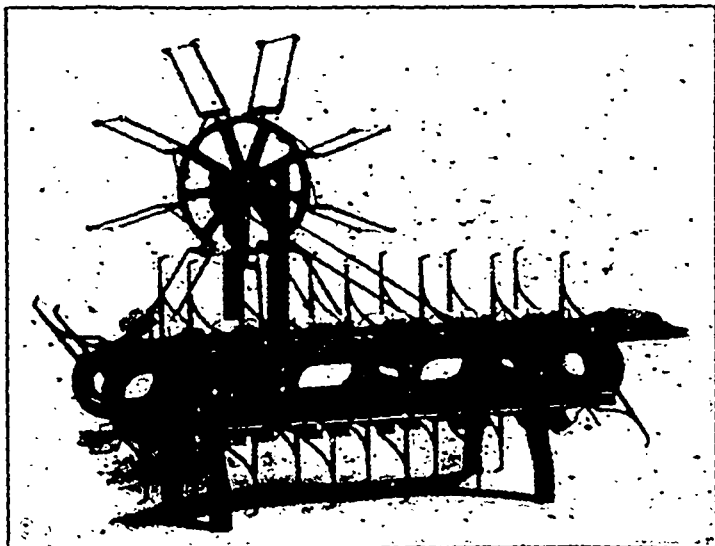
Bensing's Automatic Side Cut Brick Cutter



Bensing's End Cut Brick Cutter with Belt Delivery



Bensing's End Cut Brick Cutter with Roller Delivery



Bensing's Automatic Drain-Tile Cutter

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

ture of at least 230 deg. F. is attained in those parts of the kiln most remote from the source of heat. After some experience in using the watersmoking thermometer, it will be learned under regular conditions of draft, etc., what temperature it is necessary to have in the top of the kiln in order to have the required temperature in the bottom. Then the armored thermometer in the bottom may be dispensed with and there be used instead, in the top of the kiln alone, the long-stem thermometer. This thermometer has a long stem 24 inches to 48 inches in length, so that the bulb may reach down under the crown of the kiln from 6 to 12 inches and the scale-case remains always out of the kiln in plain view. This thermometer must be well made, the stem and bulb of Jena, high-resistance glass, carefully packed in a metal tube with non-conducting material, and the bulb to be

case the use of the thermometer prevents waste of time during the watersmoking period. With continuous kilns the watersmoking thermometer should always be used as a safeguard against scumming.

#### MEASUREMENT OF HIGH TEMPERATURES.

The practical measurement of the high temperatures used in kilns for burning clay products is not so simple a matter. It would require a volume to describe the many different pyrometers that are now manufactured. Most of these, however, are not well adapted for brickyard use. Most of them are sufficiently accurate, but few of them are sufficiently durable for high temperatures. There are two types of pyrometers that are in common use on ceramic kilns, the pyrometer for intermittent use and the pyrometer for constant use. The latter may also be

construction of these pyrometers is the conversion of heat into an electric current, which is set up when the junctions of dissimilar metals are exposed to the heat. The degree of heat is determined by a suitable device indicating the magnitude of the electromotive force of such a current.

The instrument consists of a galvanometer, a thermo-couple or element, protected in a suitable manner, and the wires which connect the thermo-couple to the galvanometer. Many metals and alloys have been used to form the thermo-element. Some of these have been fairly successful for use in measuring low temperatures, but for the high temperatures employed in burning clay wares, the only safe and satisfactory element is that made by the junction of a platinum wire with a wire composed of platinum and 10 per cent. of rhodium or of iridium. This thermo-couple was first used by Le Chatelier and is now known the world over by his name.

The thermo-couple, inclosed in porcelain tubes and the whole protected with a fireclay tube, is inserted in the kiln, usually through a hole in the crown, but sometimes through the door of the kiln, near the bottom. To insure accurate readings, the end of the couple furthest from the heat should be kept moderately cool. For comparative and approximate results, especially at high temperatures, this factor need not be considered. The end of the couple outside of the kiln is connected, at the binding posts, by insulated copper wire, to the galvanometer. This galvanometer, or millivolt-meter is especially adapted to the measuring of thermo-currents. The current is transmitted to an armature, the coil of which carries a pointer which moves over a scale or two scales, one in millivolts and one in degrees Centigrade or Fahrenheit. Owing to the high resistance of the galvanometer, the instrument may be set up at a considerable distance from the source of heat without the necessity of making allowance for the resistance of the conducting wires.

By means of a special form of recording galvanometer, the Le Chatelier electrical pyrometer can now be furnished to record the temperature continuously on a paper sheet. The galvanometer boom or pointer such as is used in the indicating galvanometer, is depressed every minute or half-minute, as desired, on to an inked thread, which is forced against the paper, rotating on the drum by clock mechanism. This, of course, makes a costly instrument, but we must come to the recording pyrometer, of some form in the near future; if our present rate of progress is to continue and we are to gain a more perfect control of the burning of our products.

The chief defect of the thermo-electric pyrometer is that it occasionally gets out of order. The thermo-couple, especially by repeated heatings has its structure changed, becomes brittle and finally breaks. The protecting tubes also may easily be broken in handling or damaged by high firing. The galvanometer is more durable, but sometimes gets out of order. These difficulties are not so great that one who has used this pyrometer would give it up, but they are such as perhaps make the intermittent pyrometer more practical in the hands of the average brick-burner.

There are also various optical pyrometers in

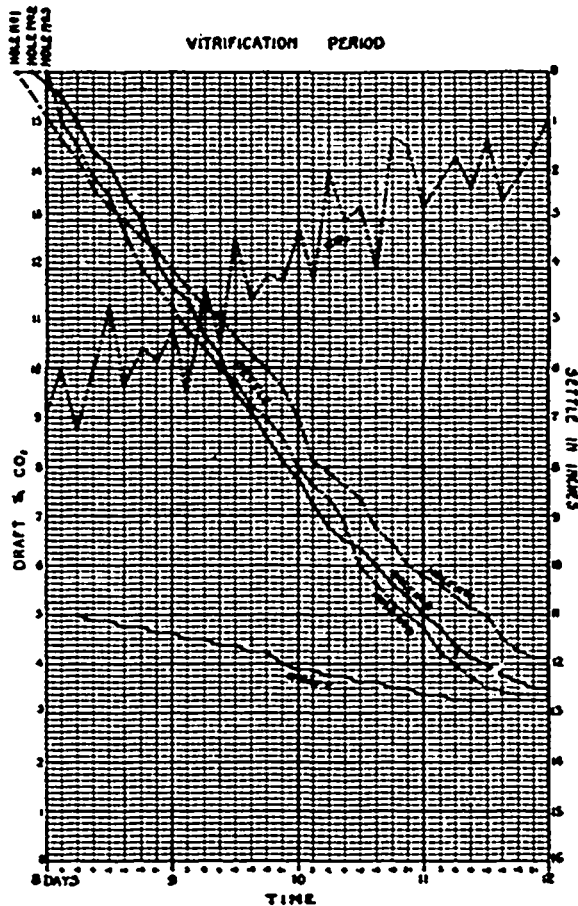


CHART NO. 6.

exposed to the heat must be well protected from damage. The scale-case outside of the kiln should be protected by a plate-glass front. As the instrument is quite heavy, it should be provided with a handle for removing from one kiln to another.

The advantage of the long-stem thermometer is that the bulb remains in the kiln, and the scale-case is outside in plain view for reading, while the armored thermometer must be removed to the cold air and the soot wiped off before reading and if a drop of rain should strike the hot glass it is apt to crack it.

There are also two or three practical recording thermometers for use during watersmoking. Where the ware is liable to damage during watersmoking it is advisable to use the recording thermometer. In any

self-registering and make a constant record.

The most practical pyrometer for intermittent use upon clay working plants is Brown's quick acting platinum pyrometer. A large number of these instruments are in use on brickyards in the United States and give good satisfaction. The ordinary workman can take the kiln temperature with this pyrometer as satisfactorily as the engineer. It is generally inserted through the crown of the kiln, and indicates on the dial the highest temperature of the kiln in 15 to 20 seconds. It is then withdrawn and, as soon as cold, which will be in about 15 minutes, it can be used again in the same or in another kiln.

For constant reading of kiln temperatures, the thermo-electric pyrometer is most commonly used. The principle involved in the

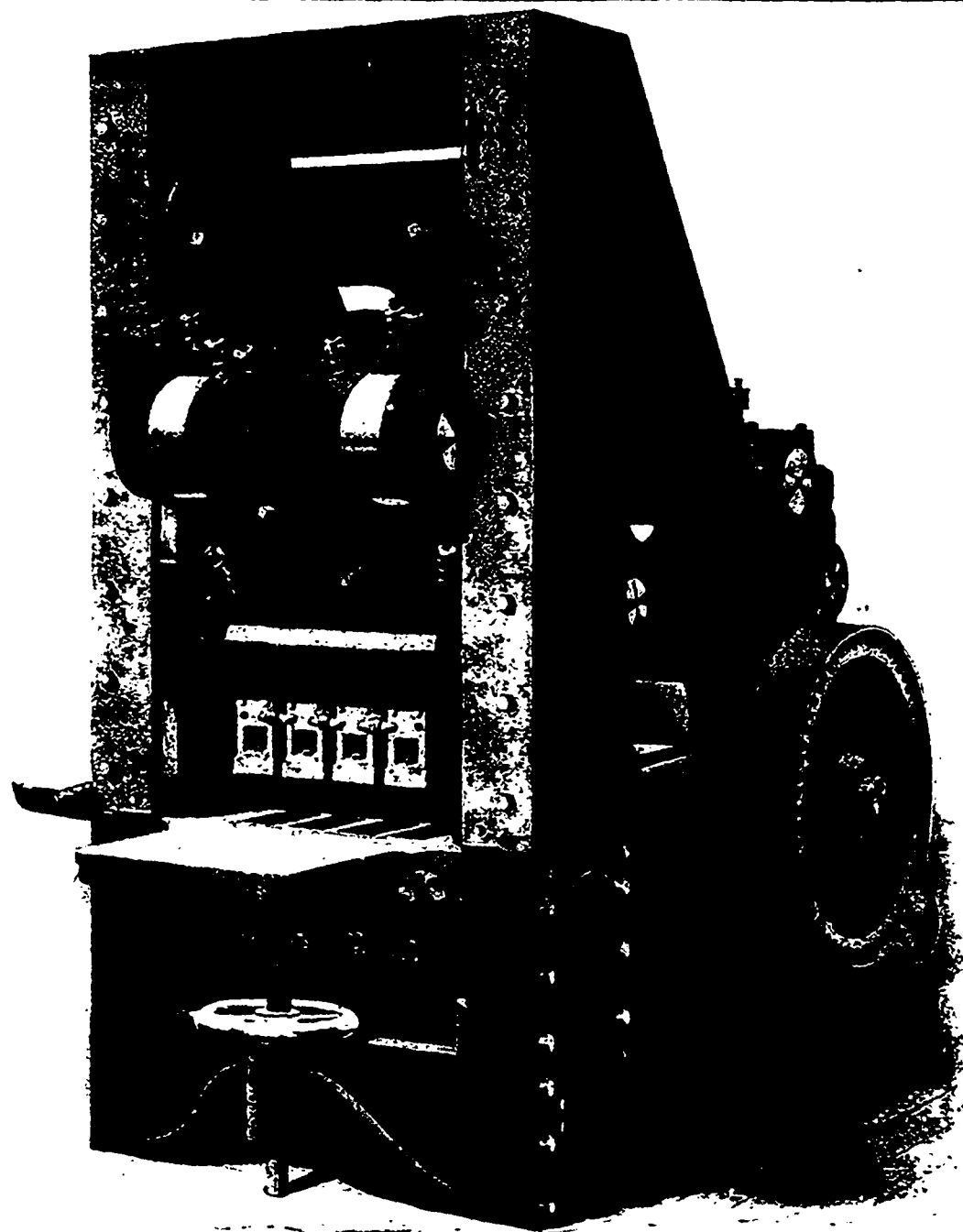
What's  
in a  
Name

**SIMPLICITY**  
**STRENGTH**  
**DURABILITY**

**ACCESS**  
**TO ALL**  
**PARTS**

**GREATEST**  
**PRESSURE**

**BEST**  
**PRODUCT**



IMPROVED BERG BRICK PRESS

The BERG is built for quality, for simplicity and for strength.



