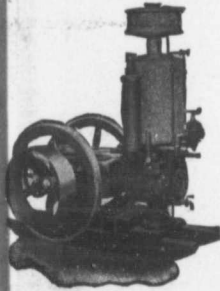


# CANADIAN CONTRACT RECORD

*A Weekly Journal of Engineering, Public Works,  
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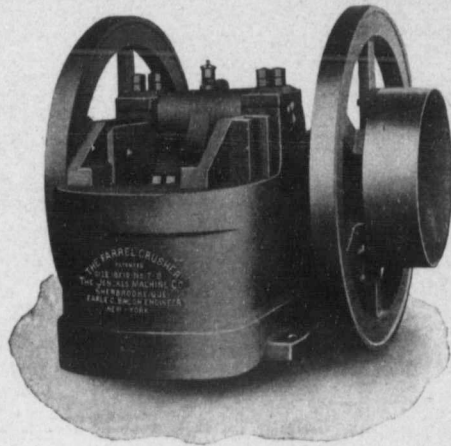
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# TENDERS AND FOR SALE DEPARTMENT



## TENDERS FOR ANNUAL SUPPLIES

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on **TUESDAY, DECEMBER 31st, 1907**, for annual supplies for the year ending December 31st, 1908.

Lumber,	Cedar Posts.
Pit Gravel (screened and unscreened),	Rubble Stone.
Sand,	Stone for Street Purposes.
Cement.	Street and House Numbers.
Sewer Pipe,	Hardware, etc.
Brass and Bronze Castings,	Sewer Brick.
Brass Work for House Services,	Hydrants.
Lead Pipes,	Lubricating Oils.
Stop Valves,	Rubber Valves, etc.
Special Castings,	Iron Valves and Stop Cock Boxes.
Crushed Stone,	Iron and Steel.
Paving Bricks,	Asphalt.

Envelopes containing tenders must be plainly marked on the outside as to contents. Specifications may be seen and forms of tender obtained at the office of the City Engineer, Toronto. The usual conditions relating to tendering, as prescribed by city by-law, must be strictly complied with. The lowest or any tender not necessarily accepted.

**E. COATSWORTH (Mayor),**  
Chairman Board of Control,  
City Hall, Toronto,  
November 7th, 1907.

## TENDERS WANTED

Applications will be received up till **DECEMBER 1st, 1907**, for the position of Engineer for a system of waterworks in Chesley, also for drilling 5, 6, 7 or 8-inch holes for test wells in the town of Chesley.

**WM. McDONALD**  
Clerk of Chesley,  
Chesley, Ont.



Sealed Tenders addressed to the undersigned, and endorsed "Tender for Astronomical Observatory, Toronto, Ont.," will be received at this office until **THURSDAY, NOVEMBER 21, 1907**, inclusively, for the construction of an Astronomical Observatory at Toronto, Ont.

Plans and specifications can be seen and forms of tender obtained at this Department and at the office of **Burke & Horwood, Architects, Toronto, Ont.**

Persons tendering are notified that tenders will not be considered unless made on the printed form supplied, and signed with their actual signatures.

Each tender must be accompanied by an accepted cheque on a chartered bank, made payable to the order of the Honourable the Minister of Public Works, equal to ten per cent (10 p.c.) of the amount of the tender, which will be forfeited if the person tendering decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By Order,  
**FRED, GELINAS,**  
Secretary.

Department of Public Works,  
Ottawa, October 29, 1907.

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1 "MYLES" Concrete Block Machine, nearly new, with 250 Wooden Pallettes.  
1 No. 2 Pressed Bowl Wheel Scrapers.  
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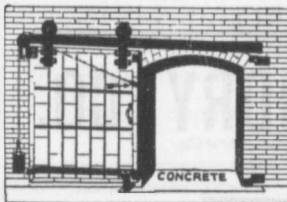
Tenders will be received by the undersigned up to noon, **SATURDAY, DECEMBER, 7th**, for one Waterworks Pump of 2,000,000 gallons (Imp.) to be operated by water power.

Particulars may be obtained from  
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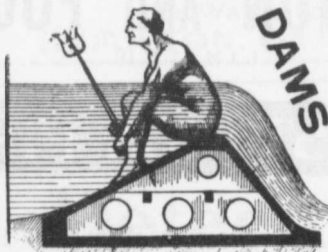
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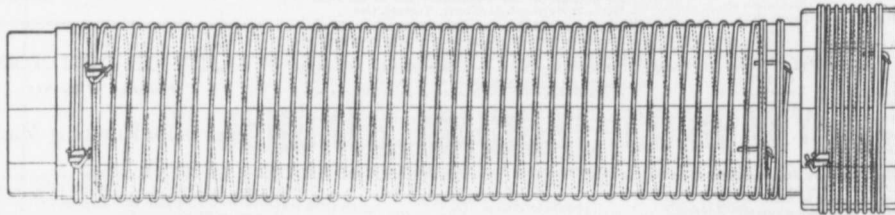
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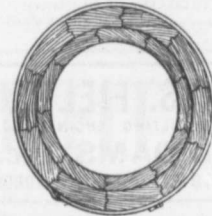
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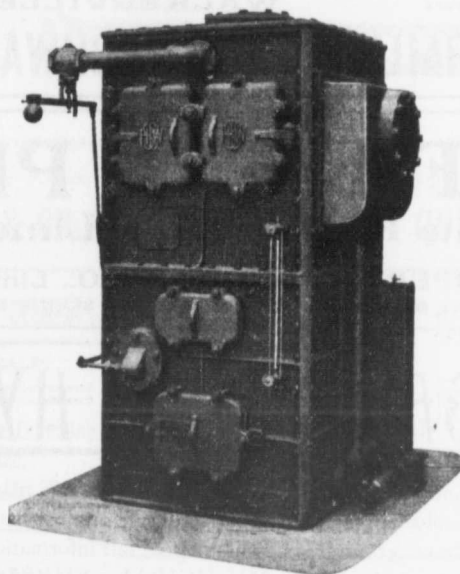
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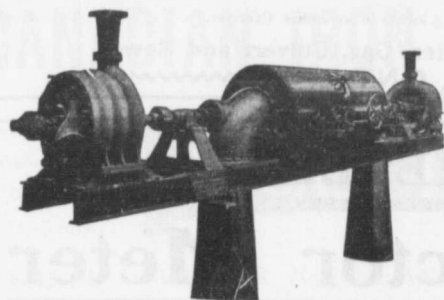


