

# CANADIAN CONTRACT RECORD

*A Weekly Journal of Engineering, Public Works,  
Tenders, Advance Information and Municipal Progress*

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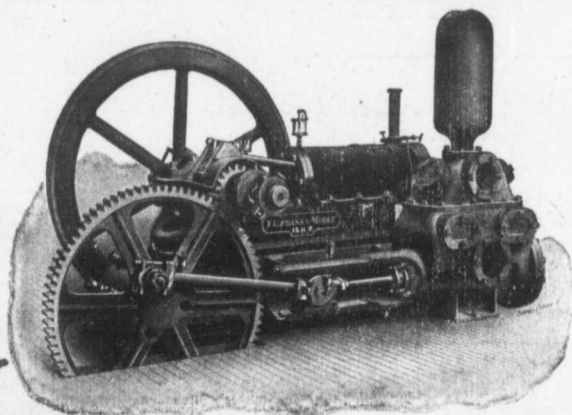
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A Canadian Company organized to promote and develop for itself or other persons all commercial and industrial enterprises; to undertake the construction of all kinds of public, municipal and private works, and especially railways, tramways, water works, sewers, hydraulic and electrical installations.

The Company is supported and backed in Europe by nine of the strongest Banks, enabling it to carry through the largest undertakings, and to financially take an interest in Canadian enterprises.

The Company has a staff of competent and experienced engineers, and invites correspondence from municipal and private corporations, and from business men who require technical or financial assistance to plan, execute or construct any private, municipal or public work.

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**Simple, Compact  
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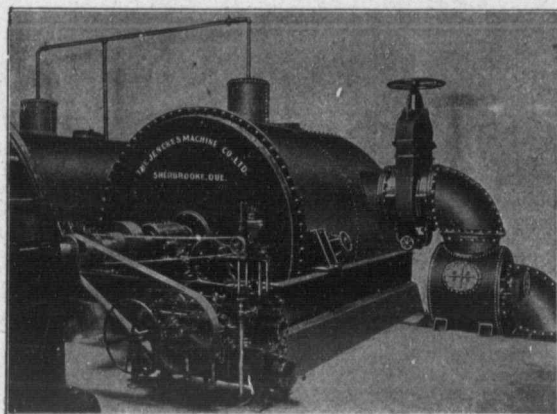
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# TENDERS AND FOR SALE DEPARTMENT

## FOR SALE

One 15 inch Austin Jaw Crusher, mounted with 28 ft. of elevator and screen, all complete in good working order. An early reply will oblige. THAMES QUARRY Co., St. Marys, Ont.

## United Counties of Prescott and Russell.

## Tenders for Iron Highway Bridge

Sealed tenders addressed to the undersigned will be received up to 12 o'clock NOON of TUESDAY, the 21ST DAY OF JANUARY NEXT, A.D. 1908, for the construction of an iron highway bridge over the Big Castor River, 120 to 122 feet span. State price for each and also for removing the old 80 foot span, now in use, to the site of the new bridge over the Little Castor, about one mile distant, and place the same on the new abutments ready for public use.

Tenders are also asked for the masonry work required for the Big Castor bridge, concrete or st ne. Information may be obtained from the undersigned by letter or in person, who will visit the locality with those tendering if required.

The lowest or any tender not necessarily accepted. By order of Council.

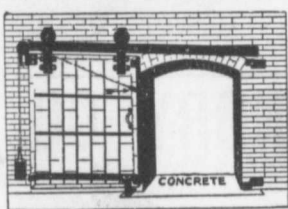
E. ABBOT JOHNSON,  
County Clerk,  
Prescott and Russell,  
L'Original, Ontario.

L'Original, December 16th, 1907.

## The Ontario Accident Insurance Co.

ACCIDENT, EMPLOYERS, ELEVATOR AND GENERAL LIABILITY . . . .

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the country over endorse on Fire Door work. We make any contract undertaken a standing advertisement for ourselves.

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Civil Engineer (20), A. M. Inst., C. E., 11 years sewerage and sewage disposal experience, desires position of responsibility with consulting engineer or contractor, with view to partnership preferred. Box 120, CONTRACT RECORD, Toronto, Ont.

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WM. MAHLON DAVIS,  
Town Engineer, Berlin, Ont.

## City of Sherbrooke

Province of Quebec

## Tenders for Pipe

Sealed tenders addressed to the undersigned, and marked "Tenders for cast iron water pipe and fittings," will be received up to TUESDAY, DECEMBER 31ST, 1907, for about 516 feet 24 inch cast iron water pipe, 13,100 feet of 18 inch and 7,000 feet 16 inch, also fittings for above sizes.

The lowest or any tender not necessarily accepted.

Particulars may be obtained from  
THOMAS TREMBLAY,  
Supt. Waterworks,

## THE PRIESTMAN EXCAVATOR AND DREDGER

is used throughout the world. Will do more work with less labor, at a less first cost than any Excavator at present in use in Canada. For particulars write

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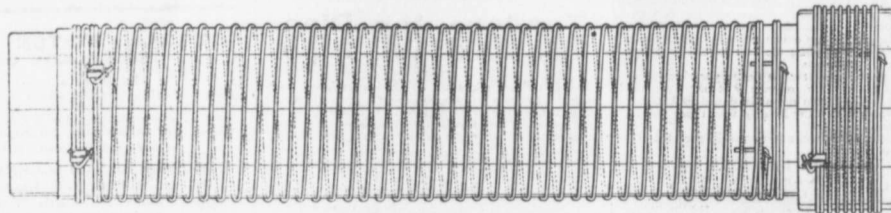
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During 1906 we manufactured and sold 614,336 feet of Pipe.



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Showing special method of winding with two independent parallel wires.  
The great advantage of this is, that in event of one wire becoming damaged,  
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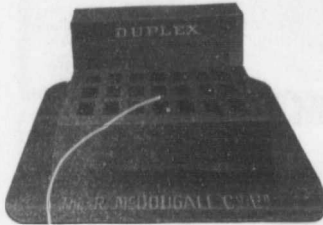
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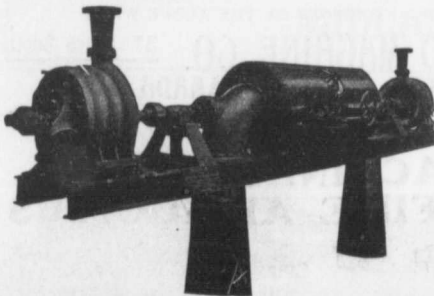
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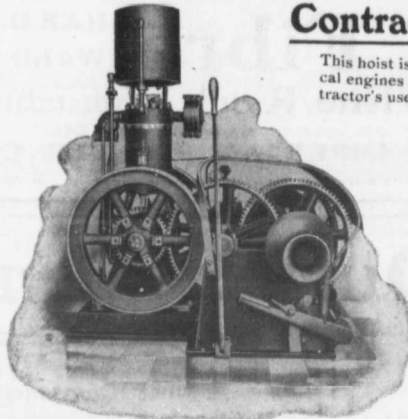
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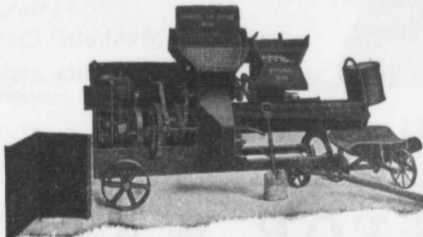
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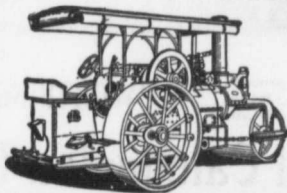
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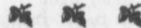
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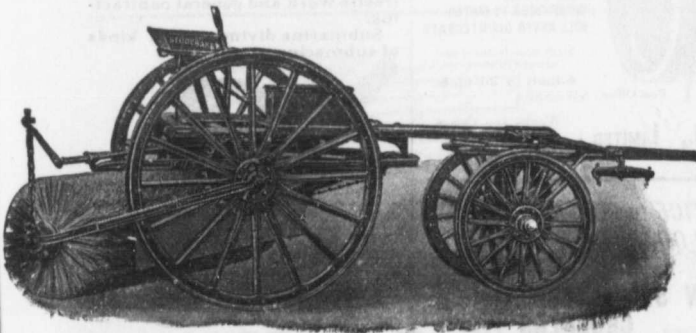
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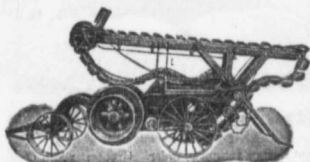
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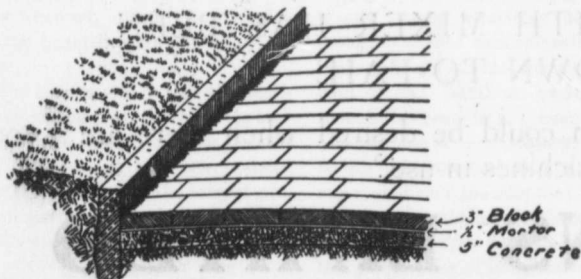
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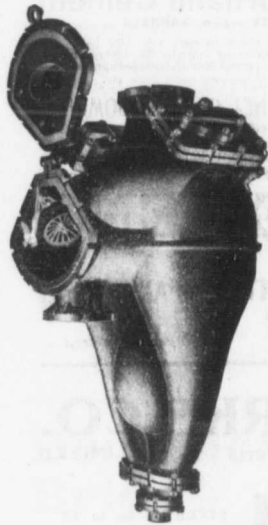
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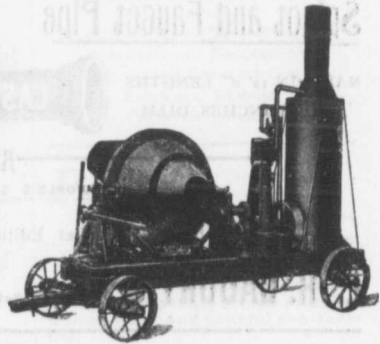
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# CANADIAN CONTRACT RECORD

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## QUANTITATIVE ESTIMATING.

In a recent number of "The Building News," London, appeared an exhaustive article on the subject of estimating the cost of buildings upon a quantitative basis. In America, as well as in England, some attention has already been given the subject, and it would appear that in the not far distant future the principle might come into general use. "The News" says in part:

"Ever since it was first thought necessary to take out independent quantities for building work, the question whether these should or should not form the basis of the ultimate building contract has been one which has been constantly discussed. Up to the present, opinion has been much divided upon the matter, in spite of the apparent fairness of this method of procedure, and the arguments on either side appear to be fairly balanced, unless it be conceded that the quantities are absolutely accurate.