The BERG is built for work; long work; hard work; steady work—and it never fails to do its work, day after day, year after year.



The Berg saves the most time and saves the most labor—and it makes the most money for the brick manufacturers.



Correspondence invited.

Manufactured by its inventor in Toronto, Canada, exclusively.  
All equipment for Brick Plants to make Sand Lino Brick, Sand Cement Brick, Shale Brick, Clay Brick and Fire Brick.  
DRY PRESS, STIFF MUD AND SOFT MUD BRICK MACHINERY

**The Berg Brick Machinery Co., Ltd.** FOOT OF BATHURST ST. TORONTO

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use, none of which have been found practical in the clay industry. The pyrometer that promises most for the clayworker, but which we are not yet able to recommend, is the radiation pyrometer, invented by M. Fery, professor at the School of Physics and Chemistry, Paris. The radiation which emanates from a hot body, or which passes out through an observation hole in the wall of the kiln, falls upon a concave mirror and is thus brought to a focus. In this focus, is a thermo-electric couple, whose temperature is raised by the radiations falling upon it; the hotter the kiln the greater the rise of temperature of the couple. This pyrometer, of course, like the optical pyrometers, can only be used after the kiln becomes incandescent and is not very reliable until a temperature of 900 to 1,000 deg. C is reached, where the radiant heat is sufficiently strong to be readily measurable. The Fery pyrometer is also furnished with a recording apparatus.

As a guide for finishing the burning at the proper temperature, as a safeguard against underburning or overburning of clay wares, nothing can take the place of the Seger pyrometric cones. These are now so universally used as to require no description.

Summing up this brief discussion of the measurement of kiln-temperatures the following conclusions can be drawn.

1. During the watersmoking period, some form of thermometer should be used and the readings taken at least every three hours. Indicating mercury thermometers are good, but the recording thermometer is better.

2. During the oxidation and vitrification periods, that is, from the completion of the watersmoking to the end of the burning, there should be used the intermittent platinum pyrometer or the Le Chatelier electrical pyrometer. The recording instrument gives better control and is to be preferred also for the moral effect upon the burner and firemen.

3. The pyrometric cones should always be used. At what points in the kiln it is best to place them, depends upon the kind of ware being burned, and upon what pyrometers are used.

4. In down-draft brick kilns, a pyrometer in the top of the kiln and cones in the bottom give all the control of temperature to be desired.

#### MEASUREMENT OF SHRINKAGE.

In burning brick or other clay wares in an open kiln, that is, not in muffles or saggars, there is no better means of ascertaining the progress of the burning during the vitrification period, or of determining when the brick are sufficiently burned, than by measuring the settling of the brick in the kiln due to the shrinkage of the clay. There are some clays, to be sure, that do not shrink in the burning, but these are rare. It is not safe, however, to rely upon the settle alone, since the settle may be only in the hottest zone of the kiln or there may be errors in measurement, due to various causes. Yet this source of information should never be neglected. When accurately taken, in a properly-fired kiln, the settle is a true indication of the work done in transforming a block of clay into a durable brick, and hence shows more than an intermittent measurement of the temperature.

The apparatus for measuring settle varies with the conditions, but it is always simple. It pays to have a good apparatus and to do the work carefully. For periodical down-

draft kilns, a settle-measuring rod is made that saves time and insures accuracy. A more complicated apparatus is also made that remains in the kiln and indicates the settle constantly on a dial.

#### KILN RECORDS.

To get the full value of the use of controlling apparatus, it is not only necessary to have the daily-record sheets, but all of the data thus secured, together with the results obtained from each burn, should be recorded in a compact and permanent form for reference and comparison. It is only in this manner that the burning can be reduced to a system that gives positive assurance of the highest percentage of the desired product.

These records free the management from dependence upon any man and become a valuable asset of the proprietor or company. It was my practice for many years to have a record-book for each kiln. Later, in my engineering practice, I elaborated somewhat upon this in preparing such books for my clients. These books give a complete record of the kiln when the forms are filled out under the headings: Repairs, Setting, Burning, Cooling, Emptying and Results. For a graphic record of the burning there are three co-ordinate sheets, one for each of the chief periods of burning: Watersmoking Period, Oxidation Period, Vitrification Period. On the watersmoking and oxidation sheets, curves are to be traced of the draft and temperature. On the vitrification sheet, curves are to be traced for draft, CO<sub>2</sub>, and settle. Four pages of the book are required for each burn.

An enlarged sheet of the Vitrification Period is shown on Chart No. 6, with imaginary curves traced thereon.

These books are kept in the office by the bookkeeper, office clerk or by the superintendent, the data being furnished by the burners upon daily-report cards.

We will never attain perfection in burning our clay products, but our duty to strive for it never ceases. I believe that I have outlined the course we must pursue in order to make substantial improvement. The growing competition of sand-lime and cement products, makes it incumbent upon clay-product manufacturers to improve every process in their manufacture, to make a better product and make it for less money. That there is room for improvement, especially in the burning, no one familiar with the subject will dispute.

#### BIG REDUCTION IN INTERSWITCHING CHARGES.

The Dominion Board of Railway Commissioners have issued an order, under date of July 8, 1908, to the effect that it shall be lawful for the contracting carrier to continue to absorb the toll charged for the inter-switching of competitive traffic.

As regards traffic destined to consignees located upon or reasonably convenient to the tracks of the contracting carrier, or which may be so consigned as not to indicate clearly the delivery required, and which subsequent to shipment is ordered by the shipper, consignee or the agent of either for inter-switch delivery involving an additional service by another carrier, and which is so inter-switched the contracting carrier may charge and collect in addition to its freight charges the inter-

switching toll of the carrier which performs such service, which toll shall not be more than 20 cents per ton for any distance not exceeding four miles.

Upon traffic consigned to consignees located upon or reasonably convenient to tracks other than those of the contracting carrier, or to consignees who have customarily required such other carrier's delivery, the contracting carrier may for the inter-switching service rendered necessary for such delivery charge and collect an additional toll of not more than 10 cents per ton for any distance not exceeding four miles, the distance to be computed to or from the nearest point of inter-switching.

The foregoing tolls shall include the empty movement of the car to and from points on which it is received by the inter-switching carrier.

Traffic inter-switched at the point of shipment shall be subject to the same conditions as also traffic consigned to order.

By this order the carriers are required to reduce their tolls for switching within terminals. On such traffic as originates at non-competitive points the contracting carrier is required to absorb 50 per cent. of the toll of the carrier which performs the inter-switching service.

Heretofore a manufacturer located at a point where there was only one line of railway was discriminated against in his rates to the extent of this switching charge. While the order does not place him on an equal footing with the shipper located where there are competing roads, it places him in a much better position than he was. The contention of the manufacturers who brought this question before the railway commission has been that the carriers should afford shippers at local points who are compelled by reason of their location to ship over one line of railway the same facilities for doing business as the shipper located where there are several lines of railway.

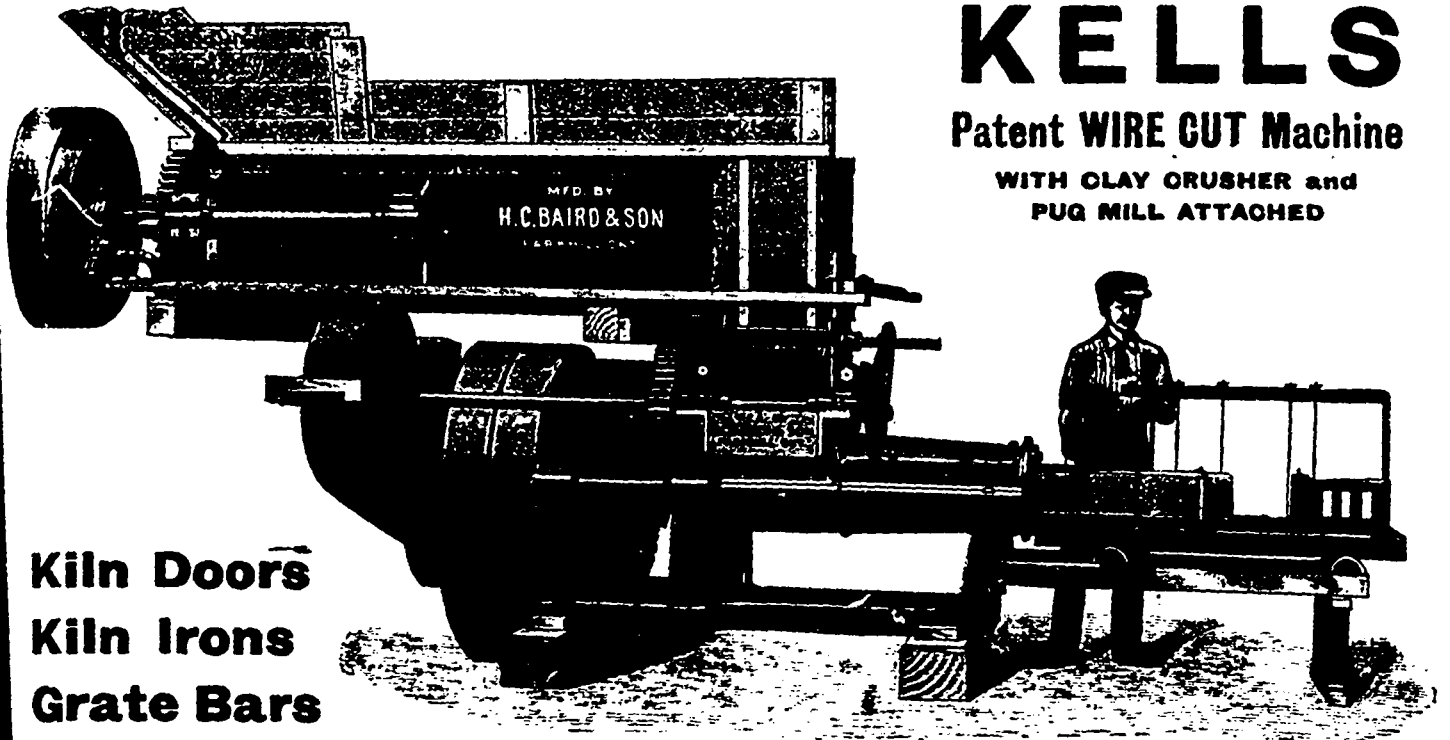
The Mutual Steamship Co., Toronto, have entered the package freight trade on the Canadian Lakes by putting on a line of fine new steel steamers fully equipped with all the newest and most modern devices for handling the highest classes of traffic offering.

A great many shippers have avoided the lake and rail route, claiming that their goods received considerable rough handling resulting in the freight being delivered to consignees in bad condition, but owing to the freight handling machinery used on these boats, this trouble is reduced to a minimum, and shippers will find that any class of business can be handled to their entire satisfaction.

This line is handling freight from all interior points, on the lake rail basis, on through bills of lading to any point in Western Canada, and it is their intention to endeavor to give the trade an efficient and up-to-date service. Manufacturers and other shippers desiring further information and rates, can get same on application to the Head Office, 509 Board of Trade Building, Toronto.

The new elevator at Port Colborne is nearing completion.

The Grand Trunk elevator at Tiffin, Ont., is nearing completion, and is expected to be ready for the grain trade this summer.