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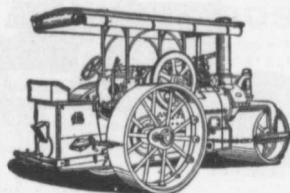
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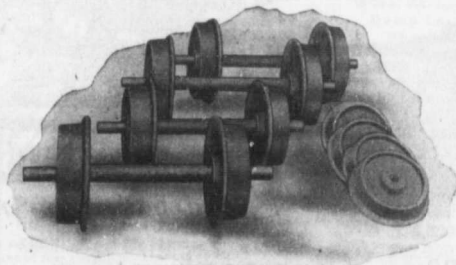
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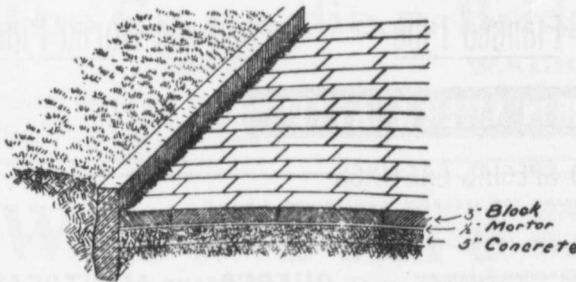
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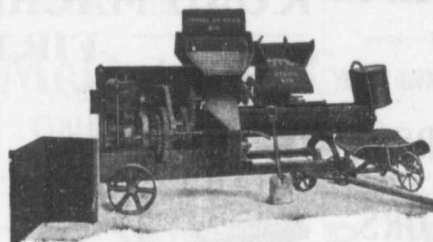
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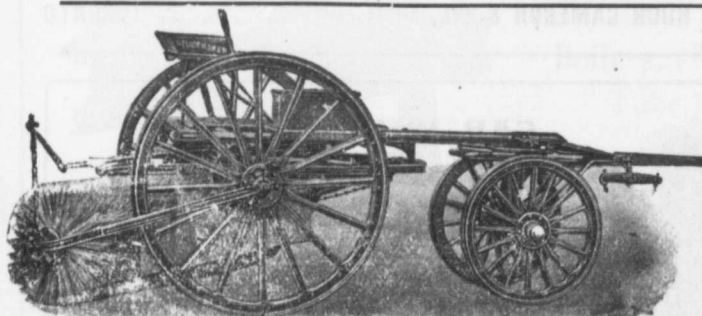
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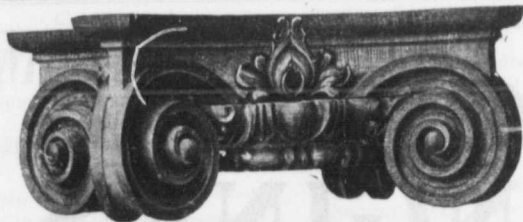
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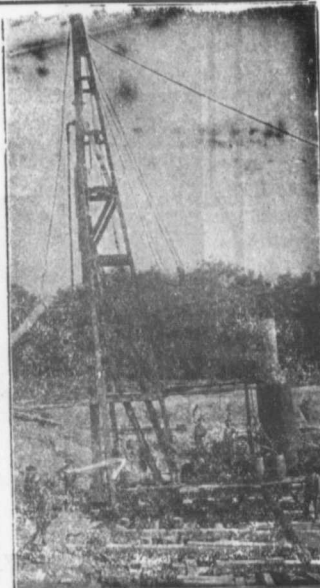
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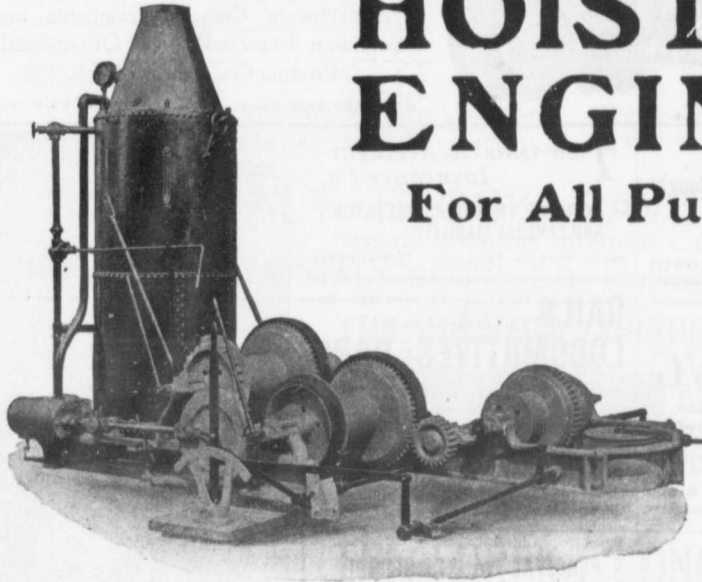
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idth of spray.  
volume.

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Pavements  
on, Ont.

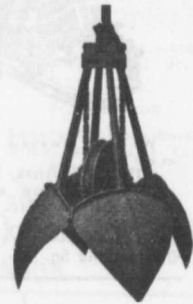
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larity in delivery of papers.

### WHICH IS CORRECT?

In circular No. 15 of the United States Forest Service, recently to hand, some statistics regarding the comparative strengths of structural timbers have been issued which seem at variance with a test made a short time ago by Professor Riddell, of the School of Practical Science, Toronto, for the Boake Manufacturing Company. This test was to determine the comparative strengths of British Columbia Douglas fir and Georgia pine, the test resulting in favor of the former.

To quote the report of Professor Riddell, "the beam of Douglas fir failed under a load of 55,320 pounds, by shearing along the neutral axis, there being also slight indications of failure on the tension side. This ultimate load of 55,320 pounds corresponds to a shearing stress along the neutral axis of 263 pounds per square inch, or a fibre stress at the lowest point of the tension side of the beam of 5,744 pounds per square inch.

"The beam of Georgia pine failed under a load of 43,550 pounds, by breaking on the tension side. This load of 43,550 pounds corresponds to a modulus of rupture of 4,522 pounds per square inch."

The United States Forest Service report states that "longleaf pine has been for a long time the standard construction timber, not only on account of its strength, hardness and durability, but also on account of the good

lengths of heartwood that can be obtained free from knots.

"Longleaf pine timber has been very extensively tested, not only in small sticks, but more rarely, in large sticks as well. In the markets at present any heart pine, whether longleaf, shortleaf, or loblolly, which shows a close-ringed, hard texture, is sold under the name of longleaf pine, while the wider-ringed, more rapid and sappy growth is sold as shortleaf pine. The names 'Georgia pine' and 'Alabama pine' are often used to designate timber coming from the tracts of longleaf pine in those States.

"The tests represent longleaf pine of an excellent merchantable quality. That from Georgia was purchased at New Haven, Conn., and had been on the market about six months. It was of better quality than that ordinarily found in the market as 'merchantable' stock."

The modulus of rupture of this latter is given as 8,384 pounds and the modulus of elasticity as 1,820,000 pounds per square inch, the modulus of rupture representing the strength of the timber and the modulus of elasticity its stiffness.

In the case of partially air dried Douglas fir the modulus of rupture was found to be only 6,975 pounds and the modulus of elasticity 1,000,000 pounds per square inch.