"The time is still within the recollection of some of the older practitioners when quantities were practically unknown; at any rate, outside London and a few of the largest provincial towns. The architect prepared his drawings and his own specification with quite as much care as at present, and, perhaps, a little more; and builders were asked to tender from these, a few tracings perhaps being made, and one sent to each of

the builders in turn, they being allowed a few days for making their calculations. As a natural result, the estimates were entirely without detail and, to a large extent, mere lump sum guesses; for each builder, having to arrive at his own result, could not devote much time to detailed computations, even if he had sufficient knowledge for the purpose. He went very largely by the size of the building and its character, and his general knowledge of the architect who was to supervise the work. Variations in the tenders submitted were, naturally, considerable; but the margin of profit allowed was high, and builders were able to make a livelihood under this system while at the same time putting in thoroughly sound work, and doing a great many little things for which an extra would now be claimed.

"Gradually this somewhat free-and-easy method of estimating became obsolete. Builders were not satisfied with tendering upon meagre information and at short notice, and they took to clubbing together to employ somebody, very possibly a clerk in the architect's office, to take out quantities for them, agreeing that the successful man should pay him for his services.

"By slow degrees the surveyor employed direct by the builder gave place to an independent surveyor, appointed by the builder owner through his architect. It still remained usual for the contractor who obtained the work to pay for quantities, charging for them as part of the cost of the building, and, in fact, including their cost in his lump sum estimate. This is still almost invariably done, although it is now well recognized that the surveyor's charges are eventually paid by the building owner, even though he receives his money from someone else as intermediary. So well is this acknowledged that, as we all know, it is now the rule that a building client should be so informed.

"In two other respects, however, this preparation of independent quantities, either by the architect or by someone else, brought about a distinct change. The surveyor was no longer a servant of the builder, but of the

employer, and, holding an independent position, it was no longer to his advantage to exaggerate in one place in order to make up for possible deficiencies in another. In fact, the probabilities of error became steadily less as the surveyor became more skilled, and the science of his work better understood upon definitely laid down systems. Once this was recognized, the builders began to clamor that they should be paid for exactly what was in the quantities upon which they had based their estimate, and not be compelled to erect a complete building, as described in the drawings and specifications or to be reasonably implied therefrom, for the lump sum of the estimate, whether all the details were included in the quantities or not. They claimed, and they still claim, with a considerable show of reason, that whereas when the surveyor was their personal servant they were liable for his inaccuracies, they were not so now that he is appointed independently of them; that they prepared their estimates no longer from drawings and specifications, but from the bill of quantities alone, trusting the independent surveyor absolutely; and that, doing so, they should be called upon, for the sum of their estimate, to do all that is included in the quantities, and nothing more.

"Presuming that quantities are accurate, there is little difference in the result, whether they form part of the contract or not; the builder executes the same amount of work, and is paid the same sum. It is consequently, then, more simple that they should not form the basis of the contract, and very few builders will insist upon their doing so.

"It is thus eminently just that the inexperienced surveyor's quantities should form the basis upon which the builder's payment is made, as any mistakes are almost sure to be such as would tell against the contractor, and be discovered by him. Of course, from the client's point of view, it is just the quantities of such a man as this which should be taken as the basis of a lump sum contract; but it is rather the view of the client without a conscience than the man who does his building for him."

# THE COMMERCIAL SITUATION

## RESTORE CONFIDENCE THROUGH ADVERTISING.

The best manner in which the manufacturer and jobber can show his confidence in the financial and commercial situation of this country is to begin an advertising campaign the very first week in January. Nothing can be more stimulating than advertising. You may or may not have the goods to sell, you may wish to curtail credit, but advertise all the same. Keep your goods before the trade. A break in the chain is disastrous. If a merchant slackens on his advertising his present customers or his prospective patrons will come to the conclusion that his business is weak, while so long as he hammers away enthusiastically at a publicity campaign he gives the impression that business is booming with him, and fixes himself in the eyes of the trade as a man of push, enterprise and progress.

Make the good times yourself. Restore confidence. Don't go around with a long face, with "blue" stories of "up against it," "down and out," etc., or people will be afraid to do business with you. If every jobber and manufacturer were to begin an advertising campaign in January and announce that the depression had passed, we venture to predict that in a short time an atmosphere of cheerfulness and confidence would be restored to the most gloomy in the land. No man is more constantly unhappy, or succeeds in making others so, than the pessimist. He is out of harmony with things. He loses the true dignity of life.

If every business house would go to work with a will to convince its customers that there is no real cause for suspension of business, confidence would be restored almost immediately.

For the first time in years the earnings of the Grand Trunk show a decrease amounting to \$44,500, for the week ending December 21.

## THE GRAIN ACT.

According to the Grain Act, as at present in force, the elevators of the country must take their turn with the individual farmer in securing cars for the shipment of grain. It is claimed that this has worked to the disadvantage of the country this year, in the face of the withholding of funds by the banks. In a year like this, when there is more or less suspicion rampant, one could hardly blame the banks for being cautious in advancing a farmer money on un-inspected grain. They could, however, without much fear, advance money to the elevator man on his wheat, as it is not very likely that he would buy very poor stuff and load his elevator with it.

If the elevator man were allowed a number of cars proportionate, or nearly proportionate, to the quantity handled by him, there is no doubt that the money would reach the farmers more promptly than it does when the elevator man must accept only car for car with the farmer. It is hardly fair that the farmer with 5,000 bushels of grain receives turn about with the man who has 30,000 bushels in his elevator. As the practice stands at present an order book is kept at every station, in which applicants for cars make entry. Under the Act of 1900 it was possible for an applicant to make application for two or more cars as required, but by the amending Act of 1906 no applicant is allowed to have more than one unfilled order on the book at one time. This amendment was passed with the intention of giving the farmer equal privileges with the elevator companies, and, viewing the legislation from that standpoint, was a perfectly legitimate and proper course to pursue. But, when the grain dealer can secure funds for moving the grain more easily than the farmer can, every facility should be given the former to get the grain out.

We must consider the fact that the elevators in most cases have a capa-

city of from 25 to 30 thousand bushels, whereas the average farmer ships only from 3,000 to 4,000 bushels, and that in the event of the elevator company receiving sufficient cars they would be able to take delivery of the farmer's grain whenever he tendered it at the elevator. It largely amounts to the same thing, whether it is the farmer or the elevator man who ships out the wheat, so long as it gets out, and the money is received for it. The important matter is to see that it moves out quickly, and the sure remedy for that is a sufficient supply of transportation facilities. It would be unfair if the elevator men were to hold a monopoly of the car service, but at present, if we look at it in the light of the elevator man—he with his thirty thousand bushels in the same position as the farmer with his thousand—we are bound to admit that it can hardly be considered just that a large investment of capital should be held up through the lack of an adequate car service.

## HALF A BILLION FOR ROLLING STOCK.

Railroads of the United States and Canada have spent approximately half a billion dollars on rolling stock this year.

According to "The Railroad Gazette" the effect of the financial slump will be felt by the car builders next year. Orders for new equipment to be delivered during 1908 have fallen off greatly.

The total number of cars built in the United States and Canada this year is 289,645, against 243,670 in 1906. Of those built this year 284,188 were freight cars and 5,457 passenger coaches. The output of locomotives was 7,362, against 6,952 in 1906. Freight cars cost an average of \$1,100, an increase of \$100; passenger cars \$8,500, an increase of \$500; locomotives \$16,000, an increase of from \$500 to \$1,000. Taking these figures as a basis, the total expenditures for rolling stock was \$477,000,000, an increase of 25 per cent. over last year.

## New G. T. R. Shops, Stratford

The accompanying illustration shows the general layout for the new shops for the Grand Trunk Railway at Stratford, and is a typical example of the character of the improvements be-

ing done in the foreground, are now under construction, and are being rushed as fast as possible in the hope of having fifteen bents under cover and in operation this winter. The above

the store house, 60 by 200 feet; the blacksmith shop, 100 by 300 feet; the power house, 90 by 90 feet, and the foundry, 110 by 140 feet. The construction of these buildings will follow in order of their importance and needs after the machine and erecting shop is well under way and the wea-

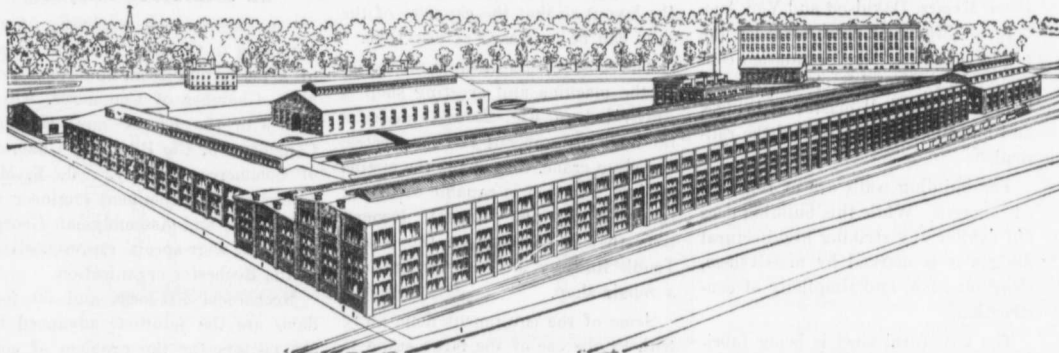
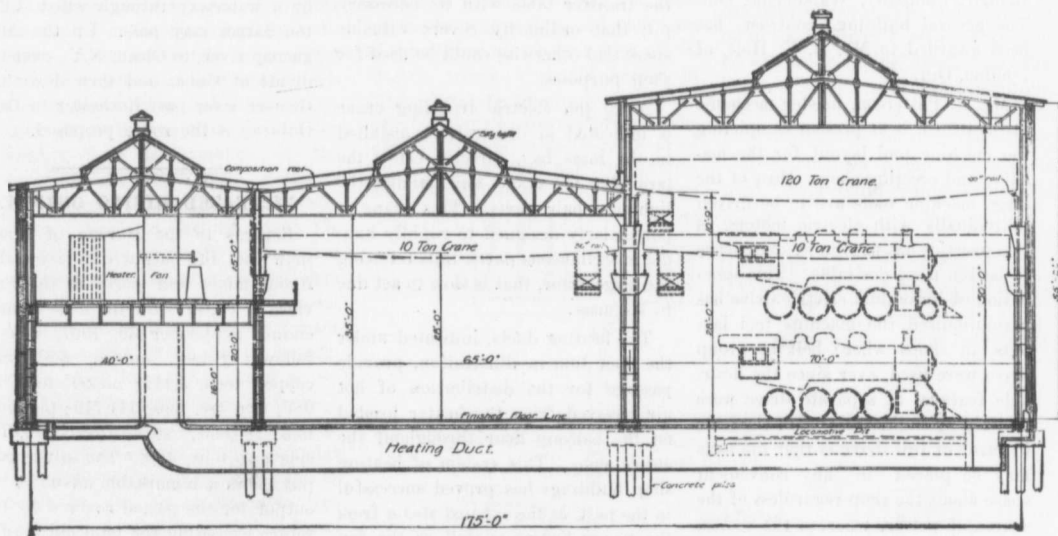


FIG. 1—BIRDS' EYE VIEW NEW G. T. R. LOCOMOTIVE REPAIR SHOPS, STRATFORD.