# KELLS

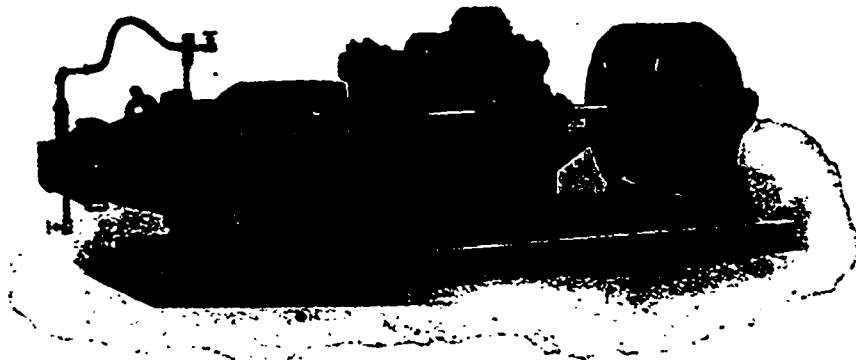
## Patent WIRE CUT Machine

WITH CLAY CRUSHER and PUG MILL ATTACHED

**Kiln Doors  
Kiln Irons  
Grate Bars**

FULL LINE OF BRICK AND TILE MAKING MACHINERY AND YARD SUPPLIES OF ALL KINDS

**H. C. BAIRD, SON & CO., Limited, Parkhill, Ont.**



## No. 555 BRICK MACHINE

You, Mr. Brickmaker, spend more or less money in repairs every year. Don't speculate by simply buying "a machine." **INVEST** in the **BEST**. It's surprising the difference it makes in the balance sheet at the end of every year.

Send for our new 1908 Catalogue. It shows the best.

**BECHTELS, LIMITED, Waterloo, Ont., Can.**

## Comparative Value of Alcohol and Gasoline as Engine Fuels.

The technologic branch of the United States Geological Survey, under the direction of Mr. J. A. Holmes, has recently completed an elaborate series of tests on the relative value of gasoline and alcohol as producers of power, says Machinery, New York. The tests, over 2,000 in number, probably represent the most complete and exact investigation of the kind that has been made either in this country or abroad, and includes much original research work.

Professor R. R. Fernald, engineer in charge of the gas producer section and professor of mechanical engineering in the Case School of Applied Science, Cleveland, Ohio, was in general charge of the tests. R. M. Strong, formerly connected with the engineering department of Columbia University, had personal supervision of the work. He was assisted by a corps of specially trained men.

These tests were conducted at the fuel testing plant of the Geological Survey at Norfolk, Va., and show the following results in regard to the comparative fuel consumption of 73 degrees specific gravity gasoline and commercial completely denatured alcohol, per unit of power.

Correspondingly well designed alcohol and gasoline engines when running under the most advantageous conditions for each, will consume equal volumes of the fuel for which they are designed. This statement is based on the results of many tests made under the most favorable practical conditions that could be obtained for the size and type of engines and fuel used. An average of the minimum fuel consumption value thus obtained, gives a like figure of eight-tenths pint per hour per brake h.p. for gasoline and alcohol.

Considering that the heat value of a gallon of denatured alcohol is only a little over six-tenths that of a gallon of gasoline, this result of equal fuel consumption by volume for gasoline and alcohol engines probably represents the best comparative value that can be obtained for alcohol at the present time, as is also indicated by Continental practice. Though the possibility of obtaining this condition in practice here has been thoroughly demonstrated at the government fuel-testing plant, it yet remains with the engine manufacturers to make the "equal fuel consumption by volume" a commercial basis of comparison.

The gasoline engines that were used in these tests are representative of the standard American stationary engine types, rating at 10 to 15 h.p., at speeds of from 250 to 300 revolutions per minute, while the alcohol engines were of similar construction and identical in size with the gasoline engines.

The air was not preheated for the above tests on alcohol and gasoline, and the engines were equipped with the ordinary types of constant level suction lift and constant level pressure spray carbureters. Many special tests with air preheated to various temperatures up to 250 degrees F., and tests with special carbureters were made, but no beneficial effects traceable to better carburation were found when the engines were handled under the special test conditions.

The commercial completely denatured alcohol referred to is 100 parts ethyl alcohol plus 10 parts methyl alcohol plus  $\frac{1}{4}$  part benzol and corresponds very closely to 94 per cent. by volume or 91 per cent. by weight ethyl alcohol (grain alcohol). No detrimental effects on the cylinder walls and valves of the engines were found from the use of the above denatured alcohol.

The lowest consumption values were obtained with the highest compression that it was found practical to use; which compression for the denatured alcohol ranged from 150 to 180 pounds per square inch above atmosphere.

Eighty per cent. alcohol (alcohol and water) for use in engines of the present type would have to sell for at least 15 per cent. less per gallon than the denatured alcohol in order to compete with it. The minimum consumption values in gallons per hour per brake h.p. for 80 per cent. alcohol is approximately 17.5 per cent. greater than for the denatured alcohol used, or for gasoline. A series of tests made with alcohol of various percentages by volume, ranging from 94 per cent. to 50 per cent. showed that the minimum consumption values in gallons per hour per brake h.p. increased a little more rapidly than the alcohol decreased in percentage of pure alcohol. That is, the thermal efficiency decreased with the decrease in percentage of pure alcohol. This decrease in thermal efficiency or increase in consumption, referred to pure alcohol is, however, comparatively slight from 100 per cent. alcohol down to about 80 per cent. alcohol. Within these limits it may be neglected in making the calculations necessary to compare the minimum consumption values for tests with different percentages of alcohol.

The nearer the alcohol is to pure, the greater the maximum h.p. of the engine. The per cent. reduction in maximum h.p. for 80 per cent. alcohol as compared with that for denatured alcohol used was less than 1 per cent. but the starting and regulating difficulties are appreciably increased.

With suitable compression, mixtures of gasoline and alcohol vapors (double carbureters) gave thermal efficiencies ranging between that for gasoline (maximum 22.2 per cent.) and that for alcohol (maximum 34.6 per cent.) but in no case were they higher than that for alcohol. The above thermal efficiencies are calculated from the brake h.p. and the low calorific value of the fuel, which for the gasoline was 19,100 British thermal units per pound and for the denatured alcohol was 10,500 British thermal units per pound.

As has been previously demonstrated, alcohol can be used with more or less satisfaction in stationary and marine gasoline engines, and these gasoline engines will use from one-and-one-half to two times as much alcohol as gasoline, when operating under the same conditions. The possibilities, however, of altering the ordinary gasoline engine as required to obtain the best economies with alcohol are very limited; for the amount that the compression can be raised without entirely redesigning the cylinder heads and

valve arrangement is ordinarily not sufficient, nor are the gasoline engines usually built heavy enough to stand the maximum explosive pressures, which often reach 600 to 700 pounds per square inch. With the increase in weight for the same sized engine designed to use alcohol instead of gasoline, comes an increase in maximum h.p. of a little over 35 per cent., so that its weight per h.p. need not be greater than that of the gasoline engine, and probably will be less.

The work was taken up to investigate the characteristic action of fuels used in internal combustion engines with a detailed study of the action of each fuel (gasoline and alcohol) as governed by the many variable conditions of engine manipulation, design and equipment. These variables were isolated, so far as possible; their separate and combined effects were determined; worked out under practical operating conditions; and lead up to the conditions required for minimum fuel consumption. The results show the saving that can be obtained over conditions for maximum consumption, and also establish a definite basis of comparison under conditions most favorable to each fuel. This latter is a point of much commercial interest and a study of the comparative action of gasoline and alcohol may be of great service in solving some of the general internal combustion engine problems where other than liquid fuels are used.

Many of the tests of internal combustion engines have been made, but most of them, especially in this country, were by private concerns, for a specified purpose, and the results are not generally available. Furthermore, as is generally recognized by those familiar with gas and especially gasoline engine operation, the conditions influencing engine performance are so numerous and varied as to make the value of off-hand comparison very limited and oftentimes misleading, exact comparisons only being possible under identical conditions or with reference to the actual known differences in all conditions that influence the results.

This investigation was made with a view to supplying the continually increasing demand for more complete and exact information concerning the operation and design of gasoline and alcohol engines and to assist the Government and others interested in the larger and more general internal combustion engine problems.

### A ROOFING THAT NEEDS NO PAINTING.

Labor saving devices are constantly being discovered, and one of the most important for builders has been the development of a new type of roofing which does not require continual painting to keep it tight.

A leader in this new development is Amatite Roofing, which has a surface of real mineral matter. The pitch in which this mineral is imbedded is so adhesive that the mineral surface will not wash off.

After an Amatite Roof is laid there is nothing more to do to it. It is not necessary to look after it each year for painting or patching, and all the labor and cost of coating the roof is done away with.

The manufacturers of Amatite are glad to show samples of their materials, and these may be obtained by a postal card request. Paterson M'fg Co., Limited, Toronto, Montreal, Winnipeg, St. John, N.B., Halifax, N.S.

# Brick Manufacturers

When you are in the market for any size or style of

## WOODEN BRICK PALLETS

Write us for prices. We have made a specialty of this line for years, and have got the cost of production to a point that enables us to give quality AND PROMPT DELIVERY at prices which cannot be rivalled.

**BARCHARD & CO., Limited**

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**Amatite ROOFING**

**THIS** advertisement will bring to your attention the *best and cheapest ready roofing* on the market. Here is how we prove it the best.

In the first place Amatite is made in one standard thickness, whereas other ready roofings range from a thin, flimsy half-ply to a three-ply thickness.

The three-ply thickness (which by the way is only one sheet of felt) is the only kind that can be compared with Amatite. But right here is the point. Amatite is better made, has better waterproofing material, and weighs more per square foot than the three-ply grade of other makes, and costs *much less*.

These facts make Amatite the most desirable roofing made.

But in addition to its superiority in material and manufacture, Amatite has one distinction which makes it stand out above all others. *It has a real mineral surface.*

It is hardly necessary to state the advantages of such a mineral surface, the freedom from painting or coating, the perfect protection against all kinds of weather, the great durability.

This mineral surface is embedded in a layer of Pitch, the greatest known waterproofing material. Beneath this in turn are two layers of the best grade of wool felt—cemented together by more Pitch, making the whole a roofing that is *absolutely waterproof.*

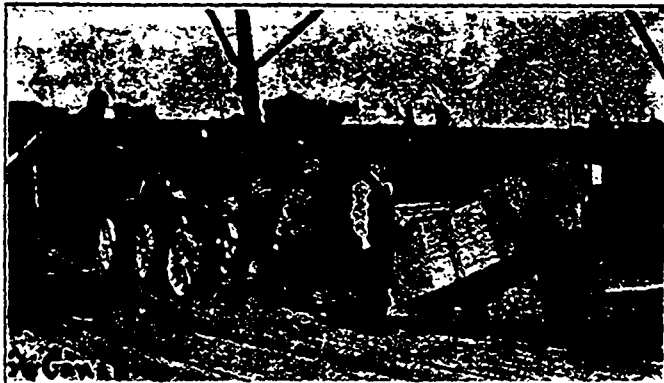
No other ready roofing can compare with this mineral-surfaced, waterproof, weather-proof, durable *of*. That's why we say—*Don't buy your roofing until you have seen Amatite.*

**Free Sample and Booklet**  
Send for Free Booklet and Sample to-day. It will pay you to get acquainted with Amatite. Address nearest office.