That tests of this kind show varied results is perhaps to be accounted for by the fact that the strength of timber varies greatly with the amount of moisture it contains, the regularity of the grain, number and position of knots, etc. The strength of large sticks appears to change very little for the range of moisture usually met with in practice. Small pieces, when kiln dried, increase in strength as much as 300 per cent., but large beams can not be dried out to the same extent. Moreover, the drying process often produces checks and ring shakes, the weakening effects of which more than counterbalance any gain in strength due to seasoning.

Much of the information hitherto available concerning the strength of timber has been secured from tests of small pieces without defects. This can not safely be assumed to hold good for large sized timbers as found

on the market, since these commonly contain such defects as checks, knots, cross-grain, etc. The location of the defects, as along the centre or near the upper or lower surfaces of the timber, varies the extent to which they lessen its strength; and the proportion of heart and sap wood, and the moisture condition must also be considered.

The ultimate conclusion of these various tests will be watched with great interest by many lumbermen and contractors in Toronto, to whom the question has been a source of speculation for some time past.

### PUBLIC ROADS AND BRIDGES.

Of late criticism has been frequently heard of the condition of the roads throughout the country and also of the state of the bridges spanning the rivers and streams that must be crossed by rural traffic. Drivers of automobiles have been among the most outspoken in their comments upon this question, and it must be admitted that they talk for the most part from personal experience. It will be a long process, this building up of permanent roads, even in the most thickly populated of agricultural districts, but come it will in time. In the meantime experiments with materials and methods are continually giving to engineers new light upon this problem. Particularly in country bridge building has improvement taken place, with the result that there are fewer accidents and decreased expense. However, it must be admitted that most of the longer spans are still steel trusses with wood floors, while of the shorter spans a few are stone arches, but by far the larger number are constructed of wood stringers, with plank floors nailed thereto. There are many counties which have scores of this latter class of structure, which are continually wearing out and requiring to be replaced or repaired; they are also the cause of many accidents.

What is wanted is a construction which will replace the unsatisfactory and dangerous wooden part of the structure, which will rest on the abutments already constructed, which will not restrict the opening which it spans, and which will be indestructible and not need repair.

# THE COMMERCIAL SITUATION

## MR. FIELDING'S STATEMENT.

Hon. W. S. Fielding, Minister of Finance, in reply to questions as to his opinion on the financial situation in general and particularly on the complaints from the west in connection with the alleged inability of the banks to assist the crop movement, stated that in his opinion there is nothing to be said after the declarations already made by the leading bankers.

"There have been without doubt," he said, "special circumstances which have increased in some quarters the financial tension, but the general cause of the present difficulty lies in the fact that the business of the country has extended more rapidly than the amount of current capital. This is one of the disadvantages resulting from a great prosperity. As to the particular condition of affairs in the west, there is unfortunately a great diversity of opinion. We are trying to discover the actual facts."

Mr. Fielding went on to say that there was one point on which a word of explanation would probably be useful and in certain quarters even necessary, to do away with erroneous impressions. The fact that the Secretary of the Treasury of the United States had come to the aid of American bankers with large sums of government money has led certain people in Canada to feel that the Canadian Government should do the same thing. The Minister of Finance had himself been questioned on this; but these questions were due to ignorance of the financial methods of both countries. What the Government of the United States did now and then under the stress of urgent need, the Canadian Government were doing all the time.

Mr. Fielding explained that money paid in for taxation in the United States was stored up in the Government Treasury. Thus it often happens that considerable sums of money are there kept from circulation until the pressure of circumstances makes

it necessary for the Secretary of the Treasury to place some of this money on deposit in the banks of the country. The Canadian system is entirely different. With the exception of certain modest reserves for the protection of currency and the deposits for savings banks, the Canadian Government does not withdraw from circulation large sums which are stored up in its treasury. Every cent of revenue received by the Government from whatever source is immediately deposited in the banks and thus passes at once into circulation.

"I do not wish to institute any comparisons between these methods," said the Minister. "I wish merely to point out that Canada does not deprive the business interests of the country of the use of these large sums paid in in taxation, but that it is continually giving the assistance which the American Government gives in times of urgent pressure."

## PROGRESS OF THE GRAND TRUNK PACIFIC.

Mr. Collingwood Schreiber, chief consulting engineer to the Government, who recently returned from an inspection trip of the Grand Trunk Pacific line now under construction between Portage la Prairie and Saskatoon, reports that with favorable weather conditions for the next few weeks the rails will be laid all the way from Portage la Prairie to Saskatoon before winter really sets in. At present 123 miles of road are opened for trains, and nearly another hundred is now ready to be opened.

"The great difficulty in the way of the constructors," says Mr. Schreiber, "is the lack of ties and the scarcity of labor." While he was in the West some three hundred men in one section of the road left work to go into the harvest fields, where the wages paid were as high as \$3.50 per day.

## A REASSURING ESTIMATE OF THE WESTERN CROPS.

The Canadian Pacific Railway has handed out for publication the following estimate of the crop for 1907, affording a comparison with that of 1906:

		1907.			
Grain	Acreage	Estimated yield per acre	Estimated crop	Average price Oct. 15th	Value at Fort William
Wheat.....	5,010,352	14	70,144,928	106 3/4	\$ 32,198,381.21
Wheat.....				100	39,982,510.00
Oats.....	2,332,110	36	83,955,960	55	14,575,000.00
Oats.....				45	25,855,162.00
Barley.....	787,000	28	22,036,000	68	14,984,480.00
Flax.....	121,575	10	1,215,750	135	270,000.00
Flax.....				98	995,435.00
Total estimated value of crop of 1907, Oct. 15.....					\$128,860,988.21
		1906.			
Grain	Acreage	Estimated yield per acre	Estimated crop	Average price Oct. 15th	Value at Fort William
Wheat.....	5,013,544	19	94,461,000	73 1/4	\$ 53,278,365.52
Wheat.....				68 1/4	14,828,015.47
Oats.....	2,119,757	41 1/2	87,850,655	34 3/4	25,338,325.29
Oats.....				31 1/2	4,741,738.99
Barley.....	603,485	35	21,050,147	40 1/2	8,520,309.53
Flax.....	93,795	10 1/2	985,019	110 1/2	1,001,369.78
Flax.....				75 1/2	59,495.51
Total value of crop of 1906, Oct. 15, 1906.....					\$107,772,620.00

## SHOULD ROOF TILES BE GLAZED

The added beauty of glazed roofing tiles for certain classes of building opens up a question of great technical interest, quite apart from the artistic side of the matter. It is well known that many glazes are far from durable when exposed to the exigencies of the English climate, but even if a perfectly durable glaze—one which would not craze or shell after several years' exposure—could be used, would it be desirable to apply such a glaze to the majority of roof tiles or not?

A well-known Continental tile manufacturer, who has studied the question most carefully, has come to the conclusion that glazed roofing tiles are a delusion and a snare, and that their beauty is only obtained at the sacrifice of durability in countries where the tiles are subjected to repeated frosts.