CROSS SECTION  
OF  
MACHINE & ERECTING SHOP.

FIG. 2

ing done on that road. This view is as if taken from an elevated point to the southwest of the shops and indicates demolition and entire reconstruction of the old shops. The Y. M. C. A., the Mooney factory, etc., are shown in the distance. The large new machine and erecting shop, 616 feet long by 175 feet wide, and boiler shop, 154 feet long by 135 feet wide, indi-

mentioned shops occupy nearly three acres of ground space. The building to the left and adjoining the boiler shop is now standing, being the new addition erected a couple of years ago, and is used for the repair of locomotive tenders.

The other proposed buildings indicated in the background of the illustration are, reading from left to right,

ther permits. The old machine shop, that is being torn down in sections as fast as the new shop is erected, occupied a portion of the space covered by the new building.

As the ground selected for the plant was irregular and low in places, it was necessary to do considerable filling and leveling before starting construction work.

Concrete piles were used in the foundations of the new boiler shop and a portion of the new machine and erecting shop. It was necessary to drive these piles from fifteen to eighteen feet below the average elevation of the ground to provide sufficient bearing power for building foundations. Messrs. Davidson and Von Aueberg, of Montreal, were awarded the piling contract. The foundation concrete work is under charge of Mr. George A. Mitchell master of bridges and buildings department of the railroad.

The building walls are of reinforced concrete. While this building does not exhibit any striking architectural designs it is marked by massiveness, clear cut lines, and simplicity of construction.

The structural steel is being fabricated and erected by the Canadian Bridge Company, Walkerville, Ont. The general building contract has been awarded to Mr. B. V. Hole, of London, Ont.

Mr. R. Patterson, master mechanic at Stratford, is at present completing the machine tool layout for the machine and erecting shop. Most of the large machine tools are to be driven individually with electric motors, as this practice has proven by experience to be the most desirable. This innovation of individual electric drive has revolutionized the machine tool layouts, in shops where belt or group drive were used, ever since the desirable features of separate drive were realized by engineers. One of the facts in favor of this drive is that the tools may be placed in any convenient space about the shop regardless of the source of power, whereas the system of shaftings with belt drive determines the location of machines within a short distance of the shafting. The common method of belt drive will be used for the smaller machine tools that require less power to drive.

Considerable use is to be made of compressed air as a source of power for the various tools and appliances throughout the plant. Some of its uses are the driving of riveting machines, chisels, turn-table motor, forge fires, blowing out engines, painting, etc. This system of operating tools

has proved by experience to be flexible and most satisfactory for the purpose it is to serve.

The new shop will be capable of repairing twenty-eight engines standing over pits at the same time, and should this be insufficient space in the future, the engineers have arranged the layout so that the capacity of the shop can be increased at any time.

The cross section through the centre of the machine and erecting shop is illustrated in Fig. 2, and indicates the huge, magnificent 120 ton electric traveling crane, that spans the engine pit bay, and that is capable of lifting up one of the largest locomotives that is operated on the Grand Trunk Railway and conveying it to a repair shop.

Some of the equipment done away with by the use of the large crane to place locomotives at various pits, is the transfer table with its necessary pit, that ordinarily covers valuable space and otherwise could be used for shop purposes.

A 10 ton electric traveling crane is indicated in illustration, installed in the same bay, directly below the large 120 ton crane, and handles the lighter repair parts. This crane is particularly designed to rapidly handle miscellaneous parts, thus relieving the large crane, that is slow to act due to its mass.

The heating ducts, indicated under the floor line in illustration, provide passage for the distribution of hot air received from the heater located on the balcony floor throughout the entire shop. This system of heating shop buildings has proved successful in the past, as the exhaust steam from the power house, as well as the fan engine, is utilized for heating coils in the heater.

Separate lockers will be provided at convenient places throughout the shops for men to keep their belongings. In some cases lockers will be portable, so that men working on odd jobs around the shop can move lockers near their work.

Drinking fountains with a continual stream of artesian water flowing are to be installed at convenient places throughout the shop. Lava-

tories will also be arranged in various portions of the shop. At night the shops will be brilliantly lighted by one of the improved systems of vapor lamps which have recently been perfected.

#### AN AMBITIOUS PROJECT.

"A twelve foot waterway from Pittsburg to Ontario" was the slogan of a delegation from the Rochester, N.Y., Chamber of Commerce, which met with the Rivers and Harbors Committee of the Pittsburg Chamber of Commerce recently. J. Y. McClintock, a prominent engineer of New York, and Assemblyman George L. Meade, were special representatives of the Rochester organization.

Mechanical lift-locks and 50 foot dams are the solutions advanced by the visitors for the problem of connecting Pittsburg and Lake Ontario by a waterway through which 1,200 ton barges may pass. Up the Allegheny river, to Olean, N.Y., over the divide at Cuba, and then down the Genesee river past Rochester to Lake Ontario, is the route proposed.

#### INCREASED MINING OUTPUT.

Returns to the Bureau of Mines show that the output of the metalliferous mines and works in the Province of Ontario for the nine months ending September 30, 1907, was as follows: Silver, ounces, 6,919,987; copper, tons, 5,111; nickel, tons, 8,087; iron ore, tons, 141,719; pig iron, tons, 180,663; steel, tons, 120,077; zinc ore, tons, 400. The silver output shows a remarkable advance, the output for the period covered by the return exceeding the total output for last year by 1,518,221 ounces. The value of the 1906 output was \$3,667,551, and that of the output for the first nine months of this year \$4,312,000. There will also be a considerable increase in the output of copper, iron ore and pig iron, if the rate of production continues to be the same during remaining portion of the year.

Winnipeg claims to have more fire-proof theatres than any other city in Canada.

## The Heating of Factories

By A. G. KING in Architects' and Builders' Magazine.

Small factories are frequently heated by direct low pressure steam either from a low pressure boiler or from the power boiler, after the steam, of course, in the latter case has been reduced in pressure. As with the heating of all buildings, there can be no

The reducing pressure valve shown can be so set as to reduce the pressure on the apparatus to as low a point as may be desired. On the riser out of the boiler is shown the connection for the steam supply to engine. The heating main is run through the base-

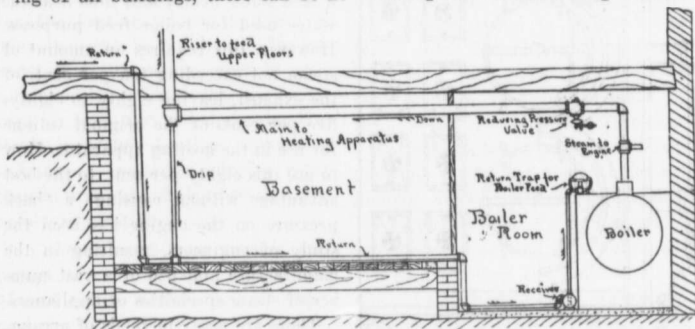


FIG. 1.

set rule as to the manner of running the piping or the placing of the radiators. Each particular job requires individual attention and usually different plans. The radiating surface must be so located that it will thoroughly cover the exposure of the building, glass and wall. Factories have usually a large number of windows. Again, a factory where the operatives are constantly on their feet requires a less amount of heat than a similar building where the operatives sit at benches. For the former a temperature of 60 degrees is sufficient, while 70 degrees would be required for the latter type of factory.

The general rule governing the installation of a plant of this character is that the radiating surfaces (coils or radiators) must be so placed and the piping so arranged as not to interfere with the placing of shafting or machinery.

We shall illustrate this by considering the heating of a small two-storey and basement factory, and for the purpose of making the work as complicated as possible we show a basement under only a portion of the building. Live steam from the power boiler is to be used at a reduced pressure for the heating apparatus. Figure 1 shows the arrangement of the piping and the various appliances necessary for the work.

ment to a convenient point for feeding the heating system and then rises to the ceiling of the first floor of the factory, where it should branch in either direction to supply the radiators throughout the building. The top of this riser is the high point of the heating system and the branch mains should pitch downward from

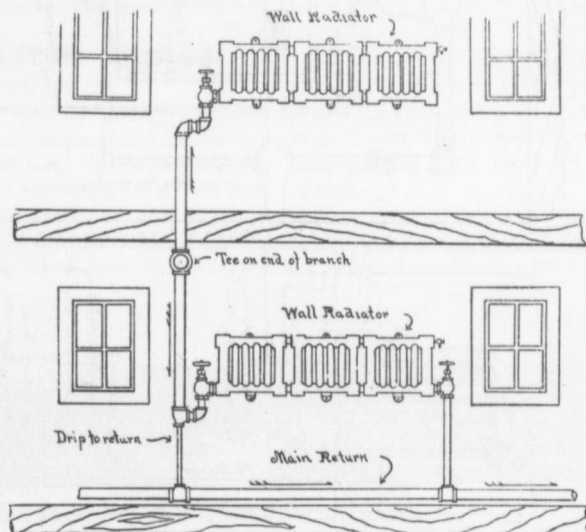


FIG. 2.

this point. By running the main thus it can be hung from the ceiling of the first floor in such a manner as not to interfere with machinery or shafting, the branches being taken from it as

frequently as necessary to feed radiators or coils. All main and supply pipes are counted as radiation, as they are carried through the space to be warmed.