**THE PATERSON MANUFACTURING CO., Limited**  
TORONTO MONTREAL WINNIPEG ST. JOHN, N.S. HALIFAX, N.S.

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One of our Steamers loading at Hamilton

Between  
**KINGSTON**  
**TORONTO**  
**HAMILTON**  
**PORT STANLEY**  
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**WALKERVILLE**  
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**SARNIA**  
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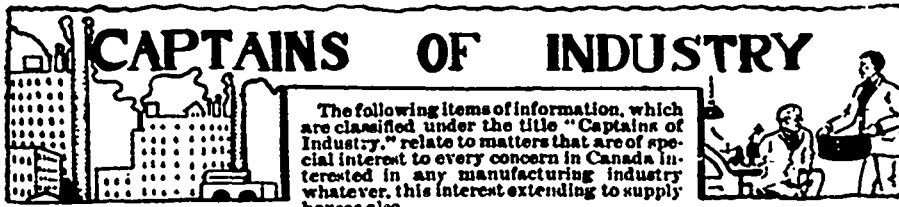
In connection with C.P.R. and C.N.R. to all points West

Largest, Finest and Best Equipped Package Freight Steamers on this Route

For Rates and Information apply to

**THE MUTUAL STEAMSHIP COMPANY, Limited**  
 509 Board of Trade Building, TORONTO





The Packard Electric Co., St. Catharines, Ont., have secured an order from the Intercolonial Railway for 92 type D induction motors. These motors range from 3 to 40 h.p. and constitute the complete electrical equipment of the Intercolonial Railway shops at Moncton.

A new Welland canal is being considered, which will leave the present one at Thorold, and will run immediately west of Thorold to Port Dalhousie, and from a point on the canal near Welland to Jordan Harbor, and thence from some point on the Welland river or canal below Port Robinson to the Niagara River near Old Niagara. This would give a deep harbor seven miles long.

About 5,000,000 feet of lumber in Turner's lumber yard, Victoria Harbor, Ont., was destroyed by fire, July 2. Loss about \$125,000.

The celluloid factory of Smith & Dentremont, Toronto, was destroyed by fire, July 8. Loss about \$90,000.

Port Arthur, Ont., is now in the Western division of the Canadian Pacific Railway, and is now under the supervision of Superintendent Graham, of Fort William.

The electric railway, Port Arthur, Ont., will be extended to Kakabeka Falls.

Newman Bros., St. Catharines, Ont., have been awarded the contract for the erection of the New Administration Building at the Jordan Harbor Experimental Farm, at a cost of about \$16,000.

The Clemens Co., Guelph, Ont., have been awarded the contract for the erection of the new boiler house and fruit house at the Agriculture college.

Corn & Co., Windsor, Ont., have received the contract for the construction of the water conduit at Guelph, Ont., at a cost of about \$30,000.

A new school will be erected on Boyd Street, Owen Sound, Ont., at a cost of about \$11,000. A concrete arch bridge will be erected on Union Street at a cost of about \$12,000.

The ratepayers of Merriton, Ont., have carried a by-law to purchase the electric light plant there, at a cost of about \$10,000.

The MacLean Separator Co., Sarnia, Ont., propose locating in St. Thomas, Ont.

The Kingston Milling Co., Kingston, Ont., will erect an addition to their mill.

The Dominion Soap Co., Hamilton, Ont., are considering the establishment of a factory in Brantford; Ont.

The Canada Paper Co., Toronto, will erect extensive additions to their two mills.

Allis-Chalmers-Bullock, Limited, Toronto, have been awarded the contract for the erection of a 2,500 barrel mill at Kenora, Ont.

The Holmes Safety Blasting Compound Co., now forming to manufacture the new explosive discovered by J. E. Holmes, Haliburton, Ont., propose locating either at

Lindsay or Toronto. The company will be capitalized at \$500,000.

The ratepayers of Richmond, Ont., will shortly vote on a by-law authorizing the expenditure of \$20,000 for fire stations, sidewalks and sewers.

W. Cornish is erecting a new elevator building at Lakefield, Ont., to take the place of the flour mill recently destroyed by fire.

The city council, Ottawa, are discussing the question of an improved waterworks.

The ratepayers of Fort William, Ont., will vote on a by-law, August 5, to raise \$95,000, to extend the Loch Lomond waterworks.

The ratepayers of Listowel, Ont., voted favorably on a by-law to raise \$6,000 to complete the waterworks system.

A new school will be erected in Sudbury, Ont., at a cost of about \$35,000.

Pottersburg, Ont., will expend \$5,000 on school improvements.

The congregation of the Methodist church, Peterboro, Ont., will erect a new edifice.

The Six Nation Indians on the reserve near Brantford, Ont., will erect a hospital at a cost of about \$5,000.

The congregation of the Lutheran church, Stratford, Ont., will erect a new church.

S. S. Cooper, Clinton, Ont., has been awarded the contract for the erection of the new Presbyterian church at Brucefield, Ont.

The congregation of the Methodist church, Eglinton, Ont., will erect a new church and Sunday school room at a cost of about \$10,000.

Thos. Crooks, Hamilton, Ont., will erect an office and apartment block at a cost of about \$30,000.

The Atlantic Hotel, North Bay, Ont., will be enlarged by the erection of an additional three stories.

The Chatham City Council, at a meeting on Monday, July 14, deferred acceptance of the electric light plant which has been installed by the Colonial Engineering Co., of Montreal. A despatch from Chatham says that it is charged that the plant was not installed according to specifications.

An order to wind up the James Warnock Co., Limited, manufacturers of edge tools, and axes, Galt, Ont., has been granted and H. Vigeon has been appointed provisional liquidator.

Representatives of the Canadian manufacturers of woollens waited on Hon. Mr. Paterson, Minister of Customs, asking for greater protection for the Canadian textile industry, but were informed that nothing would be done for them this year.

The Hamilton Separate School Board will erect a school in the east end of the city at a cost of about \$12,000. The Board have also appointed a committee to proceed with the erection of St. Ann's School at a cost of about \$8,000.

The flour mills of W. D. Mace, Tamworth, near Kingston, Ont., were struck by lightning July 5, and completely destroyed.

The Electric Railway Commission, Port Arthur, Ont., will proceed with the double tracking of the railway line between Current River park and the southern boundary of the city.

Work on the construction of long distance lines to Broughton, Greenwood, Dunbarton, Audley and other towns is shortly to be undertaken by the Markham & Pickering Telephone Co., Markham, Ont.

The Maitland River Power Co., are considering the construction of a power plant at Black Hole, three miles from Goderich, Ont.

The Grand Trunk Railway property in London, Ont., will be extensively improved.

The Bell's Lake Portland Cement Co., Markdale, Ont., capitalized at \$450,000, will erect a cement mill at Walter's Creek, to have an initial capacity of 1,000 barrels a day.

The ratepayers of Stratford, Ont., will vote, July 31, on a by-law to raise \$2,500 for the construction of an iron bridge over Trout creek and \$9,500 for concrete sidewalks.

The Molesworth Telephone Co., Molesworth, Ont., will considerably improve their building.

The filtration bed for the waterworks system is being considered for North Toronto, Ont.

A Government observatory will be built at Onemee, Ont. It will be 80 feet high and will be constructed on a stone foundation with superstructure of Norway pine and steel.

An Orange Hall will be erected in Queensboro, Ont.

The Canadian H. W. Johns-Manville Co. are sending out an invitation to their customers and friends to call at their offices, warehouses and retail store at 55 and 57 Wellington St. West, Toronto, where a full stock of their lines are kept.

The James Smart Mfg. Co., Brockville, Ont., are building a new machine shop. It will be a three-story, brick, mill construction, 150x60 feet building. This company intend to later build a 60x40 foot addition to their tool department and forging shop.

The Peterboro Lubricator Co., Peterboro, Ont., have been incorporated with a capital of \$100,000, to manufacture grease, oils, lubricators, lubricating material, etc. The provisional directors include W. Harter, R. A. Elliott and E. R. Wilson, Peterboro, Ont.

A new Presbyterian Church will be erected at New Edinburgh, Ont., this summer.

A new Shea's Theatre will be erected in Toronto, at a cost of about \$150,000.

The council of Ingersoll, Ont., are considering a by-law to raise \$16,000 for school purposes.

An addition will be erected to the public school, Preston, Ont.

The Minto Rural Telephone Co., Harriston, Ont., have been incorporated with a capital of \$10,000, to carry on the general business of a telephone company. The provisional directors include G. Gray, E. W. Lambert and A. Spotton, Harriston, Ont.





**T**HERE are two kinds of Crucibles. The other kind and ours. You may know the other kind. Do you know ours? Have you tried ours? Large stock—prompt shipments.

**McCULLOUGH-DALZELL CRUCIBLE COMPANY, PITTSBURGH, PA.**



*The Howe-Buller Co.*  
CLEVELAND, O.

**FIRE BRICK**

SILICA FIRE CLAY  
ALUMINATE  
SILICA CEMENT

MACRESITE    BOMIT MACRESITE

Our factories are the most complete in the country. Located in Pennsylvania, Ohio, and Kentucky—and controlling the largest known bodies of Refractory materials for different work. Operated by experienced managers. We manufacture material for all heat work—second to none. Capacity over 300,000 Brick and Special Shapes per day. Write for catalogue.

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CO.

ST. MARY'S, PA.

Best Fire Brick for Any Purpose.

There are none "just as good."

## UNITED FIRE BRICK COMPANY

SUCCESSORS TO  
The Dunbar and Fayette  
Fire Brick Companies

Manufacturers of **HIGH-GRADE CLAY AND SILICA FIRE BRICK**

FOR ALL PURPOSES.

THERE ARE NONE BETTER

Offices: **PITTSBURGH and UNIONTOWN, Penn.**

## The Hamilton Steel & Iron Co., Limited

HAMILTON, CANADA

Basic Open Hearth  
**Steel Castings**

**Bar Steel**

**Bar Iron**

**Angles**

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Specialty of **Machine-Straightened Tire Steel**

**Pig Iron**

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**Basic**

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A new school will be erected at Picton, Ont., at a cost of about \$2,500.

The Wellesley Public School, Toronto, will be remodelled at a cost of about \$22,000.

The Schrader Cigar Co., Hamilton, Ont., have been incorporated with a capital of \$40,000, to manufacture cigars, tobacco, etc. The provisional directors include J. H. Schrader, C. L. Schrader and A. E. Lay, Hamilton.

The Darby Mountain Mining Co., Haileybury, Ont., have been incorporated with a capital of \$50,000, to carry on a mining, milling and reduction business. The provisional directors include C. D. Scott, J. P. MacGregor and A. MacGregor, Toronto.

The Helen Mines at Michipicoten, Ont., are at present being worked to their fullest capacity, and heavy shipments of ore are being sent out.

White's Bonanza Lode Mining Co., Toronto, have been incorporated with a capital of \$50,000, to carry on a mining, milling and reduction business. The provisional directors include C. D. Scott, A. MacGregor and J. P. MacGregor, Toronto.

The Kent Canning Works, Chatham, Ont., are considering the erection of an extensive addition to their plant.

The plant of the Sault Ste. Marie Pulp & Paper Co., Sault Ste. Marie, Ont., which was destroyed by fire recently, is again in operation and turning out 100 tons of pulp per day.

Hill & Co., Mitchell, Ont., have been awarded the contract for the erection of the new iron bridge at Egmondville, Ont.

An addition will be erected to the fire hall, West Toronto, Ont.

The Walper Hotel, Berlin, Ont., will be improved at a cost of about \$10,000.

Benedict & Cusin, Buffalo, N.Y., are planning the erection of a theatre at Mohawk Park, Brantford, Ont.

W. R. Graham, Cobalt, Ont., will erect a two story block 66x60 feet, at a cost of about \$8,000.

The hotel of A. H. West, Chapleau, Ont., will be improved at a cost of about \$5,000.

J. McHelvey, Stratford, Ont., is considering the erection of a furniture factory in Galt, Ont.

McMalon, Granger & Co., London, Ont., will erect a new warehouse at a cost of about \$35,000.

Department of Railways and Canals are calling for tenders for deepening and improving a channel way from a point in Cook's Bay, Lake Simcoe, Ont., to the mouth of the Holland River, and east branch thereof to the Bradford Road at Holland Landing.

The fire hall, Port Arthur, Ont., will be improved.

Turner Bros., Peterboro, Ont., have secured a site and will erect a new card factory.