In lecturing before the German tile makers recently Herr Hielscher pointed out that the porosity of tiles by different makers, even when obtained from the same yard, often differed considerably. Some tiles are exceedingly porous, whilst others are partially vitrified, and can absorb little or no water.

The average tile is distinctly porous, but, provided that it is not open enough to be penetrated by a series of heavy showers this no objection. Porosity alone is no hindrance to durability, as many of the oldest tiles known are exceedingly porous.

The reason that porous roofing tiles are regarded with suspicion in some quarters is that there is a difference in durability dependent upon the size of the pores and the relative thickness of clay around them. Thus if the pores are very large and the clay between is very thin, the latter will not be able to resist the pressure of the expansion when water in the tiles is converted into ice, and damage will be done. If the air spaces are more evenly distributed and smaller, a satisfactory tile may be produced which has, at the same time, a high degree of porosity.

### SOME ADVANTAGES—

It is commonly argued that a coating of glaze on a roofing tile will pre-

vent any water from soaking into it, and thereby prevent any action of frost on the tile, no matter how porous the latter may be. To a large extent this is true, and fully so as regards the effect of water on the outside of the roof, but is it equally true of water which gains access to the tiles from inside the building?

Provided the glaze is a suitable one to withstand the variations in temperature and other climatic conditions, it is quite certain that much of the water generally absorbed by roofing tiles cannot be held by those which have been glazed. But the question comes—is this the most important part of the water when regarding the tiles from a durability standpoint in frosty weather?

### —AND DISADVANTAGES.

In every building a certain amount of water vapor is always present, and can be seen in a condensed form on the inside of the windows, and occasionally on the walls in cold weather. Water vapor, being lighter than air, has a strong tendency to gather in the upper parts of the building—near the roof—and the largest amount of condensation therefore takes place in the tiles. The difference is that the porous tiles absorb this water so that in the ordinary way it is not noticed, as is the water condensing on the non-porous walls or window panes.

Another difference also occurs in that when windows are opened the condensed water again evaporates and disappears, but with a glazed tile roof this evaporation cannot take place to any appreciable extent, and consequently remains within the tile long after the cold weather which caused its production has gone. Consequently, the amount of water accumulating in the pores of the tiles increases until they can hold no more, and the action of the frost is as strong or stronger than if the tiles were porous.

### A COMPARISON.

If a short piece of glass tube, about one-eighth of an inch internal diameter, be held vertically, and its lower end immersed in water, the upper end being then closed with a finger, the tube may be lifted out and carried

about the room without any danger of the water flowing out of the tube, in spite of its vertical position. The reason is that the pressure of the air outside the tube is greater than that within it, and consequently the water remains in the tube. If the finger is removed the balance of pressure is destroyed, and the water runs out.

The result of these combined actions is that the water remains in the tiles and cannot be evaporated from above because of the coating of glaze; it cannot escape from below because of air pressure. Consequently it is fully exposed to the frost, just as much as if no glaze were present.

The only way in which to prevent this troublesome condensation from occurring is for the tiler to so lay the tiles that they admit of sufficient ventilation and air circulation, without at the same time having sufficient space between the joints for rain to leak or be blown in. By this means the water vapor may escape without accumulating in the roof, and much of the difficulty may be prevented.

Above all must the tiler be warned against fixing the tiles with cement mortar, as this prevents legitimate expansion and contraction with varying temperatures, and is a frequent cause of broken tiles, especially when these are of the interlocking kind. If such tiles are too twisted to allow of their being fixed without the assistance of some filling material, then a lean hair-lime-sand mortar should be employed, but never cement.

Some architects specify glazed roofing tiles for window sills and other parts of buildings, where they are laid directly on or at the side of ordinary brickwork. When this is done they should be warned that no tiles will stand long under such conditions unless they are completely vitrified throughout, and not merely surface glazed.

The moisture in the surrounding brickwork is bound to enter into the porous backing of the tiles, and, being unable to evaporate (on account of the glazed surface) it remains there, and the tiles are split after a few frosts. Such tiles must, if glazed, be protected by means of a waterproof backing and side pieces, or an air space must be left all round the tiles.

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# CEMENT AND CONCRETE

[NOTE.—Contributions suitable for publication in this Department are invited from subscribers and readers.]

## FINISHING CONCRETE SURFACES.

A very large number of bridge abutments, retaining walls and other pieces of masonry presenting large, continuous surfaces, are now being constructed in cities throughout the country of concrete, and with excellent satisfaction. In most cases they are given a smooth finish, which offers the objection of being glaring in a bright light, of showing the finest of hair cracks that any irregularity in mixing shows in the color, and that any patching is apt to result in scaling off of the surface, tells the "Municipal Journal." A more pleasing appearance has been obtained by the Philadelphia Department of Public Works in its concrete structures by the construction of what it calls granolithic surfaces. In this the removal of the mortar leaves the surface color that of the stones used; it is not so liable to streak, and cannot be scribbled on or covered with posters. The use of a stiff scrubbing brush or wire brush in connection with the washing will expedite the work. The specifications of the Philadelphia Department of Public Works for granolithic surfaces are as follows:

Granolithic surfacing, when required, shall be composed of one part cement, two parts coarse sand or gravel and two parts granolithic grit, made into a stiff mortar. Granolithic grit shall be granite or trap rock crushed to pass a one-quarter inch sieve and screened of dust. For vertical surfaces the mixture shall be deposited against the face forms to a least thickness of one inch, by skilled workmen, as the placing of the concrete proceeds, and thus form a part of the body of the work. Care must be taken to prevent the occurrence of air spaces or voids in the surface. The face forms shall be removed as soon as the

concrete has sufficiently hardened, and any voids that may appear shall be filled with the mixture. The surface shall then be immediately washed with water until the grit is exposed and rinsed clean, and protected from the sun and kept moist for three days. For bridge seat courses and other horizontal surfaces, the granolithic mixture shall be deposited on the concrete to a least thickness of 1 1-2 inches immediately after the concrete has been tamped and before it has set, and shall be troweled to an even surface, and after it has set sufficiently hard shall be washed until the grit is exposed.

## EXPANSION AND CONTRACTION.

A paper by Mr. A. C. Lewerenz, M. Am. Soc. C.E., containing some notes on concrete and reinforced concrete retaining walls at the United States Navy Yard, Puget Sound, is deserving of study, as the subject of expansion joints in structures of the kind has never been exhaustively investigated, and many practical engineers are not entirely convinced as to the efficacy of such joints. In the case of a solid concrete wall built some four years ago, Mr. Lewerenz states that the expansion joints provided all appear to be active, opening as much as 3-16 inch. Across the top of the wall many fine cracks, sufficiently wide to admit the blade of a pocket knife, and 2 inches to 3 inches deep, have appeared at intervals of about 6 feet apart. It is interesting to compare these results with the record concerning a reinforced concrete wall with a thin face slab, and buttresses at intervals. This wall, over 1,200 feet long, was built last summer without expansion joints, as it was considered that the reinforcement would prevent serious cracking of the concrete. The anticipation has

been fulfilled, for careful examination shows that the only effect of exposure to the sun at low tide during the day, and to the cold water at high tide during the night, has been the formation of very fine surface cracks across the top and down the face of the wall at intervals of about 75 feet apart. From the foregoing and other examples, Mr. Lewerenz concludes that the use of properly designed expansion joints, or of sufficient reinforcement, will prevent the development of cracks through concrete structures, but that neither method of treatment will obviate fine surface cracks in situations where sudden and extreme changes of temperature are experienced.—The Builder.