As factories are ordinarily constructed they have an abundant supply of windows and for this reason it is sometimes difficult to make use of pipe coils. We, therefore, recommend any one of the various types of wall radiators. These may be placed on the wall between the windows.

Figure 2 shows a method of connecting to these radiators. The branch from main feeds the radiators on the floor above the main and below the main, those above being connected by the one-pipe system and those below by the two-pipe system. The return is carried on the floor and against the outer wall of the building. The return is run through the basement and boiler room, where it is connected into the receiver, as shown, and is delivered to the boiler by a return trap placed as shown on the illustration, Figure 1. There is sufficient pressure on the receiver to raise the water to the trap, which delivers it to the boiler.

A boiler feed pump may also be used. This would require a consider-

able quantity of steam to operate. The amount of steam needed by the trap is very small—just sufficient to equalize the pressure on the trap and boiler. This arrangement is considered

more economical than the provision of a pump. In case it is not possible to return the water of condensation to the receiver by gravity, or with such pressure as is on the return pipe,

the receiver in the boiler room to the trap on top of boiler.

**EXHAUST HEATING.**

In a large factory where engines and boilers of considerable size are

and passed through the cylinder, and this amount varies at from five to ten percent., according to the condition and type of engine used. This leaves from ninety to ninety-five per cent. in the exhaust which is available for heating or other purposes.

In a plant of this character it is customary to run the exhaust through a feed water heater and thus heat the water used for boiler feed purposes. However, this requires an amount of steam not exceeding ten per cent. of the exhaust, leaving eighty to eighty-five per cent. of the original volume for use in the heating apparatus. How to use this eighty per cent. to the best advantage without causing a back pressure on the engine has been the study of engineers, resulting in the manufacture and use of a vast number of steam specialties or appliances.

There are many methods of arranging the piping and appliances for exhaust heating. So far as the piping for the heating apparatus is concerned, any one of the up-to-date methods of steam piping may be used, providing the pipe is of sufficient size for the work. It is not our purpose to discuss systems of piping, but rather to show what appliances are necessary and their arrangement on a plant of this character.

Figure shows a lay-out of this kind, and is sufficiently plain to give a very good idea of the fixtures employed and the manner in which they should be placed on the apparatus. It very often happens that there is not a sufficient quantity of exhaust steam available for heating purposes, and it is necessary to make provision for letting live steam into the heating main to assist the exhaust in heating the building. It is the usual custom to make a connection from the live steam main ahead of the reducing pressure valve to the main of the heating system, a valve being placed on the pipe. This valve is used as a throttle valve and may be adjusted so as to supply only such a quantity of steam as is required.

The heating capacity of an exhaust plant is determined by the horsepower of the engine. It is estimated that the exhaust from each horsepower will supply 100 square feet of radiation. For example, the exhaust

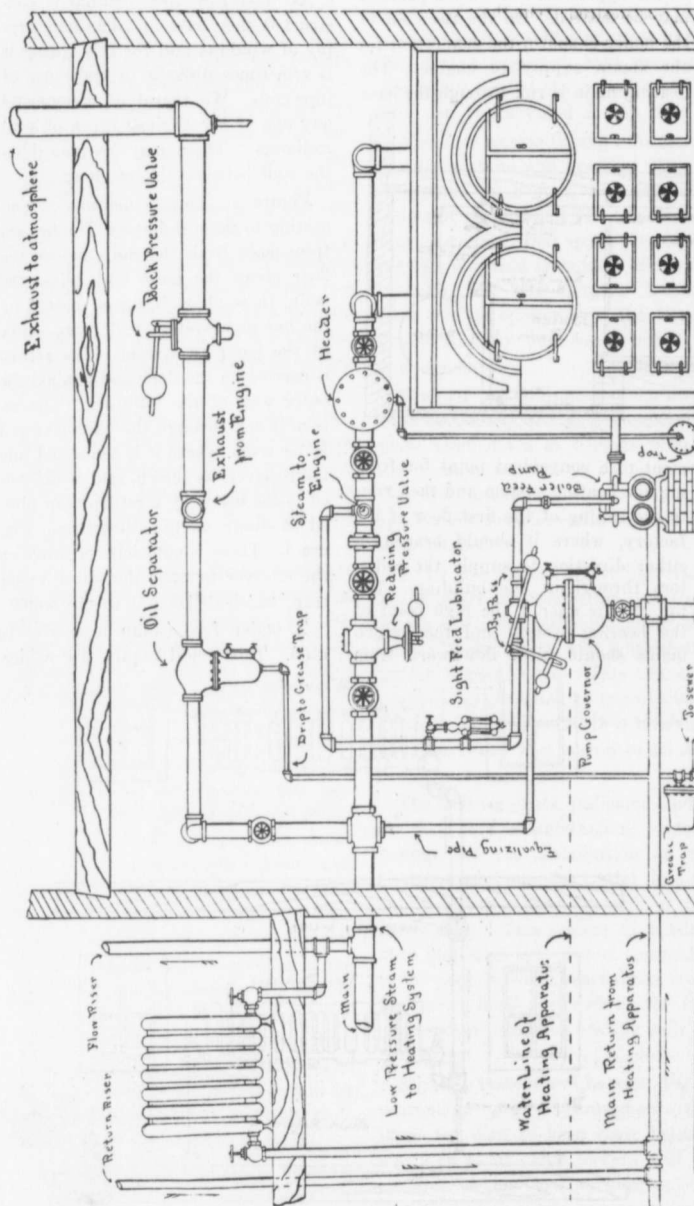


FIG. 3

a second trap may be employed. This can be located at any point in the building. This trap has steam pressure on it, receiving the water of condensation and delivering it through

required, there is sufficient steam in the exhaust from the engines to heat the building. It is a well established fact that the engine uses but a small percentage of the steam generated



from a 50 horse-power engine, when working at its full rated capacity, should supply 5,000 square feet of radiation. If a feed water heater is used allowance must, of course, be made for the amount of exhaust consumed by it.

The pressure reducing valve is used in the manner indicated by its name. Very often the amount of radiation for the heating of the building is more than can be supplied by the exhaust and live steam must be used continuously. Where this is necessary it is better to admit the live steam into the heating apparatus through a pressure reducing valve than to make use of the throttle valve as before mentioned.

In the exhaust from engines and pumps there is always more or less oil and refuse matter, such as small particles of packing, etc. This accumulation should not be allowed to enter the boiler, as it naturally would through the return of the heating system. To clean or clarify the steam a separator is used. In such an appliance there are a series of baffle plates which separate the oil and other impurities from the water. This is located on the exhaust line as shown

in Figure 20. A drip pipe from the bottom of the separator connects with a grease trap on the floor of boiler room and with a catch basin or sewer, and all oil and water collected in the separator is drained through this pipe.

In relieving the back pressure on the engine a back pressure valve is placed on the exhaust pipe. When the exhaust steam is confined and forced into the heating apparatus there is a back pressure of two or three pounds, plus the pressure of the atmosphere, which is 14.7 pounds.

The various traps, pump and pump governor shown are such as are ordinarily used on a power apparatus.

As a matter of safety, and we might say economy as well, we would advise both architect and builder to employ a competent heating engineer to plan work of this character and prepare specifications, as there are hardly two jobs alike in exhaust heating, each one requiring separate treatment according to the conditions encountered. At the same time it is well to become familiar with the methods and appliances employed in order to advise with a client as to the arrangement of the building.

bridge has just been completed at a cost of \$10,000.

Another concrete bridge, at Massey, was erected by the Ontario Government on what is to be a main provincial highway along the north shore of Georgian Bay, from Sudbury to Sault Ste. Marie. The arch spans the rocky gorge of the Sable river, and adjacent to it is a steel bridge of the C. P. R. The span of the arch is 94 feet; it is five-centered, with a rise of 24 feet, and is the longest concrete arch in Canada. The length of the bridge over all is 154 feet. The reinforcement consists of steel beams and plain round bars. Instructions issued to the foreman on the Massey arch were as follows:

#### SPECIFICATIONS FOR CONSTRUCTION.

Concrete for the arch ring and spandrel walls will be mixed in the proportions of one of cement, two of sand and four of gravel, unless otherwise directed; and for the abutments and wing walls in the proportions of one, three and five.

Concrete is to be brought up uniformly at each end of the arch, and in successive parallel sections across the arch. Each pair of segments must be of such dimensions that they can be finished in one day's continuous operation.

To prevent the centering being forced up at the crown by the weight of concrete at the sides, the crown is to be loaded with cement or other heavy material, as required, for this purpose.

When the arch ring is commenced, it is to be completed with all possible expedition, in order to prevent un-

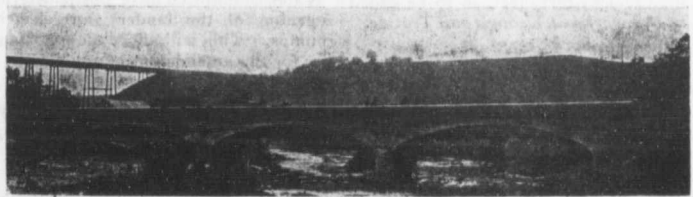
## Good Roads and Concrete Bridges

By W. A. McLEAN, C. E., Toronto, Ont.

The good roads movement in Ontario has to its credit not only a long mileage of splendidly macadamized roads, but has been productive of a demand for the best class of highway bridges. This Canadian province has long been known for its large lumbering operations, and that timber for bridges should now be giving way to concrete and steel is indicative of the trend of the most modern construction. In many parts of Ontario practically nothing but concrete, in the form of tile or small arches, is used for small waterways. For the longer spans, concrete abutments with steel superstructure are generally employed, but that the domain of steel for spans of considerable length is being invaded is shown by the accompanying illustration of a concrete bridge at St. Thomas, Ont.

The bridge at St. Thomas consists

of three spans of 55 feet each, with an 18 foot roadway, and length over all of 185 feet. The foundations for piers and abutments are carried four feet below the bed of the stream to a stratum of hard-pan. The reinforcement consists of Johnston corrugated



steel bars. The aggregate used in the foundations was pit gravel, in the proportion of one to eight, with a large amount of river stone. In the arch from the haunches, the quantities are one of cement, two of sand and four of screened gravel. This

equal shrinkage of the concrete.

When work is stopped for the night, see that the joints are clean-cut, and parallel with the radius of the centre at that point. Work may be roughened but not left with an un-

(Continued on Page 23)

# Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies.