The Ontario, Quebec and Dominion Governments will erect a bridge across the Ottawa River at North Temiscaming.

Quality Beds, Limited, Welland, Ont., will considerably extend their plant.

The Temiscaming & Northern Ontario Railway, have awarded the contract to R. R. Wood, Latchford, Ont., for the construction of engine house and additions to the freight shed at Cobalt, Ont.

The county of Simcoe, in conjunction with the Ontario Government, will build a bridge at Bradford, Ont.

S. Carter, Guelph, Ont., is calling for tenders for the erection of a cement block of stores, corner of Wilson and McDonnell streets in that city, at a cost of about \$10,000.

Demens & Fraser, New Hamburg, Ont., have been awarded the contract for several concrete culverts and abutments by the Temiscaming & Ontario Railway Commission.

The Gilt Evaporator Co. and the Connor Machine Co. are to locate in Essex, Ont. Both have secured free sites for a factory from the municipality.

The stables of the Hendrie Cartage Co., Toronto, were destroyed by fire July 12. Loss about \$10,000.

The Board of Harbor Commissioners, Toronto, have decided to take out the old wooden cribbing at the Queen's Wharf, and replace it with concrete masonry at a cost of about \$10,000.

The sawmill of Geo. Bruinwell, Lindsay, Ont., was destroyed by fire July 10. Loss about \$7,000.

The premises of the Soo Falls Brewing Co., Sault Ste. Marie, Ont., were destroyed by fire July 9. Loss about \$15,000.

Among the firms who have recently purchased Smart-Turner pumps are Isailes & Son, Cobalt; the Northern Navigation Co.; the Canadian Steam Boiler Equipment Co.; the Hamilton Bridge Works; the Grand Trunk Railway system, for Portage La Prairie, Man.; E. S. Brennan, Portage La Prairie; the Lotbiniere Lumber Co., St. Jean Desacillons, Que.; Aylmer Condensed Milk Co., Aylmer, Ont.; the Northumberland Paper & Electric Co., Campbellford, Ont.; I. Meiklejohn, Stirling, Ont.

D. Eason, mfrs. tables, etc., Stratford, Ont., has admitted R. L. Oman into partnership under the style of Eason & Oman.

The Northern Sulphite Mills of Canada, Limited, Sturgeon Falls, Ont., and the Imperial Paper Mills of Canada, Toronto and Sturgeon Falls, are to be sold by tender on the 27th inst., under power of mortgage.

The Bank of Montreal will erect a branch at Sawyerville, Que.

The Canadian Pacific Railway have placed an order for 20 new freight engines with the Locomotive & Machine Co., Lachine, Que.

Blue Bonnets, Que., have awarded the contract to the Montreal Light, Heat & Power Co., Montreal, for the lighting of that town.

The premises of the Mount Royal Box & Lumber Mfg. Co., Montreal, were damaged by fire, July 6. Loss about \$53,000.

Work on the establishment and buildings of the Imperial Locomotive & Machine Works, which will be located in Lachine, Que., is to be commenced this summer.

C. E. Morissette, Quebec city, has been awarded the contract for the new workshop to be erected on Bridge Street, for F. N. Drolet, at a cost of about \$50,000.

A new Presbyterian church will be erected at Brownsburg, Que.

Laval University, Montreal, will convert the Holy Spirit St. Joseph into a public library.

The Princess Hall Co., Montreal, will erect a new hall at a cost of about \$20,000.

Jess Applegath will expend \$20,000 on G. H. Fetherstone's store, Montreal, recently purchased by him.

The St. Anne's Orphanage for the Grey Nuns, at Quebec city, will be erected shortly, at a cost of about \$46,000.

The Public Works Department have awarded to Robert Cameron, Almonte, Ont., the contract for the erection of a public building at Magog, Que., to cost \$20,000.

The American Dressing Co., Montreal, have been incorporated with a capital of \$20,000, to manufacture boots, shoes, valises, trunks, oils, varnishes, dressings, polishes, etc. The charter members include S. C. Marson, H. Mackay and E. G. Place, Montreal.

The Northern Construction & Supply Co., Montreal, have been incorporated with a capital of \$25,000, to carry on a general constructing business. The charter members include E. L. Baugh, E. Laflamme and A. P. Proctor, Montreal.

The Atlas Centering Co., Montreal, have been incorporated with a capital of \$30,000, to carry on a general construction business, and to manufacture tools, machinery, etc. The charter members include M. Morssen, W. C. Munn and C. Bernstein, Montreal.

The Peat Gas & Coal Co., Montreal, are installing a plant to make gas from peat at St. Bonaventure, P.Q.

L. H. Gaudry & Co., Montreal, have secured the contract for the structural steel for the addition to the St. Joseph Academy, Hochelaga, P.Q. Jos. Venne, Montreal, is the architect.

The King Paper Box Co., Montreal, have been incorporated with a capital of \$10,000, to manufacture paper and wooden boxes, etc. The charter members include O. Gesteau, J. H. Lefebvre and N. Langlois, Montreal.

The ratepayers of St. Louis, Que., will vote on a by-law to raise \$180,000 for the purpose of laying water pipes.

A new school is being erected at Guelph, Que., at a cost of about \$4,000.

A new curling rink will be erected in Sherbrooke, Que.

The Montreal City Council have decided to accept the offer of the Robert Co., to supply electricity in the city for lamps and motors. The company will develop power on Beauharnois Canal.

Plans are already formulated for the rebuilding of the town of Three Rivers, Que., which was destroyed by fire recently, on a much larger scale. It is stated that the Provincial Government will guarantee a loan of about \$2,000,000.

An amourey will be erected at Westmount, Que., on condition that the city provide a site.

G. A. Grier & Son, Montreal, are fitting up their large factory building on Notre Dame St. West, as a planing mill.

The Smith Marble & Construction Co., Montreal, are supplying marble and tile for the interiors of the Royal Victoria Museum, Ottawa, the Bank of Toronto at Montreal, Princess Theatre, Montreal, Westmount School, Eastern Townships Bank branches in Cowansville and Theford Mines, Que., and the Hotel de Precieux Sang, Quebec.

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**S**PECIAL Mixtures for use in Rolling Mills, Malleable Iron Works, Steel Works, Blast Furnaces, Cupolas, Glass Tanks, Cement Kilns, Locomotive Blocks, and all High Grade Uses.

Write for Catalogue and Prices.

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## MR. CONSUMER

More proof of Superiority over our competitors:—  
Production 1st half of 1908 only 700 tons under our  
Banner Year, 1907.  
We would like to have you with us.

**The Monongahela River Consolidated Coal & Coke Co**  
BUFFALO, N.Y.

# Nova Scotia Steel and Coal Co., Limited

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From  $\frac{1}{2}$  to 5 inches in Diameter. Guaranteed Straight and True to within  $\frac{1}{300}$  of an Inch.

Spring. Reeled Machinery, Tire, Toe Caulk, Sleigh Shoe, Angles, Special Sections and all Merchant Bar Steel. Sheet Steel up to 48 inches wide.

## **RAILWAY AND ELECTRIC RAILWAY CAR AXLES, FISH PLATES, SPIKES AND TRACK BOLTS**

Tee Rails, 12, 18, 24 and 28 lbs. per yard.

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"SCOTIA" PIG IRON FOR FOUNDRY USE.

WORKS—TRENTON, N.S., and SYDNEY MINES, N.S.

HEAD OFFICE—NEW GLASGOW, NOVA SCOTIA

The New Brunswick Telephone Co., Fredericton, N.B., are considering the extension of their line from Prince William to Harney Station, N.B.

Another isolation hospital is being considered for Crow's Island, Moncton, N.B.

The McLellan & Smith Lumber Co., Burton, N.B., have been incorporated with a capital of \$24,000, to manufacture lumber, timber, etc. The provisional directors include G. Smith, Burton, N.B., R. W. McLellan, and A. B. McLellan, Fredericton, N.B.

The Department of Public Works, Fredericton, N.B., invite tenders up to July 20, for the construction of three metal superstructure spans of the highway bridge there.

Willis MacPherson has established a foundry and machine shop at St. Mary's Ferry, N.B.

C. B. Simmons, Fredericton, N.B., has been awarded the contract for the construction of the new spans of the highway bridge at Fredericton, N.B.

J. P. McLeod & Sons are erecting a new warehouse at Baddick, N.S.

F. L. Dixon, Sydney, N.S., has been awarded the contract for the erection of the new Presbyterian Church at Inverness, N.S.

The governors of Acadia College, Wolfville, N.S., have awarded the contract for the Carnegie Science Building to Rhodes, Curry & Co., of Amherst, N.S.

The Yarmouth Street Railway Co., Yarmouth, N.S., are planning to purchase a 300 k.w. generator, turbines and hydraulic equipment. Extensions will also be made to the car house.

An electric light station is being considered for Sydney, N.S.

A saw mill will be erected at Oromocto, N.B., this summer. S. G. Fitzpatrick, St. John, N.B., is interested.

The Stanley Railway & Manufacturing Co. will erect a woodworking factory at Ryan's Brook, N.B. It is stated that this company will take over the York & Carleton Railway and extend to the Grand Trunk Pacific, near Napiadoggan Lake, N.B.

A farmer's elevator is being considered for Manitou, Man.

The public school, Elgin, Man., will be enlarged at a cost of about \$3,000.

The Dominion Bank will improve their premises in Winnipeg, Man., at a cost of about \$7,000.

The Public School Board, Winnipeg, Man., will shortly call for tenders for furnishing spiral fire escapes for fourteen schools, at a cost of about \$36,500.

The estimates for the post office and customs office, Emerson, Man., have been passed at Ottawa, and the government is now in a position to proceed with the work. It is understood that plans and specifications are practically finished and tenders will be called for at a very early date. The building will cost \$20,000.

The Canadian Pacific Railway have awarded to Carter, Halls-Aldinger Co., Winnipeg, Man., the contract for two subways at \$25,000.

The congregation of St. Matthew's Church, Winnipeg, Man., will erect a new church building at a cost of about \$25,000.

A school will be erected at Morris, Man., at a cost of about \$10,000.

The James Stuart Electric Co. have been negotiating with the city of Winnipeg, Man., with a view to the erection of a factory for the manufacture of water meters.

A rural telephone system will be constructed at Hamiota, Man.

The Brandon Generator & Carbide Co., Brandon, Man., recently incorporated, will establish premises there for the manufacture of gas engines and other supplies.

The Superior Fuel & Coal Co., Winnipeg, Man., have been incorporated with a capital of \$100,000, to manufacture coal screenings, coal, pitch, tar, minerals, etc. The provisional directors include W. A. T. Sweatman, D. E. Maclean and J. D. Atchison, Winnipeg, Man.

The Lyall-Mitchell Lumber Co., Winnipeg, Man., have been incorporated with a capital of \$250,000, to manufacture lumber, timber, brick, stone, cement, etc. The provisional directors include P. Lyall, Montreal, G. A. Mitchell and J. McCrea, Winnipeg, Man.

The Controllers, Winnipeg, Man., are recommending that the tender of J. J. Gartshore, Toronto, be accepted for 800 tons of rails for the power tramway at \$36.50 per gross ton.

Davidson Bros., Winnipeg, Man., have been awarded the contract for the construction of the new Cecil Rhodes School in that city. The contract price was \$64,781.

Carter, Halls, Aldinger & Co., Winnipeg, Man., contractors and engineers, have just completed a fine hotel at Winnipeg Beach.

The Central Electric Co., Portage la Prairie, Man., will improve their plant at a cost of about \$40,000.

A new school building will be erected at Craik, Alta., at a cost of about \$19,000.

The Department of Public Works will erect a jail and courthouse in Lethbridge, Alta., this year.

W. H. Hutchison is refitting his mill at Prince Albert, Sask., with new machinery for sawing shingles.

An addition will be erected to the power station, Calgary, Alta.