## COST OF MAKING CONCRETE POSTS.

Dellwood Park, near Chicago, contains 62 acres of land and is fenced with concrete posts. A thousand of these posts are nine feet long and the remainder seven feet. They are 4 x 4 inches in cross section at the top and 4 x 6 inches at the base. They are made of one part Portland cement and two parts stone screenings, ranging from dust to one-fourth inch pieces. Each post is reinforced with four one-fourth inch Johnson corrugated bars, one on each corner.

Two men were engaged in making the posts and could produce about forty a day. The working platform was large enough to hold eighty forms, or two days' product. In casting a post, a layer of concrete would be placed in a form, then two reinforcement rods were placed, followed by a second layer of concrete, the other two rods and then the remainder of the concrete. The latter was made wet and was tamped well in place. The forms were stripped twenty-four hours after the posts

were cast, the latter being kept wet in the meantime. The posts were left on the planks on the platform an additional twenty-four hours, and were then removed from the platform while still on the planks. They were stored at least a week on this platform and were then laid out in piles in single layers until used. For three weeks after they were made they were kept wet and for the first week of that time were covered. Two men in making an average of forty posts a day also mixed the concrete and moved and watered the posts. Forty forms were provided and after being used in making 1,500 posts, were still

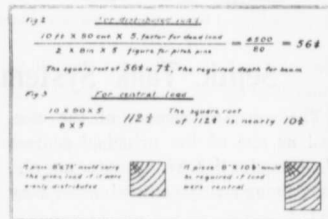
in good condition. Altogether, not over three per cent. of the posts were broken after they had been made before they were set in place in the fence.

The average cost of the nine foot posts was sixty-five cents each, including all expenses and based on the following prices: Cement cost \$2 a barrel; screenings, 75 cents a cubic yard; reinforcing steel 3 1-2 cents a pound; the two laborers were paid \$2 a day each.

The posts were allowed to season at least a month after they were manufactured before they were set.

much if the load is evenly distributed along it, as it would if the load were in the centre only. The figure 2 is therefore placed below the line in the present case. The effect of this is shown by comparing the result in Fig. 2 with that in Fig. 3.

From the several calculations made during this series of articles, it will

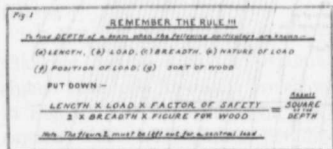


## THE STRENGTH OF BEAMS.

Very often it happens that the breadth of a beam is fixed, especially in the case of beams or girders over openings in brick walls, and the problem then is to find what depth the timber should be to carry the load safely. To find this presents no difficulty to any one at all acquainted with mathematics.

A beam is to carry an 8 inch wall over an opening. The beam is presumably yellow pine, the opening 10 feet wide, the height of the wall above the beam 13 feet 6 inches, giving 90 cubic feet (10 feet by 13 feet 6 inches by 8 inches), say, 90 cwt. as weight to be carried on beam.

The method of putting down these particulars is shown in Fig. 1. Fig. 2 shows the calculations for our present case, all the values above the line being multiplied together and divided by the product of all the values below the line when they have been multiplied together.



The only difficulty is in working out the final answer, for the result obtained at first will be the square of the required depth; that is, the depth multiplied by itself. To arrive at the exact depth it is necessary to "extract the square root" of the answer,

which means to find what number multiplied by itself will give the answer. For all ordinary practical purposes of wooden beam calculations, however, the exact result is not obtained by inspection of the first answer. For instance, in the foregoing problem the answer is 56 1-4. Now, the nearest square of a whole number to this is 49, the square of 7 (7 x 7 = 49), therefore the depth of the beam is more than 7. The next square of a whole number is 64, the square of 8 (8 x 8 = 64), and as that is greater than our answer, evidently our beam should be somewhere between 7 and 8 inches deep. As a matter of fact, it proves in this case to be exactly 7 1-2 inches (7 1-2 x 7 1-2 = 56 1-4), but if the sum had not worked out so exactly as that a result quite good enough for practical purposes could have been arrived at by the method indicated above; namely, by finding the nearest squares of the whole numbers above and below the answer and allowing a sufficient amount over and above the root number of the square below. As in the previous articles the nature and position of the load must be considered in any calculations made. The factor of safety used is 5, the usual for a dead load. That is, one-fifth of the breaking weight is considered to be the amount a beam can safely carry when the load is a stationary one.

The position of the load is important, as a beam will carry twice as

been seen that if two beams or joists be of the same length and sectional area, the one of greater depth will be the stronger of the two. This can be readily seen by taking as examples two joists of the same sectional area, but of different dimensions. A piece of 12 inch by 2 1-2 inch and one 10 inches by 3 inches have the same sectional area (30 square inches), but their relative strength when placed on edge is as 360 to 300, since the strength of a beam is as "the square of its depth," that is, the depth must be multiplied by itself. 12 x 12 x 2 1-2 = 360 and 10 x 10 x 3 = 300, or a proportion of strength between the two as 6 is to 5.

There is, of course, a limitation in the practical application of this, for if a beam be made very deep in relation to its breadth, it will buckle and twist when loaded. In the case of floor joists the disproportion of depth to breadth is very marked, but their tendency to buckle is overcome by strutting, either with solid blocks the same depth as the joists cut in between each pair, or "herringbone" strutting cut from narrow battens. Many experiments have been made to find the best proportion for the breadth and depth of wood beams, and it has been laid down that a ratio of 5 to 7 gives the best section. This is a useful thing to remember and can be easily kept in mind.—Condensed from an article by T. B. Kidy in the "American Carpenter and Builder."



[NOTE.—Contributions suitable for publication in this Department are invited from subscribers and readers.]

## Septic Tank System of Sewage Disposal

The constant menace of the cesspool as one of the principal sources of contamination of the water supply, even though this contamination may

septic tank is, perhaps, the one most in general use.

In this method of sewage disposal it is customary to discharge the house

sewage into a receiving basin, where fermentation is carried still further, accompanied by a final slight precipitation.