## CONTRACTS OPEN.

### Arcola, Sask.

The government architect has practically completed plans for the proposed new court house which is to be erected at a cost of \$50,000.

### Belleville, Ont.

The Belleville Tubular Axle Company are contemplating the enlargement of their factory in the near future.

### Brandon, Man.

City Engineer Shillinglaw is preparing plans for the remodeling and enlargement of the City Hall.

### Carleton Place, Ont.

At the forthcoming elections the ratepayers will probably be asked to vote on a measure to raise \$200,000 for the installation of sewage and waterworks systems.

### Charlo, N.B.

The sawmills at this place, which were destroyed by fire last week at a loss of \$20,000, will be rebuilt by the owner, William Currie, M.L.A.

### Chatham, Ont.

James Blythe has donated a site to the Raleigh Plains Methodists for a new church and building operations will commence at an early date.

J. B. Stringer and Company, the owners of the Alexandra Block which was destroyed by fire last week involving a loss of \$7,000, have decided to rebuild at once.

A new machinery building, one hundred feet by forty feet, is to be added to the works of Keough and Trotter.

### Dalhousie, N.B.

Since the fire at the mills of the Dalhousie Lumber Company the concern has been re-organized and plans have now been prepared for rebuilding on an extended scale early in the year.

### Dresden, Ont.

The ratepayers have approved a by-law to grant a bonus and loan to the Chatham Carriage Company.

### Elgin, Man.

The town badly need a public hall and it is possible that the building now occupied by the Massey-Harris Company or another of the larger

business structures will be acquired and remodeled for that purpose.

### Frank, B.C.

The Canadian-American Coal and Coke Company will extend their plant and add considerable machinery at a cost of a quarter of a million dollars.

### Goderich, Ont.

F. C. Hennicke, of Buffalo, N.Y., is negotiating with the town with a view to the establishment of a brass and iron bedstead factory.

### Guelph, Ont.

Negotiations have been opened with the board of trade by the Spinella Corset Company, of Meadville, Pa., with a view to the location in this city of a Canadian branch factory.

### Halifax, N.S.

Tenders are invited by Fred. Gelinas, Secretary, Department of Public Works, Ottawa, up to January 13th for the supply and installation of an electric lighting system at Lawlor's Island Quarantine Station. Specifications may be examined at office of C. E. W. Dodwell, resident engineer, and at the Department.

### Hamilton, Ont.

Further details in connection with the proposed new \$150,000 Y.M.C.A. building for this city have been arranged by the local officers of the association and a definite announcement concerning the project will shortly be made.

In compliance with the request of some of the contractors the Fire and Water Committee have postponed the opening of the tenders for electric pumps. This will afford an opportunity for the amendment of any bids.

### Humboldt, Sask.

The ratepayers have approved a by-law to expend \$7,500 on fire fighting appliances.

### Kemptville, Ont.

G. L. Brown, civil engineer, of Morrisburg, has been in town for some time making a survey of that portion of the river that passes through the town with a view of deepening it so that boats can come up to the Prescott street bridge. The plans include a wharf on both sides of the stream and also a turning basin.

It is estimated that the outlay will be about \$20,000.

The Government have surveyed property for the new depot which it is proposed to erect here next season.

### Lethbridge, Alta.

The ratepayers have approved a by-law for the expenditure of \$30,000 in the development of natural gas.

E. U. Rylands, chairman, board of managers, Knox church, will receive tenders up to January 25th for the construction of a brick and stone church according to plans prepared by J. H. G. Russell, architect. Separate tenders are asked for the plumbing and heating.

### Markdale, Ont.

Engineer Aiken, of Toronto, has just submitted a report on a proposed waterworks system to cost approximately \$20,000. The matter will be dealt with by the new council in the near future.

### Mission City, B.C.

The Government have been asked to assist the local authorities in the erection of a traffic bridge across the Fraser river at this place.

### Moose Jaw, Sask.

The town council have decided not to order a new electric generator as proposed. The generator will be obtained by contract at a later date.

### Mulgrave, N.S.

D. Pottinger, general manager, Intercolonial Railway, wants tenders up to January 7th for the construction of a block of cribwork at the wharf. Specifications with local station master and at office of chief engineer, Moncton, N. B.

### Nanaimo, B.C.

In an explosion which occurred last week at the works of the Hamilton Powder Company the buildings were damaged to the extent of \$20,000. It is understood that the owners will reconstruct the factory at an early date.

### Nelson, B.C.

Finishing touches are being made to the new plant of the Canada Zinc Company and it is expected that operations will commence next month. It is the general impression that the establishment of these works will open up many idle Slocan properties.

**Okotoks, Alta.**

The stores and plant of Otto V. Hough have been taken over by the newly formed Independent Meat Packing Company, who are contemplating extensive enlargements and additions thereto.

**Ottawa, Ont.**

The City Council have decided not to submit the metropolitan power by-law to the property owners. This development follows an intimation from the company that they could not accept a lower price than \$200,000.

**Pointe aux Trembles, Que.**

The Lakefield Portland Cement Company will shortly install additional machinery at their new plant.

**Portage la Prairie, Man.**

Plans have been prepared for an addition to the Souris Hardware Company's building; estimated cost \$40,000.

It is understood that provision has been made by the Government in the supplementary estimates for a new armory at this town.

**Quebec, Que.**

A rumor is current to the effect that a wholesale consolidation of local electric, gas and traction companies is taking place which will produce a powerful concern capitalized at \$20,000,000. It is reported to be the intention of the new company to at once construct the Quebec and Saguenay railway, and possibly an additional track of their own in this city, along the river front. All arrangements are understood to have been made towards securing electrical power for the line to Murray Bay, and other large works are to be established, one of which is a large car building industry.

**Revelstoke, B.C.**

Preparations are being made for the removal of the old wooden structure over the Columbia river and for its replacement by a modern steel bridge of nine spans.

**Saskatoon, Sask.**

Gauthier & Daoust, architects, have been instructed by the congregation of Knox church to prepare plans for a new edifice west of the C.P.R. track.

**Sherbrooke, Que.**

Ross and Holgate, of Montreal, have been instructed to prepare plans for a new civic lighting and power plant.

**Simcoe, Ont.**

Estimates are being prepared for the installation of a sewerage system next spring. Extensions are also to be made to the water works.

**St. Paul, Que.**

A new edifice is to be built to replace the Presbyterian church recently destroyed by fire. The estimates call for an outlay of \$165,000.

**Sudbury, Ont.**

The Evans' planing mill which was destroyed by fire a short time ago is to be rebuilt early next spring.

**Swift Current, Sask.**

Plans have just been prepared by architect Hutchison for a new Masonic Temple in this city to be erected at a cost of \$30,000. The same architect has completed plans for the new Roman Catholic church which is to be erected here in the coming season.

**Sydney, N.S.**

Application has been made to the Board of Works by the North Sydney Marine Railway Company for assistance in the projected enlargement of their plant.

**Toronto, Ont.**

The Toronto Ferry Company are going to enlarge their premises early this year at an estimated cost of \$15,000.

Tenders have just been called for the new St. Helen's Catholic church to be erected corner of Dundas street and St. Clarens avenue at a cost of \$50,000.

Improvements estimated to cost \$8,000 are to be made by P. A. Manning upon the residence recently acquired by him at 7 Walmer road.

In a report recently submitted by City Engineer Rust, sewerage work is called for at a cost of \$200,000.

A committee have been appointed to select a new site for the headquarters of the Toronto Club.

Tenders are being taken on the construction of an eight roomed house plans of which may be seen at 35 Amelia street.

Recent building permits include: P. O'Hara, 2-storey brick dwelling, Wardell street, \$2,000; A. Stephens, 2-storey brick dwelling, College street, \$2,000; T. Knight, 2-storey roughcast dwelling, Woodward avenue, \$1,500; M. A. Dowie, 2-storey brick veneered front and roughcast dwelling, Shaw street, \$1,600; the Joseph estate, 5-storey brick warehouse, Bay street, \$10,000; J. A. Goddard, 2½-storey brick dwelling, Crawford street, \$5,000; Geo. Remise, pair 2-storey semi-detached brick dwellings, Olive avenue, \$4,000; S. King, alterations to dwellings, Sullivan and Huron streets, \$4,000; Jno. McGibbons, 2-storey roughcast dwelling, Hamburg avenue, \$1,000.

**Vancouver, B.C.**

Tenders will shortly be taken by the

water committee for building and laying four miles of stave pipe from the Seymour Creek intake to the canyon. The material for the pipe will be provided by the city.

Estimates have been prepared by City Engineer Clement for the block paving of Powell street at a cost of \$190,000.

Architect Dalton has completed plans for an extension to the jail and it is probable that a by-law for \$25,000 will be submitted in connection with this project early this year.

Architect Blackmore is about to take tenders for the proposed improvements at Kitsilano.

The city council are continuing negotiations with R. C. Jenkins, of Morrisburg, Ont., with a view to the establishment of a tin plate factory in this neighborhood at a cost of \$150,000.

H. Von Pogrell has taken out a permit for the erection of a business block corner of Bridge street and 6th avenue to cost \$12,000. Other permits include: H. W. Jeffery, frame dwelling, Salsbury street, \$2,000; L. Guille, Cordova street east, \$6,910; M. A. Thomas, Hamilton street; \$1,900; T. McCrossan, First avenue, \$1,750; F. J. Inglehart, Salsbury drive, \$2,200; Johnston & Co., Seymour street \$1,500.

**Victoria, B.C.**

The date for receiving tenders on the Fraser river bridge has been extended to January 31st.

A bylaw will possibly be submitted to the ratepayers to raise \$54,000 for an incinerator plant.

**Wingham, Ont.**

\$25,000 is to be spent upon the repair of the hydro-electric power plant.

**Winnipeg, Man.**

Plans have been submitted by the City Engineer for considerable extensions of the sewer system west of Aubrey street; also for the extension of the Polson avenue sewer from Power street to Sinclair street. The estimated cost of the former work is nearly \$35,000 and for the latter, \$21,880.

Merrick-Anderson & Company are planning the erection of a large warehouse in the spring and architect Horwood is now busily at work on the designs.

Recent building permits include: C.P.R., warehouse, city yards, \$3,900; Dominion Government, repairs to drill hall, Fort Osborne barracks; F. Wilson, frame dwelling, Johnson street, \$3,500; S. Singer, frame dwelling, Lorne avenue, \$2,500; W. R. Hewitt, frame dwelling, Lorne avenue, \$9,000.