Prince Albert, Sask., invites tenders up to July 31, for supplying a four-wheeled double cylinder, chemical engine, and one haul chemical engine.

The Red Cliff Brick Co., Limited, Medicine Hat, Alta., have suffered loss by fire; partially insured.

The Canadian Pacific Railway are installing their own lighting plant in the station at Regina, Sask.

The council, Lethbridge, Alta., have awarded the contract for street grading to Janz Bros. & MacDonell, and for cement sidewalk to Marshall, Batcheller & Skairin, of Calgary. The total contracts were about \$75,000.

The Dominion Bridge Co. have just completed the structural steel work on the Canadian Bank of Commerce building, at Strathcona, Alta. This steel was all shopped in the Winnipeg premises of the company.

The Farmers' Milling Co., will erect a flour mill at Duck Lake, Sask.

The Aberdeen Milling Co., Aberdeen, Sask., will erect a 150 barrel flour mill there.

The Edmonton Cement Co., Edmonton, Alta., are negotiating with the town council of Red Deer, Alta., regarding the establishing of a cement works on the river banks near the electric power house.

The waterworks, Regina, Sask., may be extended.

The ratepayers of Arcola, Sask., have passed the by-law to complete the construction of the waterworks system.

The Canadian Bank of Commerce will erect a bank building at Strathcona, Alta., at a cost of about \$30,000.

An Inland Titles office will be erected at Saskatoon, Sask., at a cost of about \$34,000.

Carl Berch, Vancouver, B.C., will erect a \$90,000 theatre building at Edmonton, Alta., for Vancouver capitalists.

The Alberta Sanitarium, at Edmonton, will be moved to Strathcona, Alta., and a new \$35,000 building will be erected.

The Canadian Pacific Railway are considering altering the hotel at Banff, Alta., at a cost of about \$2,000,000.

The Humboldt Light, Power & Telephone Co., Humboldt, Sask., have been organized.

The Western Saskatchewan Telephone Co. are making arrangements to build a line between Drinkwater and Belle Plain, Sask.

The Canadian Pacific Railway bridge and pumping station at Macleod, Alta., have been swept away recently.

The Central Light & Power Co., Wolsley, Sask., will increase the capacity of their plant in the near future. It is proposed to install a 150 h.p. gas engine and suction gas producer and a 90 k.w. generator.

The Moose Jaw, Sask., town council have awarded the contract for the new generating unit to the Canadian General Electric Co., at \$36,000.

Tenders will shortly be taken for the installation of heating apparatus, electric elevators and laundry machinery in the new hospital building at Calgary, Alta.

The Fort Pelly Telephone Co., Fort Pelly, Sask., are considering an extension to their plant.

Neilson Bros will erect a large garage in Saskatoon, Sask.

The Parsons Construction Co. have been awarded the contract for the construction of the new bridge across Wascana Lake, Regina, Sask.

The Canadian Pacific Railway will erect a depot at Guernsey, Sask.

E. Disney, Coleman, Alta., has been awarded the contract for the construction of the Miner's Hall and opera house in that town.

The saw and grist mill of Prince Bros., Battleford, Sask., was destroyed by fire recently.

The Twin City Coal Co. of Edmonton, Alta., have recently purchased an 80 h.p. Robb-Mumford Water Tube boiler.

The Granby Copper Mines, in British Columbia, are being improved at a cost of about \$250,000.

The Canadian Consolidated Gold Dredging Co., Vancouver, B.C., are placing orders for four new dredges, to cost \$460,000.

The congregation of Holy Trinity Church

# CANADIAN IRON & FOUNDRY CO.

LIMITED

SMALL DIAMETER WHEELS AND AXLES FOR CONTRACTORS. CAR WHEELS.

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Fairview, B.C., are considering the erection of a new edifice.

Victoria, B.C., invite tenders up to July 20, for the supplying and erecting of one horizontal cross-compound pumping engine, one steel tank and tower, one concrete and steel water tower.

The Imperial Bank of Canada have opened a branch at Hosmer, B.C.

The Dominion Copper Co., Boundary Falls, B.C., have resumed operations.

C. W. Shideler, Fruitvale, B.C., has begun the manufacture of brooms at that place.

M. R. Smith & Co., Victoria, B.C., have sold their business to a syndicate, who are erecting an extensive bakery.

The British Columbia Electric Railway Co., Vancouver, B.C., have turned out three new cars monthly during the past three months, and have orders for ten more cars.

A fruit packing and evaporating plant at Port Haney, and linen and linsed oil mills on Lillooet Prairie, are two new industries locating at Maple Ridge, B.C.

The new \$50,000 fish-freezing plant of the British Columbia Packers' Association at New Westminster, B.C., has been finished. It has a capacity of 30 tons of fish daily.

E. J. Skeans, Vancouver, B.C., will erect a large sawmill on the Alberni Canal, to be in operation this coming fall. The mill will have a capacity of 75,000 feet per ten hours. The cost of the plant will be \$75,000.

R. H. Fulton, Montreal, is considering the establishment of a turpentine factory on Vancouver Island, B.C.

A high school will be erected in Everett, B.C., at a cost of about \$200,000.

The British Columbia Provincial Government will erect a sanitarium at Tranquille, B.C., at a cost of about \$50,000.

A new school will be erected in New Westminster, B.C.

A new school will be erected in Victoria, B.C., at a cost of about \$54,000.

W. T. McMullin, Vancouver, B.C., will erect a three story business block at a cost of about \$20,000.

Additions will be erected to the Grandview and McDonald schools, Vancouver, B.C.

Joseph Rodgers & Sons, Sheffield, England, are considering the advisability of establishing a branch house in Vancouver, B.C., in order to look after Western business.

The Fernie Brick Co., Fernie, B.C., a recently organized concern, are about ready to start operations in their new plant. The plant will have a capacity of 30,000 bricks per day.

Macdonald & Wilson, who have the contract for the erection of the new provincial court house in Vancouver, B.C., are intalling a \$30,000 stone sawing plant.

Three hotels, telephone exchange, Canadian Pacific Railway, telegraph and Dominion express offices, the Eastern Townships Bank building and several other buildings, Grand Forks, B.C., were destroyed by fire July 10. Loss about \$300,000.

The ratepayers of New Westminster, B.C.

voted favorably on a by-law to authorize the expenditure of \$61,000 on the construction of a new bridge across the Fraser River.

The British Columbia Telephone Co. are preparing to build a telephone system in South Vancouver, B.C.. The company are also considering the construction of fifty-two miles of long distance lines this season.

E. K. Rogers, Vancouver, B.C., has prepared plans for the erection of a \$40,000 power plant in connection with the Hidden Creek Mines at Goose Bay, Observatory Inlet, B.C.

The Provincial Government of British Columbia has approved the plans of the Prince Rupert Power & Light Co., Prince Rupert, B.C., who are authorized to construct a system, including dam, pipe lines and power houses at or near Woodworth Lake, Shoowahltans River, in the Skeena River mining division, and to transmit and distribute electricity to various points on the Tsimpsean peninsula, Kaien and Digby islands.

The Bella Coola Telephone, Light & Power Co., Bella Coola, B.C., have been incorporated with a capital of \$25,000.

A Sister's Hospital and Catholic school will be erected in Grand Forks, B.C.

The Vancouver Island & Eastern Railway Co. have decided to build a steam road from Victoria, B.C. to Edmonton, Alta.

W. W. Ely, representing the Pantages theatre circuit, has been negotiating for a site with a view to the erection of a new vaudeville theatre in Victoria, B.C., at a cost of \$50,000.

A new school building will be erected in Nelson, B.C.

The Trades & Labor Council, Vancouver, B.C., are considering the disposal of their present hall and the erection of a larger building.

The Stanton Iron Co., London, England, have been awarded the contract by the City Council, Victoria, B.C., for 300,000 tons of iron piping for waterworks, etc.

Plans have been completed for the new pulp mill to be erected by the Quatsino Power & Pulp Co., Quatsino, B.C. Work is to be commenced at once.

## PUBLICATIONS

A Review of Books, Catalogues, Bulletins and other Publications of interest to readers of this paper. All such publications should be sent to The Editor, Canadian Manufacturer, Toronto.

**THE GAS JOURNAL OF CANADA.**—The foregoing is the title of a new 36-page publication issued in the interests of Canadian gas industries. Its publishers state that the purpose of this paper, which is well illustrated and full of interesting information, is to cover the field of gas production and its application for the generation of light, heat and power. Such a paper as this should find general favor and support from the large gas works throughout Canada, and such companies as make or install equipment for such concerns. The paper is published by The Gas Journal, 15 Toronto St., Toronto.

**ALUMINUM VS. COPPER FOR ELECTRICAL CONDUCTORS.**—A 24-page booklet stating the arguments in favor of aluminum as compared with copper for electrical conductors. Several illustrations, tables, etc., which serve to make the arguments on behalf of aluminum clearer to either laymen or expert. The British Aluminum Co., Limited, 109 Queen Victoria St., London, E.C., England.

**ECLIPSE OIL FILTERS.**—A 28-page bulletin for consulting and operating engineers describing the Eclipse Continuous Oil system, which embraces the automatic recovery, purification, transmission and application to bearings of lubricating oils in a continuous, reliable and automatic manner. The bulletin also lists a great variety of Eclipse oil filters applicable to smaller plants not equipped with oiling systems. The Standard Gauge Mfg. Co., Syracuse, N.Y.

**BRISTOL'S RECORDING THERMOMETERS.**—A 16-page bulletin, No. 92, describing Bristol's Recording Thermometers for temperatures between 40 and 500 degrees Fah., for dry kilns, feed water for steam boilers, rubber heaters, vulcanizers, sugar refineries, breweries, paper and pulp mills, chemical works, oil refineries, patent leather manufacturing, powder mills, etc. This work is fully illustrated. The Bristol Co., Waterbury, Conn.

**THE LONGEST NARROW-GAUGE RAILWAY.**—A 12-page brochure containing an article from "Engineering," London, describing the Otavi railway, in Africa, the longest narrow gauge, light railway in the world. This line was built despite great difficulties and equipped by the Arthur Koppel Co., who have in addition to their works at Koppel, Pa., plants in nearly every country in the world.

**BRISTOL'S STEEL BELT LACING.**—A 16-page catalogue describing Bristol's patent steel staggered point belt lacing for belts from 1-16 inch to 13-16 inches thick. Full size illustrations of various sizes of the lacing are given. The Bristol Co., Waterbury, Conn.

**"HELPS—DON'T'S" FOR ALL WHO GRIND.**—A 12-page booklet giving practical suggestions for the purchase and operation of grinding wheels. The Norton Co., Worcester, Mass.

**FAN MOTORS.**—A 36-page catalogue devoted to Westinghouse electric fan motors for all styles of commercial circuits, fully illustrated. The Canadian Westinghouse Co. Limited, Hamilton, Ont.

**MINING OPERATIONS, PROVINCE OF QUEBEC.**—The official report of the Department of Colonization, Mines and Fisheries of Quebec Province, on mining operations for 1907 by J. Obalski, Superintendent of Mines, Quebec City. In addition to report on the condition of the mining industry, this report contains a full list of companies in operation or in position to work in the province, with their addresses.

**ELECTRIFICATION OF WELLAND CANAL.**—An 8-page bulletin giving detailed information of the electrical equipment of the Welland Canal, with illustrations of the power house transformer station, concrete transmission line poles, motors geared to lock mechanisms, etc. The Packard Electric Co., St. Catharines, Ont.

(Continued on page 50)

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# The Chief Requisites for Successful Gas-producer Operation.

BY A. S. ATKINSON IN POWER.

The change from one system of power production to another invariably brings with it a long train of irritating annoyances which for a time at least raise doubts as to the wisdom of the choice. It took engineers and manufacturers a long time to establish the gas engine because the breaking down or interruption of a single engine would produce prejudice against the engines among many who were contemplative purchasers. Now that the gas engine has become well established these early difficulties can be looked upon with a certain degree of complacency.