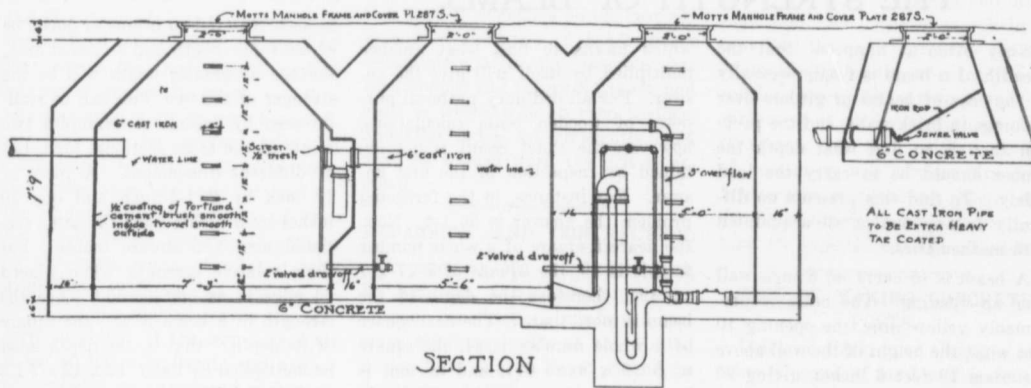


FIG. 1.

not occur immediately, but after quite a period, has been the cause of leading sanitary engineers investigating this most important question of the

sewage into a receiving basin, where it is allowed to remain undisturbed so that sedimentation and fermentation may take place during a period

When a certain determined height is reached by the sewage in the discharging basin the seal of a siphon is broken, allowing the entire contents

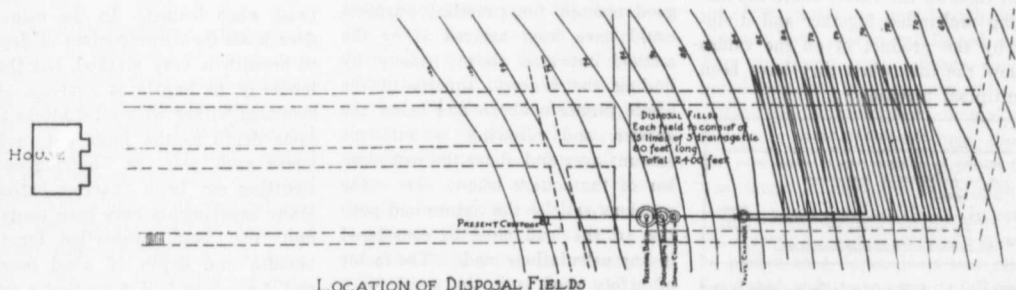


FIG. 2.

proper method of the final disposal of sewage from dwellings.

Among the various methods adopted by the sanitary engineer for the final disposal of household wastes, the

various methods of the final disposal of sewage from dwellings. Among the various methods adopted by the sanitary engineer for the final disposal of household wastes, the varying in time with the composition on the sewage from twelve to twenty-four hours or even longer, causing the albuminoid bodies which throw off various gases to disintegrate and al-

to discharge through a main distributor with lateral drainage tile branches into trenches located in a disposal field. The sewage in the trenches is attacked by the oxygen held in the

interesting off cases. As the 12 inch sorbed vegetat

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interstices of the broken stone, throwing off hydrogen, nitrogen and other gases.

As the drainage lines are laid only 12 inches deep, the nitrogen is absorbed by the roots of the growing vegetation, which accounts for the

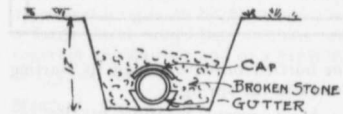


FIG. 3.

rank growth of vegetation over the field.

The disposal of sewage by this method is dependent upon the character of the soil of the disposal field, the distance of the field from the house, the number of persons living in the house, and other considerations

1-2 inch coating of Portland cement, brushed smooth inside and trowel-smoothed outside. The basins are provided with heavy iron manhole frames and covers, two feet in diameter, and have large, strong iron steps. The bottoms of the basins are composed of six inch concrete, laid to drain to one point. All the intersections of the stone are made with full round corners, so that the basins can be readily cleaned. The basins are so arranged that they may be drawn off one into the other.

"The siphon used is a three inch Rhoades Williams, the mouth of which is set in a small sump, built into the bottom of the discharging basin, so that when the siphon operates the entire contents of this basin, are carried off. In the siphon basin

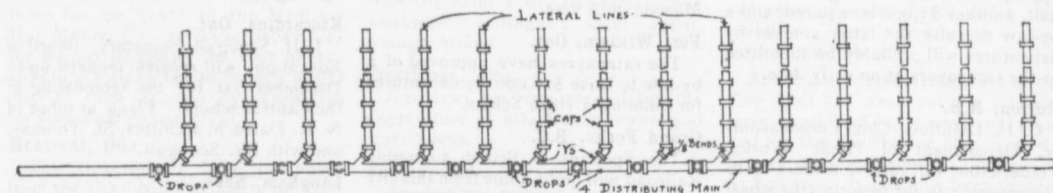
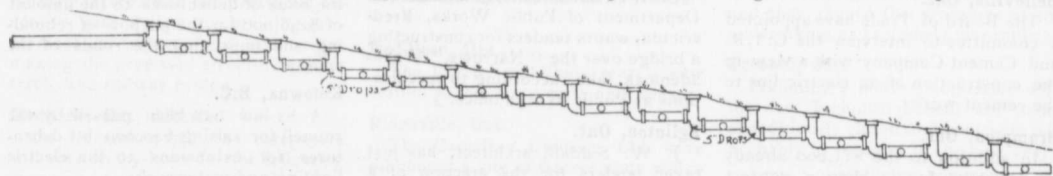
eated forty feet from the house, and consists of 2,400 feet of three inch drain tile, laid about twelve inches below the surface of the ground, as shown in Fig. 4. The tile has a fall of six inches per hundred feet, and is surrounded with about six inches



FIG. 6.

of broken field stone. The tiles are laid about a quarter of an inch apart and the lateral lines do not exceed 90 feet in length.

"The manner of disposing of the sewage by means of special 'drops' is shown in Fig. 3. By means of these 'drops' the sewage flows with but the slightest fall. The drops are of vitri-



DETAIL OF DISPOSAL FIELDS SHOWING DISTRIBUTING MAINS, 'Y' BRANCHES, LATERAL LINES & DROPS.

FIG. 4.

which can only be decided by an engineer.

The accompanying illustrations show a method of disposing of the sewage of a country residence at Millbrook, N.Y., described in a recent issue of the "Engineering Review," as follows:

"Details of the receiving and discharging basins, with the adjoining siphon basin and its siphon are shown in Fig. 1. The receiving basin has a capacity of 1,500 gallons per day, which, when the house is in normal use, allows for the daily consumption of 100 gallons of water per person. The discharging basin has a capacity of about 800 gallons and discharges twice a day. The basins are constructed of 16 inch field stone laid in Portland cement, and are given a

is also provided a three inch overflow and a two inch valve draw-off; also a three inch Barrett clean-out. All the pipe work in the basins is of 'extra heavy' tar-coated cast iron pipe. By the action of the siphon the sewage from the discharging basin is led into a four inch vitrified main



FIG. 5.

discharge pipe, which terminates in the main distributor.