M. Peterson, Secretary, Board of Control, will receive tenders up to January 6th for sewerage work on Salter, McAdam, Banning and Brant streets, Higgins, Newton and Ida avenues, and Mortimer Place. Specifications at office of city engineer.

Notice is given by J. C. Brown, city clerk, of the civic intention to construct various pavements and sewers at a cost of some \$85,000.

#### Woodstock, Ont.

The council have decided to await the prevalence of more favorable conditions before submitting the by-law for a new city hall. The need of a suitable building, however, is urgently realized, and the measure will be presented at the first opportunity.

#### CONTRACTS AWARDED.

##### Guelph, Ont.

The council have awarded the contract for the erection of septic tanks to J. A. LeGrand, of this city.

##### London, Ont.

An important contract for building the North Midland line to Stratford, included in which work is the erection of a couple of bridges, has been let to contractor A. E. Welch, of this city.

##### Minnedosa, Man.

The Hydro-Electrical Construction Company, of Toronto, have been awarded the contract for the proposed plant of the local power company at \$80,000.

##### Ottawa, Ont.

The Iroquois Iron Works, of Buffalo, N.Y., have obtained the contract for the new municipal asphalt plant at \$14,800.

The Canadian General Electric Company, of Toronto, have secured a contract for electrical supplies for the Ottawa street lighting system at \$24,672.

##### Port Arthur, Ont.

The building committee have awarded the contract for the new isolation hospital to contractor Gilker at \$3,500.

#### FIRES.

Alexandra Block, Chatham, Ont., owned by J. B. Stringer and Company; loss \$7,000.

Building of J. K. Mackenzie, Selkirk, Man.; loss \$3,000.

Store and dwelling of Cyrus Ferguson, Tyvan, Sask.; loss \$2,500.

Orange Hall building, Stellarton, N.S.; loss \$7,000.

Hees, Son & Company's building, Toronto, Ont.; building loss \$25,000.

Exhibition building, Victoria, B.C.; loss \$15,000.

Residence and workshop of John Marshland, New Liskeard, Ont.; loss \$6,000.

Currie sawmills, Charlo, N.B.; loss \$20,000.

Residence of W. J. Alward, Havelock, N.S.; loss \$3,000.

Buildings of Compton Avenue Public School, Halifax, N.S.; loss \$20,000.

#### BUSINESS NOTES.

Therrien & Therrien, lumber dealers, of Montreal, Que., are reported to have dissolved.

The capital of the Light, Heat and Power Company, Limited, of Lindsay, Ont., has been increased from \$125,000 to \$300,000.

John Murphy, senior partner of Murphy and Son, Montreal, one of the oldest painting and decorating firms in Canada, is retiring, and the business will hereafter be carried on by his son, W. H. Murphy.

David H. Scott, contractor, Montreal, Que., is reported to have assigned with liabilities of \$7,000.

The liabilities of the Wilcox Manufacturing Company of London, Ont., manufacturers of builders' hardware, amount to nearly \$110,000. The London and Western Trusts Company were last week appointed liquidators.

Carl Ide, builder, and F. W. Koch & Company, builders and contractors, both of Berlin, Ont., are reported to have assigned.

P. L. W. Dupre, contractor, Montreal, has assigned; creditors meet January 7th.

The Manitoba Iron Works, Limited, have increased their capital by \$350,000.

Another large construction company, the Oakholm Development Company, Limited, Winnipeg, Man., have just been incorporated with a capital of \$200,000.

The B.C. General Contract Company, Limited, perhaps the leading railway and general construction firm of British Columbia, are reported to be insolvent.

#### NEW COMPANIES.

Consolidated Lithographing and Manufacturing Company, Limited, Montreal, Que., incorporated, capital \$50,000. Incorporators, H. M. Ami, G. H. Burland, William Brisbane, E. C. Landon and others.

Consolidated Optical Company, Limited, Toronto, Ont., incorporated, capital \$350,000. Incorporators, F. D. MacKay, A. E. Knox, C. F. Ritchie, A. G. Parish and George Keough, all of Toronto.

Merchants Storage Company, Limited, Toronto, Ont., incorporated, capital \$40,000. Incorporators, G. E. Dunbar, F. D. Dunbar, A. H. Marks, E. R. Greig, and N. L. Garland, all of Toronto.

Elmira Upholstering Company, Limited, Elmira, Ont., incorporated, capital \$40,000. Incorporators, A. K. Dunke, G. Ratz, J. D. Merner and others.

Queen City Acetylene Generator Manufacturing Company, Limited, Toronto, Ont., incorporated to manufacture and deal in gas appliances, capital \$40,000. Incorporators, W. H. Kahrs, J. W. McFetridge, Hugh Rose, J. H. Watkins, A. Watkins and others.

W. Doherty Piano and Organ Company, Limited, Clinton, Ont., incorporated, capital, \$200,000. Incorporators, W. Doherty, W. Jackson, H. B. Chant, J. W. Moore, P. W. Gibbings and F. J. Hill, all of Clinton.

John F. Taylor Pharmacal Company, Limited, Weston, Ont., incorporated, capital \$40,000. Incorporators, J. F. Taylor and W. Thompson, of Toronto; F. G. Taylor and S. A. Taylor, of Hamilton.

Warner-Gibson, Limited, Welland, Ont., incorporated to manufacture agricultural implements, capital \$40,000. Incorporators, Charles Warner, Thomas Gibson and H. A. Plumley, all of Buffalo, N.Y., and C. H. Biddlecombe, of Olean, N.Y.

Oakhalm Development Company, Limited, Winnipeg, Man., incorporated, capital \$200,000. Incorporators, Thomas A. Irvine, C. H. Simpson, Charles Plaxton, W. F. Lee, C. H. Bell, A. E. Green, F. R. Lister and Joseph Turner, all of Winnipeg.

#### BUILDING NEWS.

The city of Woodstock, Ont., has not suffered much during the past year from the ravages of fire, a total loss of only \$855 being recorded.

An important bylaw has been passed by the city council of Montreal. By the authority of the new measure the officers of the Fire Department are empowered to enter at any time all structures which in any wise come under the head of public buildings, even including apartment houses, and order the removal of any inflammable material which is dangerously located. Precautionary measures are also enforced under pain of fine or imprisonment.

Whilst assisting his son in the erection of a house at Montague, Ont., Abraham Lampman, a prominent farmer of Wainfleet, Ont., fell from a scaffold, sustaining concussion of the

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brain, and never regained consciousness.

The successful architects in the competition for plans for the proposed legislative buildings at Regina, Sask., were E. & W. S. Maxwell, of Montreal, who it will be remembered also gained a short time ago first place for the departmental buildings at Ottawa. Seven firms in all competed, these being: E. & W. S. Maxwell, Montreal; Mitchell & Raine, London, England; Cass Gilbert, New York; Darling & Pearson, Toronto; F. N. Ruttenberg, Victoria, B.C.; Storey & Van-Egmond, Regina; and Marchand & Haskell, Montreal. The unsuccessful architects receive \$1,500 each for their trouble. No less than a million and a quarter dollars, exclusive of furnishings, are called for by the specifications.

The Hamilton Powder Company's works at Departure Bay, Nanaimo, B.C., experienced last week a tremendous explosion, which completely destroyed two of the mixing buildings and did considerable damage around the works. The explosion was felt in Vancouver and New Westminster. At Ladysmith it was felt as strongly as in Nanaimo. Of the buildings destroyed not a stick remains to indicate where they stood and the lowest estimate places the loss at \$20,000.

The accident is supposed to have been caused by the heating apparatus setting fire to some of the explosives.

The keynote to the success of the cities of British Columbia is undoubtedly the enterprise of the citizens. Expansion is the dominating idea. It seems to be diffused through the very atmosphere of the north west and the coast. A good instance of this progressive spirit is furnished at New Westminster. The manager of the Westminster brewery has commenced the construction of an addition to his brewing plant that will entail the expenditure of about \$25,000 and will place the industry on a par with the best brewing plants on the coast. Mr. Nelson the manager, will embody features such as an improved gas producing plant which in some respects will place his business in advance of those of his competitors. The building now in course of erection will be entirely of stone and iron with the exception of the finishing and roofing. The outside walls will be of stone work about 20 inches thick, and will extend two storeys high. The lower storey will comprise the basement. About 500 cubic yards of hard earth had to be removed to facilitate construction in accordance with the plans. The large basement will have a cement floor and will be divided into two parts. One will be used as a store-

room and will be sufficiently large to contain about 2000 barrels of beer. The building being entirely of stone, the room will be always cool and therefore most valuable as a storeroom. The plant will be operated by power supplied from a 60-horse power Canada Foundry suction gas producer, part of which is manufactured in Toronto, the engine coming from England. It is expected that the addition will be completed by the end of next month.

The Mount Royal Spinning Company, Montreal, are about completing the erection of their new cotton mills at Cote St. Paul and it is the general opinion that these buildings will be the finest of their kind on the American continent. They were designed by C.R. Makepeace & Company, of Providence, R. I., while the resident architects are Finley & Spence, of Montreal. The main building is a fine five-storey structure 312 feet by 134 feet. The office building is a two-storey structure, 80 by 45 feet, and immediately adjoining stand the large 200 feet by 80 feet cotton storage rooms in two divisions. The structure throughout is practically fireproof, being equipped with a modern fire pump and sprinkling system. The steam power to run the mill will be supplied by two fifteen hundred horse power Corliss engines, with rope drive, made by C. and G. Cooper, of Mount Vernon, Ohio, while a battery of Babcock and Wilcox boilers will do duty in the boiler room. It will be seen that, although the Mount Royal Spinning Company only came into existence during the early part of the present year, the plant is already very far advanced towards completion. Operations will be opened some time this year and the pay roll is not likely to number less than a thousand employees.

The Vancouver city council recently discussed the new building by-law at considerable length, with the result that the clauses aiming at the restriction of building to 90 per cent. of the space on one lot and the prohibition of rows of cabins were referred back for further consideration, but the restriction of one house to 2000 square feet of space was allowed to stand. Churches with a seating capacity of 1,500 will henceforth have to be built of fireproof material as far as the first floor. Frame houses will also be restricted to a height of 40 feet in the walls.

An official denial has been published by the St. Louis Car Company in contradiction of the statement that they are contemplating the establishment of a branch Canadian factory in the west. While the expansion of their business

might warrant such a proceeding the company state that they have no present intentions.