But apparently the producer-gas plant is having some of the same sort of difficulties to contend with that the ordinary gas engine had in its early development. There are sufficient data to show that the producer-gas plant is an important development in the power field and that for certain kinds of work it has no superior. Manufacturers, certain of the economy and efficiency that can be obtained from their producers, are going ahead in a no uncertain way in their manufacture.

Nevertheless, troubles come and multiply, and engineers are kept busy trying to make good with the plants. It is possible that a good deal of the trouble comes from the fact that many of the manufacturers advertise their systems as being so automatic in operation that it requires the attention of one man only a very small part of the time, leaving him free meanwhile to attend to other duties. A great many operators have taken this so literally that they loaf on their jobs and let plants run themselves to such an extent that the proper results are not obtained.

This attitude may be illustrated by the following confession of an old licensed engineer of a large steam plant: "I'm going to take charge of a producer-gas plant, for the work is simpler and easier—leaves plenty of time to read and rest up. I've been tied down to a steam engine the greater part of my life, and now I'm going to take it easier."

This man was an expert steam engineer and had always proved a safe, reliable man, but he was leaving his old job to try something else that "was easier." His qualifications for the new duties consisted chiefly of a little reading and the training he had received at a night school. He thought he understood the operation of a gas-producer plant, and he did so long as everything worked smoothly. But when the first trouble came he was all at sea, and the plant had to be shut down for several days while an expert from a distant city hurried to the rescue. And the trouble had developed owing to his neglect of the plant. He had taken it easy and his employers paid heavily for it. The cause of the breakdown, however, was attributed to the plant and not to the operator.

## OPERATORS MUST HAVE SKILL.

No producer-plant has yet been devised

that does not depend a good deal more than is generally supposed upon the skill and intelligence of the man in charge. The quality of the gas generated depends chiefly upon the nature of the fuel, but it also depends largely upon the way it is utilized. One man will save 10 per cent. of the fuel in a steam plant and produce just as much steam pressure as another who does not understand properly good firing. The difference is almost as great between the man who understands running a gas producer and one who doesn't.

The operator requires, first of all, knowledge of the whole process from the time the coal is put in the producer until the gas is exploded in the engine cylinder and passes through the exhaust port to the atmosphere. Unless he has an understanding of this process, the man in charge cannot prove efficient in his work. Then there should be that intuitive knowledge which comes from experience and association with an engine, and which enables an engineer to detect symptoms of troubles before they have developed into something dangerous. It is the same class of knowledge which enables an engineer to know by the sound and action when a steam engine is working freely and easily or a dynamo is running smoothly. Added to these two qualifications should be the ambition to get the most out of the plant and to keep it at all times up to the highest physical condition. If an experienced operator has the qualifications and the desire to do his duty well, he will have time to attend to other duties at times and keep his plant in fine working order.

Misdirected zeal is almost as bad as lack of zeal. For instance, in a large producer plant in an Eastern city the linings of the generator were ruined through the misdirected energy of an attendant who zealously poked away to dislodge clinkers without making much distinction between the lining and the clinkers. The damage to the lining was so great that within a month after installation the damage had to be repaired. While it is essential that clinkers should be properly removed, and that the fire be kept burning properly, it is not supposed that the engineer in charge is to poke away without some reason. Yet this is a weak point with many beginners. They mistake zeal for good work in running the producer.

## THE VAPORIZER A VITAL PART.

The vaporizer is usually one vital part of the plant that should be immune from destruction or injury through carelessness or ignorance. Yet in the hands of a poor man it may come in for some pretty rough handling. The size, shape and design of the vaporizer differ in different producers, and it is essential that the man in charge should understand what type is under his charge. In a small producer plant where the vaporizer is in the shape of a pan forming the top of the producer, a water-supply

pipe and an overflow pipe were connected to it. The steam and the necessary air were conveyed to the under side of the grates by means of pipes which passed down through the fire-brick lining; these pipes were consequently very hot, and they superheated the air and steam. The water for the supply was obtained from a branch service pipe. The successful operation of this whole process depended therefore upon the reliability of the water supply, or the uniformity of the pressure. To obviate any uncertainty as to the pressure, a storage tank had been put up and connected with the supply pipe, through a stop-cock. The water from the storage tank was furnished by gravity under about the same pressure as that from the service pipe.

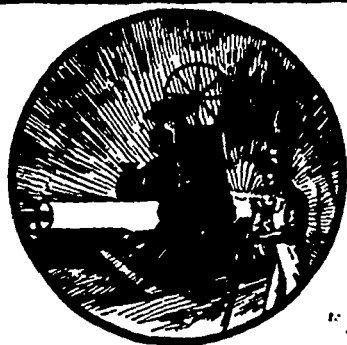
Everything had apparently been done to prevent any accident, and there was no earthly reason why a mishap should follow: But one day the vaporizing pan was burnt and fractured badly through a sudden and somewhat prolonged reduction in the pressure of the water supply. The reason was that the attendant had that day cut off the water from the storage tank by turning the stop-cock, and had left it so. His explanation was that he didn't know that the storage tank was of any use except when the service pipe was out of use. He learned his lesson, but the owners of the plant paid rather heavily for his education.

## FREQUENT EXAMINATION OF FIRE REQUISITE.

Not until it is understood that the attendant must examine his fire every half hour or oftener will we get the highest results from producers. Instruct him in the fallacy that his services are needed only every two or three hours for recharging, and neglect will follow, and sooner or later serious troubles will come. There are differences in producers and differences in coals, and these differences make for trouble unless the man in charge knows enough to adjust things properly. To work economically the engine must have just as constant a supply of good gas under heavy loads as when working light. To obtain this the man in charge must know something more than simply feeding a fire and shaking it down. The maintenance of the proper temperature in the fuel bed under all conditions is not a simple matter for the novice; it requires knowledge, skill and experience.

The chief thing for an operator to learn is to keep the proper depth of fuel bed, changing it only when the load falls off or increases. Now, any hard-and-fast rule regarding this is almost impossible to formulate. The man who follows any set schedule of stoking and cleaning at unvarying intervals and then recharging will be very apt to waste fuel, and he will frequently furnish the engine with an inferior grade of gas. No engine was yet designed that can adapt itself automatically to all sorts of gas





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quality, and if the quality drops there is bound to be irregular action of the engine.

One of the next important fundamental mistakes made by unskilled operators is to make such a complete change in the recharging that the fuel bed is cooled off and requires a long time to get up to the proper temperature again. In other words they rake and shake down the furnace too much at one time and then let down too much fresh coal. This chills the fire and has a depressing effect upon the operation of the whole plant. Where an ample supply of fuel is carried in a storage reservoir above the generator, it is a simple matter to let down fresh coal gradually to replenish the fire without cooling it off.

Cleaning the fire of clinkers and ashes is something that can be done with skill, or in a very clumsy, costly way, as in the case already cited. Poking at the clinkers roughly may injure the lining of the generator; they must be removed frequently, but carefully. Some operators, by removing the clinkers gradually and keeping the fire burning uniformly, have records of running a generator as long as 700 hours without a complete cleaning. That means high plant efficiency, and successful operation. But no one would undertake to say that this could be accomplished by a man who was anxious to be off duty for several hours at a stretch. It can be done only by one who is willing to give to the gas producer the same tireless attention that an engineer of a steam plant gives to his machinery. To this extent at least the two are alike; they require careful, skilled attention and not careless and sporadic effort.

## PUBLICATIONS

A Review of Books, Catalogues, Bulletins and other Publications of interest to readers of this paper. All such publications should be sent to The Editor, Canadian Manufacturer, Toronto.

**JEFFREY MINE FANS**—Catalogue 26 (June 1908) of the Jeffrey Mfg. Co., Columbus, Ohio, is devoted to the Jeffrey Centrifugal Fan for Mine Ventilation. This fan is designed for high efficiency at low speeds against heavy pressures. The catalogue includes complete description of the fan, with reports of tests and a page of useful engineering formulae relating to ventilation.

**PRESSURE AND VACUUM GAUGES**—Bulletin No. 2 of the Standard Gauge Mfg. Co., Syracuse, N.Y., (May 1908), is devoted to the "Standard" line of pressure and vacuum gauges, which have been developed in two models and many varieties of types and sizes. Engineers will be particularly interested in the Standard Model A. or "Indicating Movement" gauges, which are so designed that the pressure tube and movements are independent of the case and consequently the accuracy is not impaired by temperature changes or distortion of the case when gauges are installed.

Gauge boards of different designs are also shown, together with clocks of standard domestic and foreign movements.

**CANADIAN NATIONAL EXHIBITION**—The prize list, offering premiums and prizes to the

amount of \$50,000 has been issued from the offices at the City Hall, Toronto.

**IRON AGE DIRECTORY**—The twelfth annual edition of the index of goods manufactured by the Iron Age advertisers, David Williams Co. of New York.

**WINNIPEG**—The Development and Industrial Bureau of Winnipeg, has just published an attractively printed and well bound booklet of 100 pages, giving "200 facts about the coming metropolis of the West." It is intended to sell for 25 cents.

**THE MILWAUKEE-NORTHERN RAILWAY**—Bulletin 1,062 of the Allis-Chalmers Co (January, 1908) is devoted to the Milwaukee-Northern Railway, describing territory traversed, roadbed and crossings, motive power equipment, power plant, gas engines, valves and valve gearing, ignition, air starting system, lubricators, water cooling system, engines, gas producers, generators, substations, rails, roadbed, etc. The feature of the equipment that has attracted especial attention from the engineering public and users of power is the fact that the motive power of the road is furnished by gas-engine driven electric generating units of a size heretofore unknown for purely traction service. Full detailed and illustrated description of the power equipment is given in this Bulletin.

**THE BULLETIN of Allis-Chalmers-Bullock, Limited**, (No. 303, June, 1908) distributed at the Canadian Electrical Association Convention, Toronto, is devoted to Hydro-Electric plants, and contains illustrated description of their improved form of turbine, showing plants in stalled and runners designed to meet special conditions. It also includes data necessary for working out plans and estimates.

**THE JONES UNDERFEED STOKER CO., LIMITED**—512 Coristine Building, Montreal, and National Trust Building, Toronto, have recently issued an attractive illustrated catalogue showing the construction and operation of the Jones Underfeed Automatic Mechanical Stoker, and its application to standard types of boilers. This catalogue aims to enable users and prospective users of the Jones Stoker to familiarize themselves with its construction and to point out the many strong points of its mechanism. It includes a general description of the Jones Stoker, followed by illustrations showing each component part, and the application of the stoker to the various standard types of boilers. The operation and advantages of the automatic attachment are clearly explained.

The Provincial Government have approved the plans of the Prince Rupert Power & Light Co, Prince Rupert, B.C., who are authorized to construct a system, including dam, pipe lines and power houses at or near Woodworth lake, Shoowahtlans River, in the Skeena River mining division, and to transmit and distribute electricity to various points on the Tsimpsean peninsula and Kaien and Digby islands.

The Montreal & Southern Counties (Electric) Railway Co. have opened offices at 605 and 606 Canadian Express Bldg., McGill Street, Montreal, with W. B. Powell, as manager, and J. A. Burnett, as superintendent and electrical engineer. Work is now proceeding on the Montreal-St. Lambert section of this road, and entry into the city of Montreal has been arranged for.