"The main distributor, as shown in Fig. 3, consists of a four inch main with branches.

"The disposal field (Fig. 2) is lo-

ified pipe, made in one piece, and have hub and spigot ends. Between the drops are placed special drainage branches. These are also of vitrified pipe, and are made 'right' and 'left,' as the invert of the three inch branch is on the same level as the invert of the pipe itself. These special drainage Y branches are shown in Fig. 5.

"From the end of the three inch drainage Y branches is laid the three inch drainage tile, as shown in Fig. 6. This tile is the ordinary absorbent drain tile, is not vitrified, has no hub or spigot, and comes in one foot lengths. It is laid on gutters of the same material, which act as a bed upon which the tile rests, and which allows the tile to be laid with much more care than if it were simply laid

(Concluded on Page 27)

# Contracts Department

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

## CONTRACTS OPEN.

### Arnprior, Ont.

There is a general feeling that a hospital is badly needed here and the Mayor has been urged to call a mass meeting at an early date.

### Brantford, Ont.

A by-law has been passed authorizing pavement and sewer construction on George, Dalhousie and Bridge streets at an estimated total cost of \$33,000.

### Belleville, Ont.

The Board of Trade have appointed a committee to interview the G.T.R. and Cement Company with a view to the construction of an electric line to the cement works.

### Brampton, Ont.

In addition to the \$15,000 already appropriated for building a concert hall, another \$5,000 is required, and a by-law to raise the latter amount by debentures will probably be submitted to the ratepayers at an early date.

### Burton, N.B.

C. H. LaBillois, Chief Commissioner, Department of Public Works, Fredericton, will receive tenders up to November 25th for repairing the wharf at this place. Specifications at the Department and at the post offices at Oromocto, Sheffield and Blissville.

### Blackville N.S.

Tenders are invited by C. H. LaBillois, Chief Commissioner, Department of Public Works, Fredericton, up to December 16th for rebuilding the Donald bridge over Miramichi river. Specifications at office of Jacob Layton, this place, Robert Murray, Chatham, N.B., and at the Department.

### Bathurst, N.B.

Premier Roblin is authority for the statement that the Drummond Mining Company, who recently acquired the Gloucester iron mines, have in view the construction of big smelting works here. It is also understood that the Company will develop the power of the Nepisiquit River Falls which is said to exceed 10,000 h.p.

### Carterville, Que.

A by-law to issue \$11,000 sewer debentures will be voted upon on November 25th.

### Chesley, Ont.

The ratepayers have approved of a by-law to raise \$38,000 for the installation of a water-works system.

### Cobalt, Ont.

A franchise has been obtained by Judge Stone, of Cleveland, M. J. O'Brien, Hon. Frank Latchford and others, for an electric car line to Haileybury, the service to be ready for operation by July, 1909.

### Cambridge, N.B.

C. H. LaBillois, Chief Commissioner, Department of Public Works, Fredericton, wants tenders for constructing a bridge over the "Narrows," Washademoak lake, according to specifications at Public Works office.

### Eglinton, Ont.

J. W. Siddall, architect, has just taken tenders for the erection of a Masonic hall here.

### Fort William, Ont.

The ratepayers have approved of a by-law to raise \$16,000 by debentures for building a High School.

### Grand Forks, B.C.

The Spokane & British Columbia Railroad will build a line from this city to Spokane, commencing construction in February.

### Georgetown, Ont.

On December the 2nd the ratepayers will vote on a by-law to loan \$5,000 to Alfred Sykes, who is contemplating the erection of a woollen factory.

### Goderich, Ont.

A communication has been received from Hon. Dr. Pugsley in which the minister states that the proposed improvements to the harbor will be put in hand as soon as possible and that further extensions will be considered in the meantime.

The Doty Engine Works Company are asking the town for a loan of \$35,000 in order to carry out extensions to their plant.

### Halifax, N.S.

Subject to the approval of the British War Office, the proposed Technical College will be erected on the site of the old drill hall, the sanction of the Militia Department having been received last week. Negotiations will

be hurried on with a view to starting work in the spring.

At a recent meeting of the city council it was resolved to at once enter into negotiations for the acquisition of the Fuel Yard property on Bedford Road as a site for the market building, plans for which will shortly be submitted to the Department of Militia and Defence.

### Ingersoll, Ont.

A by-law has been passed by the County Council of Oxford authorizing the issue of debentures to the amount of \$236,000 for the purpose of rebuilding and improving the roads of the county.

### Kelowna, B.C.

A by-law has been passed by the council for raising \$40,000 by debentures for extensions to the electric lighting and waterworks.

### Kincardine, Ont.

J. H. Scougall, Secretary, Board of Education, will receive tenders up to December 1st for the remodeling of the Central school. Plans at office of N. R. Darrach, architect, St. Thomas, and with Mr. Scougall.

### Langham, Sask.

The ratepayers have approved a by-law to raise \$6,500 for fire protection.

### London, Ont.

According to no less an authority than Mayor Judd, plans for the new hygienic institute are being prepared by the Government, who will shortly call for tenders.

The city council have accepted Mr. J. A. Blair's offer of \$20,000 towards the erection of a tuberculosis hospital.

Representatives of the H. J. Heinz Company, of Pittsburg, Pa., were in the city last week instituting enquiries and interviewing the authorities with a view to the establishment of a Canadian branch factory.

It is probable that a by-law will be submitted to provide \$4,000 for building the proposed tuberculosis hospital.

### Mud Creek, Ont.

A grant of \$1,000 to \$1,500 will be asked for at Parliament's next session for the rebuilding of the bridge at this place.

**Magrath, Alta.**

The building committee at Winnipeg have granted \$500 to the local Presbyterians to assist them in the erection of a church.

**Mimico, Ont.**

The G.T.R. are planning extensions that will cost \$10,000. A new siding 1,500 feet long is to be built and also a large steel weighing machine on concrete foundations and of a capacity of 175,000 tons.

**Meaford, Ont.**

At a joint meeting of the town council and the board of trade, held last week to discuss the question of a new town hall it was decided to advertise for plans for a new building with a capacity of 15,000.

**Mission City, B.C.**

A steel structure is to take the place of the old wooden bridge across the Fraser at this place and a deputation recently interviewed the provincial executive with a view to obtaining government assistance in a scheme for making the proposed structure a joint traffic and railway bridge.

**Medicine Hat, Alberta.**

On December 7th the ratepayers will vote on by-laws for the following purposes: to grant an exemption from taxes for ten years to the Medicine Hat Milling Co., to issue debentures for \$6,500 to defray the cost of constructing a side track to Industrial and also to raise \$40,000 by debentures for side-walk construction.

**Montreal, Que.**

The Government have purchased from the Grey Nuns property on Youville square as a site for a new custom house. The present buildings will be utilized temporarily for examining purposes but a new block will ultimately be erected.