A good building year is recorded in the Queen City. With a total of some \$14,000,000 the season which has just passed will eclipse the previous year by about \$1,000,000.

The Page-Hersey Iron Tube & Pipe Company, whose capital has just been increased by a million and a half dollars, have commenced the construction of a large additional plant at Welland, Ont., which will employ about a thousand hands. The furnace building will be two hundred feet long, with wings three hundred and eighty feet long, and a number of other large buildings will be erected.

The new plant of the Lakefield Portland Cement Company at Point aux Trembles, Que., will start operation in about two weeks and will employ about 200 men. The daily output for the present will be 2,000 barrels. Buildings are, however, constructed to house a plant of the capacity of 3,000 barrels a day, and it is the intention of the company to install the additional machines required for the enlarged output at an early date. All of the 3,000 or more horse-power required to operate the immense undertaking is furnished by the Montreal Light, Heat and Power Co., being delivered to the works at a pressure of 10,000 volts. It is there received into three 1,000 kilowatt transformers and by these reduced to 550 volts, at which voltage the power is transmitted to thirty-two large induction motors scattered throughout the works, each of which operates some integral portion of the plant.

On the site of the old Emmanuel church at Montreal the new concert hall, due notice of the construction of which we gave our readers in a previous issue, is now fast taking the shape of a concert auditorium. The building has been much changed and re-modelled and contains a fine large gallery capable of seating nearly 400 persons. This, with the ground floor, will make the seating capacity of the new hall over 1,200. A fine entrance has been made on St. Catharine street and four convenient exits reduce the danger from fire to a minimum.

Building permits issued at Brantford, Ont., during the past year exceed half a million dollars.

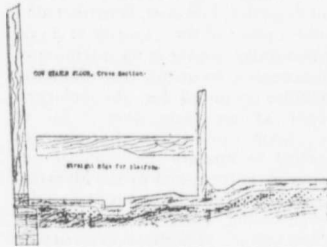
#### POWER EQUIPMENT.

A new power station is about to be installed at Edmonton, Alta. They will build six miles of transmission line, and will require line material and other equipment.

## A Cow Stable Floor

By JOHN UPTON, in the National Builder.

This stable was 34 x 60, with two rows of cows, facing each other. There were two rows of posts to support the cross beams. These were placed so as to come in line with the stanchions. This is one of the first things to be done when putting in this kind of a floor; determine the location of these posts and build the abutments for them. These abutments may be large stones, or may be built, where wanted, of concrete. If built up, they should be about two feet square. The top of them should be three or four inches below the top of the floor. Another important thing is to determine the location of the trench, so as to avoid



putting any stone here, where they will need to be moved again.

The first step in the actual construction of the floor is to build the form for the trench. We will suppose that the trench is to be one foot wide and six inches deep, or rather the bottom of it six inches lower than the platform on which the cows stand. In some cases the floor behind the trench is made a few inches lower than that where the cows stand. In such a case, the forms must be built accordingly.

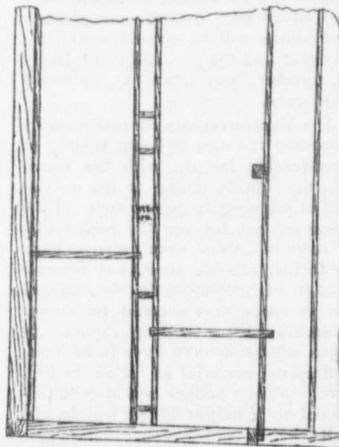
In this case, you will use a 2 x 8 for one side of the form and 2 x 6 for the other side, making them even at the bottom. This will make two inches difference at the top, which is the difference between the floors, leaving the gutter four inches below the floor behind it.

You will notice the width of these sticks is two inches more than the depth of the gutter. This is so the bottom of the gutter may be filled in after the forms are removed.

Fasten these forms together by

placing short pieces of plank between them, near the ends and in the middle. These pieces must be of such length, according to the thickness of the plank, that the outer sides of the plank are exactly twelve inches apart. Nail forms together by putting a spike through the plank and into each end of short pieces. Don't nail too much, because the short pieces must be knocked out in order to remove the plank. Place these forms where the gutter is to be, being careful to get them in a line and level. Sometimes one end is placed two inches nearer the stanchions than the other end, so that the smaller cows may be kept at the one end.

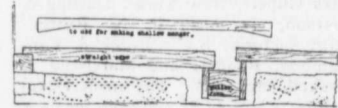
This form should rest on large stones and should be supported so that a man can walk on it, at any point, without its settling. There should be sufficient of these forms to reach the entire length of one side of the stable. The same forms may be used later on the other side, if time can be allowed for the first section to harden; if not, it will be necessary to have more forms. Good sized stones should then be placed along each side of the form. These should be in a line, two inches back from the form and should be kept two inches below



CORNER OF FLOOR.

the top. The space behind the gutter should be filled with broken stone, to within three inches of the surface of the form.

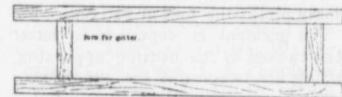
In mixing the concrete, which goes next to the gutter, use fine material and mix three to one, same as the top coat, since this is the surface of the finished work. Before placing any concrete, sprinkle the forms, tamping it down firmly and running the trowel down between it and the forms. Finish the space back of the gutter by putting on first the grout-



ing, tamping it firmly, then the finishing coat.

To level this finishing coat, you will want a straightedge, one end of which may rest on the top of the gutter form; the other end may rest on the sill, or may be supported from the sill, or it may be necessary to put in a 2 x 4 for it to rest on.

In all cases there should be a slight slant toward the gutter. Before the floor is set too hard it should be creas-



ed in any desired shape to prevent the cows slipping.

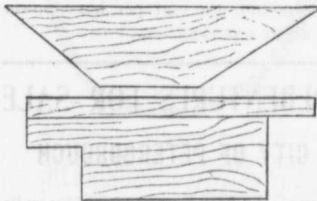
The platform on which the cows stand is the most difficult to construct properly. This should slant up from the gutter, for one-half its width. The remainder (where their front feet stand) should be at the same level as the edge nearest the gutter. This form is secured by using a stick of the proper shape for smoothing it off, while the space behind the gutter is made according to the room. This platform is made within the limits of 4 feet 6 to 4 feet 10. The rear half has a rise of about two inches, then drop down for the next 6 or 8 inches. It drops these two inches, and the remaining two feet is made level at the same height as the back edge. In case the supporting posts are not present to fasten the stanchions to, this may be done by embedding a stick (2 x 4 or larger) in the concrete. If it is desired to have bolts in this stick, to fasten the stanchions with, they

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should be put in before the sticks are placed. In leveling off the platform where the cows stand, one end of the straightedge may rest on the gutter form. For the other end to rest on some 2 x 6's should be nailed on the inside of the posts. Form the same work on the other side, leaving the centre alleyway until the last. This floor should be creased at the back side when it is partly set. After both sides are built up to the line of the stanchions, the next step is to pro-



MANGER (ABOVE). GUTTER (BELOW).

vide for the manger. This may be the floor itself, with a slight incline, or may have a slanting front. Whatever way it is desired to have the forms, it is well to have the bottom of the manger two inches higher than the cows' feet. Provision should be made for the water to run out at one end.

#### CITY CLERKSHIP VACANT.

The Revelstoke, B.C., city council invite applications up to January 20th for the position of city clerk with which are associated the offices of treasurer, assessor and collector. Applicants are asked to forward references and state salary.

### GOOD ROADS AND CONCRETE BRIDGES.

(Concluded from page 17)

even or slanting surface, or with loose material covering it.

When joining new work to old, see that the old surface is thoroughly flushed with water before new concrete is deposited, and that the joint is commenced with a cement grout of one to one mixture over the old work.

All concrete is to be thoroughly rammed and worked in thin layers when placed in the moulds, so as to make the concrete perfectly compact, free from spaces and air bubbles.

All concrete must be deposited in the forms and worked to place within thirty minutes of the time it leaves the mixer. The mixing machine is not to be operated at high speed; nor is it to be crowded to such an extent that thorough mixing is interfered with.

If mixed by hand, the sand and cement are first to be thoroughly intermixed in a dry state. Water is then to be slowly added to make a mortar of suitable consistency. The gravel is then to be added, and the whole again thoroughly intermixed. Perfect mixing is essential.

Concrete must not be wetter than is necessary to procure a proper surface finish throughout the work.

Concrete is to be deposited in a careful manner. The concrete bucket is not to come in contact with the form work, and care is to be taken in

every way not to jar the form work or steel reinforcement until the concrete has hardened.

Grout is to be worked to the front surface in all forms by spading against the forms, forcing large pieces of aggregate back and permitting the finer material to come to the surface.

There are to be no sharp angles or edges in the concrete, these to be rounded by tacking quarter-round strips of stovepipe sheeting in the corners of the frame work.

The horizontal ends of the gas pipe railing entering the concrete posts are to be greased to prevent adhesion of the concrete, and thus permit movement due to expansion and contraction.

The surface is to be worked as above, so that when the forms are removed it shall be smooth and free from voids, and will not require to be troweled or grouted to make a finished surface.

Forms are to be firmly set up and strongly braced. The concrete face of the forms is to be given a coat of oil, applied with a brush, but an excess of oil is not to be used. A combination of crude oil and kerosene gives good results, or soft soap may be used.

The lagging and interior face of all forms is to be of dressed lumber.

Forms are to be cleaned at each setting and recoated with oil.

Every care must be taken to see that the inside of the forms is free from shavings, sawdust, blocks of

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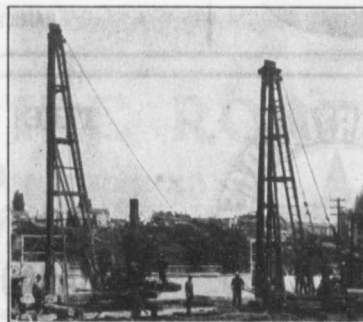
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wood or other debris, just before putting in the concrete.

Forms should be held together with No. 9 wire. Care must be taken to remove temporary spacing pieces where the concrete reaches their height.

The inside face of spandrel and wing walls is to be battered by overlapping the form work in such a way as to make a series of steps on which the earth-fill will rest.

Joints are to be closely formed, so that grout will not escape.

On the steel reinforcement, a thin film of rust is not objectionable, but loose or scaly rust must be removed with a stiff wire brush.