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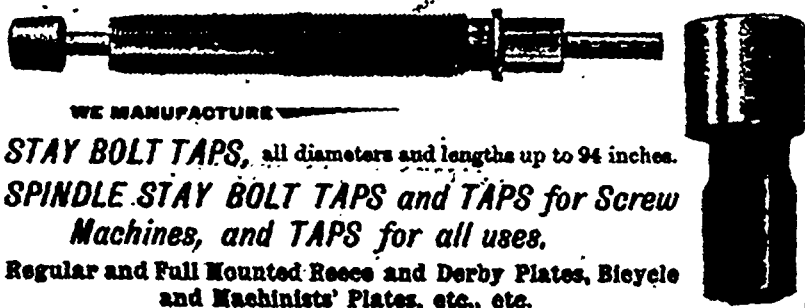
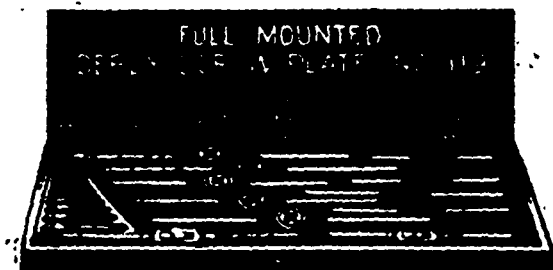
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# INDEX TO ADVERTISEMENTS.

ifo ..... inside front cover.

lbo.....inside back cover

obo.....outside back cover.

A		PAGE		PAGE		PAGE	
Agriculture, Ontario Minister of, Toronto.....	23	Canada Foundry Co., Toronto.....	6	Elk Fire Brick Co., St. Mary's, Pa.....	41	Empire Light Co., Montréal.....	12
Albert Mfg. Co., Hillsborough, N.B.....	8	Canada Iron Furnace Co., Montréal.....	14				
Algoma Steel Co., Sault Ste Marie, Ont.....	14	Canada Paint Co., Montréal.....	16	<b>F</b>			
Alia-Chalmers-Bullock, Limited, Montréal.....	ibo	Canadian Billings & Spencer, Limited, Welland, Ont.....	11	Factory Inspectors, Ontario.....	ibo	Factory Locations.....	6
Amburns Hydraulic Construction Co., Montréal.....	ibo	Canadian Boomer & Boschert Press Co., Montréal.....	ibo	Fate, J. D. Co., Plymouth, Ohio.....	32-33	Fell, I. C. & Co., Toronto.....	16
Armstrong Mfg. Co., Bridgeport, C. B.....	6	Canadian Copper Co., New York, N.Y.....	14	Fensom, G. J., Toronto.....	17	Fetherstonbaugh & Co., Toronto.....	obo
<b>B</b>		Canadian Drawn Steel Co., Hamilton, Ont.....	8	Forman, John, Montréal.....	11-18	Fyfe Scale Co., Montréal.....	17
Babeok & Wilcox, Limited, Montréal.....	ibo	Canadian Economic Lubricant Co., Montréal.....	18	<b>G</b>			
Bank of Hamilton, Hamilton, Ont.....	45	Canadian Fairbanks Co., Montréal.....	17	Galt Art Metal Co., Galt, Ont.....	12	Gartshore, J. J., Toronto.....	16
Baird, H. O., Son & Co., Parkhill, Ont.....	37	Canadian Hart Wheels, Limited, Hamilton, Ont.....	17	Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.....	45	Globe Machine & Stamping Co., Cleveland, Ohio.....	ibo
Banfield, W. H. & Sons, Toronto.....	16	Canadian Iron & Foundry Co., Montréal.....	45	Goldie & McCulloch Co., Galt, Ont.....	3	Goldschmidt Thermit Co., Toronto.....	3
Barber, Wm. & Bro., Georgetown, Ont.....	16	Canadian Manufacturer Pub. Co., Toronto.....	10	Greening, B., Wire Co., Hamilton, Ont.....	45	Gutta Percha & Rubber Mfg. Co., Toronto.....	3
Barclay & Co., Toronto.....	39	Canadian National Exhibition, Toronto.....	10	<b>H</b>			
Barrett Mfg. Co.....	39	Canadian Office & School Furniture Co., Preston, Ont.....	16	Hamilton Facing Mills Co., Hamilton, Ont.....	obo	Hamilton Steel & Iron Co., Hamilton, Ont.....	41
Bechtels, Limited, Waterloo, Ont.....	37	Canadian Rand Co., Montréal, Que.....	ifo	Hamilton Tool Co., Hamilton, Ont.....	5	Hay, Peter, Knife Co., Galt, Ont.....	54
Bell Telephone Co., Montréal.....	49	Cassella Color Co., New York and Montréal.....	51	Hore, F. W. & Son, Hamilton, Ont.....	12	Horsburgh & Scott, Cleveland, Ohio.....	16
Berg, A. & Sons, Toronto.....	35	Chapman Double Ball Bearing Co., Toronto.....	4	Hunt, Robert W. & Co., Chicago, Ill.....	17		
Bertram, John & Sons Co., Dundas, Ont.....	ifo	Continental Iron Works, New York, N.Y.....	4	<b>I</b>			
Best Steel Castings Co., Montréal.....	14	Cousins, C. C., Montréal.....	17	Imperial Oil Co., Petrols, Ont.....	49	International-Acheson-Graphite Co., Niagara Falls, Ont.....	45
Boiler Inspection and Insurance Co., Toronto.....	obo	Crossley Bros., Manchester, Eng.....	8				
Bourne-Fuller Co., Cleveland, Ohio.....	14	<b>D</b>					
Bowman & Connor, Toronto.....	17	Darling Bros., Montréal.....	6				
Bradstreets, Toronto and New York.....	17	Dixon, Joseph, Crucible Co., Jersey City, N.J.....	6				
Brandeis, C., Montréal.....	17	Dodge Mfg. Co., Toronto.....	13				
Bristol Co., Waterbury, Conn.....	obo	Dominion Belting Co., Hamilton, Ont.....	12				
Brunner, Mond & Co., Northwich, England.....	obo	Dominion Oil Cloth Co., Montréal.....	12				
Buchanan, R. H. Co., Montréal.....	11	Drummond, McCall & Co., Montréal.....	14				
Budden, Hanbury A., Montréal.....	17	Dun, R. G. & Co., Toronto.....	50				
Butterfield & Co., Rock Island, Que.....	52	<b>E</b>					
<b>C</b>		Edwards, Morgan & Co., Toronto.....	17				
Carns, Bernard, Toronto.....	50	Electrical Construction Co., London, Ont.....	19				
Canada Chemical Mfg. Co., London, Ont.....	51						

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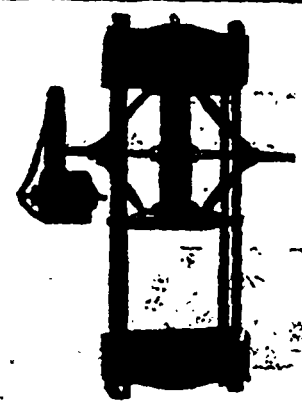
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INDEX TO ADVERTISEMENTS (Continued).

	PAGE		PAGE		PAGE
<b>J</b>					
Jeffrey Mfg. Co., Columbus, Ohio.....	3	McArthur, Corneille & Co., Montreal.....	obe	<b>R</b>	
Johnson, C. H. & Sons, St. Henry, Que.....	17	McCullough-Dalsell Crucible Co., Pittsburg, Pa.	41	Raymond, C.W., Mfg. Co., Dayton, Ohio .....	3
Jones & Glassco, Montreal.....	15	McDougall, John, Caledonian Iron Works Co., Montreal.....	7	Richards Mfg. Co., Montreal, Que.....	1
Jones & Moore Electric Co., Toronto.....	19	McGuire, W. J. Limited, Toronto and Montreal	16	Richardson, John L. & Co., Toronto.....	2
Jooss, J. L. Engraving Co., Toronto.....	50	McKensie D., Guelph, Ont.....	16	Robb Engineering Co., Amberst, N.B.....	1
<b>K</b>					
Kahn, Gustave, Toronto.....	17	McKinnon Deah & Metal Works Co., St. Catharines, Ont.....	obe	Roland, Charles F., Winnipeg, Man.....	1
Kays, Joseph, & Sons, Leeds, Eng.....	53	McLaren, D. K., Limited, Montreal and Toronto.	ibc	Rolland Paper Co., Montreal.....	1
Kelly's Directories, Toronto and London Eng.	53	<b>N</b>			
Kent, P., Montreal.....	17	Neff, A. C. & Co., Toronto.....	17	Sadler & Haworth, Montreal.....	5
Kerr Engine Co., Walkerville, Ont.....	8	Nichols Chemical Co., Limited, Montreal.....	51	Senator Mill Mfg. Co., Galt, Ont.....	1
Koppel, Arthur Co., New York.....	8	Northern Aluminum Co., Shawinigan Falls, Que., and Pittsburg, Pa.....	52	Sheldon School, Chicago, Ill.....	1
<b>L</b>					
Laurie Engine & Machine Co., Montreal.....	ifo	Nova Scotia Steel & Coal Co., New Glasgow, N.S.	43	Sheldons, Limited, Galt, Ont.....	1
Legg Bros., Engraving Co., Toronto.....	12	<b>O</b>			
Leonard, E. & Sons, Montreal.....	12	Oakey, John & Sons, London, England.....	51	Siemon Bros., Warton, Ont.....	1
Leslie, A. C. & Co., Montreal.....	obe	Oncida Community, Niagara Falls, N.Y.....	15	Smart-Turner Machine Co., Hamilton, Ont.....	1
Lindsay, A. J., Toronto.....	16	Ontario Lime Association, Toronto.....	16-50	Smith's Falls Malleable Castings Co., Smith's Falls, Ont.....	1
Lockerby & McComb, Montreal.....	17	Ontario Wind Engine & Pump Co., Toronto.....	16	Somerville, T. A., Hamilton, Ont.....	1
London Machine Tool Co., Hamilton, Ont.....	15	Orford Copper Co., New York, N.Y.....	14	Sterne, G. F. & Sons, Brantford, Ont.....	1
Lowell Crayon Co., Lowell, Mass.....	16	Otis-Fensom Elevator Co., Toronto.....	54	Stevens Co., Galt, Ont.....	11-
Lysaght, John, Limited, Bristol, Eng. and Montreal.....	16	<b>P</b>			
<b>M</b>					
Manufacturers' List Co., Toronto.....	16	Packard Electric Co., St. Catharines, Ont.....	19	Stowe-Fuller Co., Cleveland, Ohio.....	11-
Marion & Marion, Montreal.....	17	Park Bros., Chatham, Ont.....	50	<b>T</b>	
Metal Shingle & Siding Co., Preston, Ont.....	17	Parks, Roderick J., Toronto.....	17	Toronto & Hamilton Electric Co., Hamilton, Ont.	1
Metallic Roofing Co., Toronto.....	49	Parmenter & Bulloch Co., Gananoque, Ont ..	16	Toronto Paper Mfg. Co., Cornwall, Ont.....	1
Metcalf Engineering, Limited, Montreal.....	49	Paterson Mfg. Co., Toronto.....	39	Toronto Stamp & Stencil Works, Toronto.....	1
Millar, John & Son, Montreal.....	49	Pennsylvania Fire Brick Co., Beech Creek, Pa....	43	Toronto Testing Laboratory, Toronto.....	1
Miller, W. L. & Co., Montreal.....	12	Perrin, William R., & Co., Toronto and Chicago, Ill.....	53	Trussed Concrete Steel Co., Toronto ..	1
Mitchell, Charles H., C.E., Toronto.....	17	Phillips, Eugene F., Electrical Works, Montreal... 18		<b>U</b>	
Monongahela River Consolidated Coal & Coke Co., Buffalo N.Y.....	43	Pullan, E., Toronto.....	50	Union Drawn Steel Co., Hamilton, Ont.....	1
Montreal Fire Brick & Terra Cotta Works, Montreal.....	16	<b>Q</b>			
Morris Machine Works, Baldwinsville, N.Y.....	10	Queen City Oil Co., Toronto.....	obe	United Fire Brick Co., Pittsburg, Pa.....	1
Morrow, John, Scraw, Limited, Ingersoll, Ont... 49		<b>R</b>			
Mutual Steamship Co., Toronto.....	38	<b>S</b>			

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