No oil or grease on the surface of the steel can be permitted.

Where rods intersect the intersection is to be firmly wound with No. 18 wire.

The whole steel reinforcement is to be so held in place by temporary or other bracing that it will not be disturbed when the concrete is deposited around it.

Care must be taken not to allow the first concrete placed to stiffen or set

appreciably before the remaining concrete is placed.

Not more than 48 hours is to elapse without adding a little more concrete to all exposed surfaces from which work is to be continued.

The timber centres are not to be removed in less than thirty days from the date of the completion of the arch ring.

#### A YEAR BOOK FOR 1908.

The United State Fidelity & Guaranty Company, of Baltimore, Maryland, have sent us a neatly bound year book for 1908. Each page is enlivened by the superscription of a "surety saying"—and the majority of these trite maxims may be followed out to advantage. Some of the more urgent truths are forced home by amusing but apt cartoons. Altogether the volume presents an interesting diary, useful alike to the business and professional man.

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\$21,000, 4½% due December 31st, 1937. Interest payable 30th June and 31st December in each year.

\$10,000.00, 5% payable in 30 equal Annual Instalments.

Both of the above are confirmed by Special Act of the Ontario Legislature.

No tender necessarily accepted.

F. ADAMS,

City Treasurer.

Peterborough 30th December, 1907.



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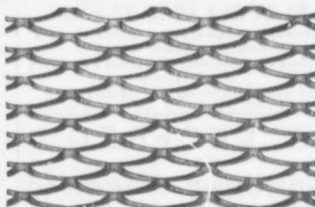
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**LEAD PIPE VS. IRON PIPE FOR  
PLUMBING.**

Modern times have witnessed a tendency to substitute iron pipe for ordinary connections, specious arguments as to its superiority being advanced by those most interested in its jurisdiction. An impartial consideration of these pleas will not by any means serve to convince the owner-builder of the advantages of iron as a substitute for lead pipe, as the following brief review of their respective merits will prove: Iron, or what is to-day the same thing, steel pipe galvanized, is cheaper in first cost than lead, and it is to the shortsightedness of those who did not look beyond this fact that we owe the gradual introduction of iron (or steel) pipe in plumbing work. While iron pipe is notably susceptible to corrosion and suffers particularly under the effect of electrolysis, lead pipe under similar circumstances is almost indefinitely durable. In the course of archaeological excavations in Rome, Pompeii and other ancient centres of civilization, lead pipe has been unearthed that is more than 2,000 years old and still a good water conductor. Lead, like iron, is subject to the effect of electric decomposition, but not more so than iron, if as much.

Other disadvantages under which iron pipe labors are its rigidity, the sharpness of the bends it must make by means of its cast fittings and the number of joinings its short length compels. Every screwed coupling joint in an iron pipe is a weak spot, at which leakage is likely to develop; the wiped solder joints of lead pipe, on the other hand, are strong points, and if properly made will never give way.

The very manner of making the joints in lead and iron pipe constitute one of the defects of the latter. In the first place, the interior capacity of the lead pipe is continued without decrease; the iron pipe joint, owing to the burr the tools cause in cutting and threading, provides a more or less restricted passage for the fluid passing through it. Not only this, but the cutting process, as a rule, damages the galvanizing, as the coating of zinc depended on to prevent

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corrosion of the iron is called, and the result is usually not only a leaky joint but a joint that leaks rusty water.

In other countries, England for instance, lead is used extensively, not only as a water conductor, but for waste and air pipes, owing to its pliable character allowing it to adapt itself to settlements, etc., that would inevitably result in leaks in the rigid iron pipe, with its caulked joints. In many of the old houses in English cities, lead pipe, some of it centuries old and hand made at that, is still doing good service.

Another advantage of lead pipe is the readiness with which it can be repaired, without disturbing the remainder of the plumbing systems. The disadvantages of its substitution for iron pipe, for a majority of the plumbers' purposes, makes the change worth looking into on the part of the owner and builder.—Shoppell's.

**A SUBSTITUTE FOR MINE TIMBERING.**

The newest innovation that has taken place in the method of working a coal mine is the substitution of concrete for the mine timbering. The experiments along this line are being made by the Reading Coal Company at Shamokin, Pa. A plant for the manufacture of these cement props will be erected at the North Franklin colliery, Trevorton, from which place the new style of "timbering" will be sent to all the other collieries. The Reading Company has spent considerable time and money in determining the best method for preserving mine timbers, and the present step seems to indicate that in the future cement will replace wooden props.

**IRON SMELTING BY WATER POWER.**

A novel method of iron making is suggested by A. Hiorth as a promising industry for Norway. The Norwegian iron ore is now exported, but experiment proves that even the unsaleable low grade ore can be reduced by the impure graphite of the country in electric furnaces operated by water power, the product being fine pig iron at low cost.

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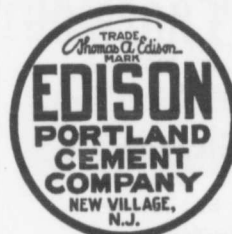
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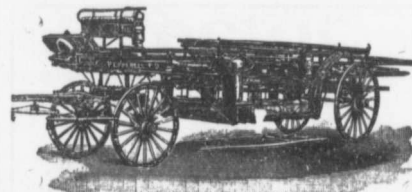
(Abstract from "Specifications for Portland Cement," issued by the United States Navy Department, June 12, 1905.)

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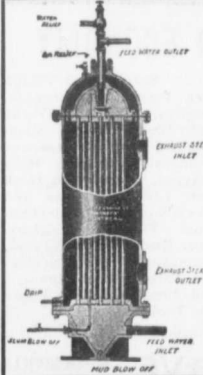
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### TO REMOVE STAINS FROM WOOD.

Answering a query from a subscriber desiring a method of removing stains from an oak and cherry hardwood floor, which have been caused by allowing wet iron nails and tools to remain upon it for a few hours, the American Carpenter and Builder says that there are several methods of removing stains or bleaching. It is presumed that the floors have not been varnished, and that the stain is in the wood itself, and not on the varnish. Probably the most effective bleacher for taking stains of all kinds out of wood is oxalic acid, dissolved in hot water, about one pound to the gallon. Vinegar or acetic acid may be added for particularly bad stains. This solution may be applied hot, and must be allowed to become thoroughly dry before the wood is varnished or otherwise finished. Oxalic acid will take out weather stains and similar discolorations. Sometimes more than one application is necessary. It is best to wash the oxalic acid off the surface with clean water, after it has become thoroughly dry, or treat it with vinegar or acetic acid.

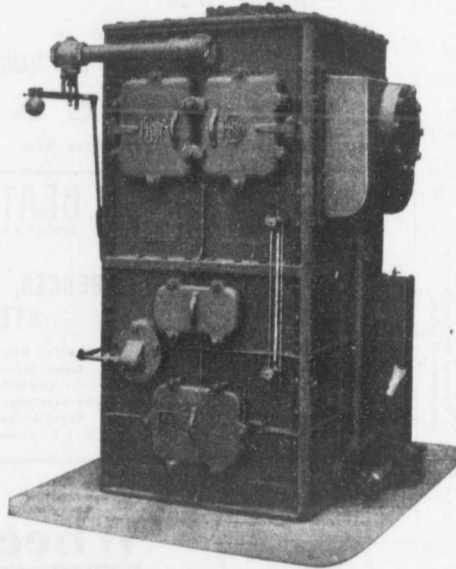
### SOUNDPROOF BRICKS.

Various methods of making soundproof building bricks or plates are noticed by German authorities. The chief constituent is calcined gypsum, and it appears that in the simplest process the mass is filled with fine pores by adding a small proportion of such substances as the bicarbonates of the alkalis, the chemical action thus set up causing a slow and steady evolution of carbonic acid gas as the gypsum sets and hardens. Though the plates become somewhat lighter, their strength is retained. The porous texture makes the material a good non-conductor of sound, there is no loss of durability, and the plates can be fastened by nailing. The sound-deadening effect can be increased by adding sawdust, coke dust or ashes. The pulp—such as a mixture by weight of 20 parts of sawdust, 40 of gypsum, 40 of water and 1 of sodium bicarbonate—is poured into moulds, and can be left to harden without further attention.

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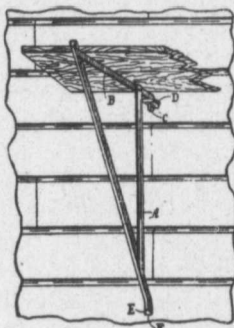
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**157 St. James St., MONTREAL**



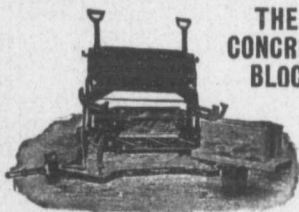
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 AND  
**GATE VALVES**  
 STRICTLY HIGH GRADE.  
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**THE KERR ENGINE CO. LIMITED**  
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**CONCRETE BUILDING**  
**BLOCK MACHINE**

MANUFACTURED BY  
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It makes all blocks FACE DOWN.

It makes all sizes of blocks from 4 to 24 inches long, in 5 widths of wall, including Circles, Gables, Watertables, Octagon, Chimney and Pier blocks, all on the one machine, and one sized pallet.

It has nine different sized Cores, all interchangeable without changing the back plate on pallet, which allows you to make a heavy or light block, as desired.

It can be changed from one sized block to another in less than two minutes.

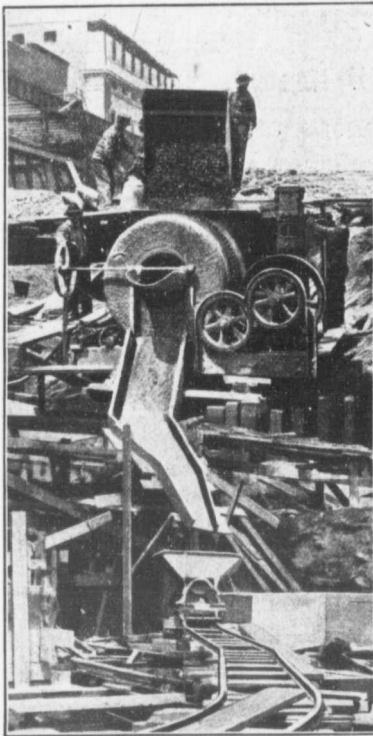
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**The Ransome Concrete Mixer  
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**We carry all capacities, with or  
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