The Temple of Solomon are contemplating the erection of a synagogue on Ontario street to cost \$50,000.

**Montmagny, Que.**

Tenders are invited by Fred Gelinias, Secretary, Department of Public Works, Ottawa, for the construction of a wharf here. Plans at the department.

**Niagara Falls, Ont.**

The City council have been asked by the School Board to prepare a by-law to raise \$23,000 for school buildings and sites.

A measure is also being considered for raising \$15,800 for water works purposes.

**Ottawa, Ont.**

Announcement is made by the Deputy Minister of Militia to the effect that an appropriation of \$100,000 has

been recommended for the purpose of building new armories.

**Owen Sound, Ont.**

It is understood that the Georgian Bay Power Co. have made a favorable offer to the town for the supply of power on condition that the town build the transmission line, the estimated cost of which is \$60,000.

**Port Arthur, Ont.**

The Y.M.C.A. have asked the council for a grant of land as a site for a \$50,000 building which they propose to erect.

**Paisley, Ont.**

A by-law has been passed authorizing the issue of debentures to the amount of \$20,000 for purposes including the re-building of Denny's Bridge.

**Pembroke, Ont.**

A by-law will likely be submitted to the ratepayers in January to raise \$7,000 for extensions to the waterworks.

**Red Deer, Alta.**

The C.P.R. will likely erect a new station at this place early next season.

**Ridgeville, Ont.**

The Canadian Cannery Ltd. have purchased a site of 6 acres upon which they will build a \$10,000 factory and workmen's cottages; local agent, George Arnold.

**Strathcona, Alta.**

A by-law has been carried for the expenditure of \$96,000 on sewers and waterworks.

**Sussex, N.B.**

Tenders are invited by C. H. LaBillois, Chief Commissioner, Department of Public Works, Fredericton, up to Nov. 25th for rebuilding the Drury Cove bridge. Specifications at office of Mr. O. P. King, M. P. P., and at the Department.

**Simcoe, Ont.**

Tenders will be received by Fred Gelinias, Secretary, Department of Public Works, Ottawa, up to December 6 for the construction of a public building in this town. Specifications may be seen at the Department and on application to the local postmaster.

**St. George, Ont.**

The County Council of Brant have authorized a measure to raise \$14,000 for bridge construction.

**St. Thomas, Ont.**

The Grace Church Methodists are endeavoring to raise funds for the erection of a new building.

**St. Vital, Man.**

The council will proceed immediately with the construction of a car line for

which estimates are already being prepared.

**St. Pierre, N.B.**

In an accident which occurred at the lighting plant last week damage was done to the power house and machinery to the extent of \$2,500.

**St. Francois d'Orleans, Que.**

Fred Gelinias, Secretary, Department of Public Works, Ottawa, wants tenders up to November 27th for the construction of an approach to the isolated crib here. Plans and specifications at office of A. Decary, Resident Engineer, Quebec, and at the Department.

**St. John N.B.**

The proposal to take tenders for an addition to the South Rodney wharf having been lost by a large majority, several aldermen have laid the matter before the Minister of Public Works with a view to government construction and they regard the prospects of the undertaking as extremely favorable.

**Toronto, Ont.**

Preliminary matters connected with the new Technical School are being expeditiously closed and contracts will probably be let early in the new year.

Knox College have commenced the campaign to raise funds for a new building. They hope to raise at least \$100,000 in this city.

At the power conference held at the City Hall last week various schemes were considered for a municipal plant and for the distribution of power, the figures ranging from \$1,000,000 to \$5,000,000. It has now been decided to submit a by-law to the ratepayers next January calling for the expenditure of \$2,500,000.

George W. Gouinlock, architect, has about completed plans for the new transportation building at the exhibition grounds which is to be erected at a cost of nearly \$100,000. The same architect is also designing a handsome monumental gateway for the grounds.

Plans have been prepared by Architect Ellis for additions to the Collegiate Institute at Toronto Junction; estimated cost \$16,000.

J. S. Brady, of the Vendome hotel, has purchased property on Palmerston Boulevard where he will erect a new residence.

Recent building permits include: Norwich Union Fire Insurance Company, alterations, Wellington street east, \$18,000; P. McGibbin, 2-storey frame dwelling, Kippendavie avenue, \$1,200; John C. Gillies, 2-storey brick dwelling, Geoffrey street, \$3,000; J. W. Walker, pair 2-storey and attic semi-detached brick dwellings, Albany



avenue, \$7,000; Chas. E. Goad, alterations, St. George street, \$6,000; E. Taylor, pair 2½-storey semi-detached brick dwellings, Dovercourt road \$5,000; J. D. McCaul, 3-storey brick store, Jarvis street, \$6,000; Board of Trustees, Toronto General Hospital, brick store, Bay street, \$4,000; Eaton & Smith, 2½-storey brick dwelling, Shaw street, \$2,800; J. C. Scott company, alterations to boiler house, River street, \$1,800; P. J. Hayes, pair 2½ storey semi-detached brick dwellings, Gladstone avenue, \$6,000; St. Andrews College, 1½-storey frame club room, Summerhill avenue, \$2,000.

#### Vonda, Sask.

A by-law to raise \$15,000 for a waterworks system has been carried.

#### Virten, Man.

Geo. Harris, of this town, has purchased a site on Nelson street upon which he will erect early next season, a large store and office block.

#### Victoria, B.C.

The Public Works Department have selected plans for the Dominion Government detention hospital which will be erected corner of Ontario street and Dallas road. Tenders are now being taken and will close December 2nd.

The plans formed a short time ago for the erection of a new \$100,000 Y.M.C.A. building are taking definite shape and the directors of the institution are considering offers of sites.

Recent building permits include: Thomas Shaw, 2-storey frame building, Linden avenue, \$3,700; I. McArthur, 2-storey dwelling, Cook street, \$3,000; B. Goodfield, 1-storey stone dwelling, Fifth street, \$2,000.

#### Vancouver, B.C.

A sum of \$240,000 will be expended by David Spencer, Limited, upon the erection of their new store and arcade.

A by-law will be submitted to the ratepayers in January next to provide for the erection of a new wing to the General Hospital.

Recent building permits include: E. Moody, frame dwelling, Fifth street, \$1,800; James Lumsden, frame dwelling, Westminster road, \$3,000.

It is understood that by-laws to raise \$100,000 by debentures for school building will be submitted to the ratepayers in January.

Recent building permits include: V. Janson, frame dwelling, Cordova street east, \$2,000; Taylor, Sumner & Brown, frame dwelling, Eleventh avenue, \$1,500; H. Nishimura, apartment house, Second avenue, \$1,000; R. N. Finch, frame dwelling, Vine street, \$1,200; Geo Gonzales, frame dwelling, Twelfth avenue, \$2,500; Harrison &

Malan, frame dwelling, Eleventh street, \$1,800;

#### Welland, Ont.

At the January elections the ratepayers will vote on a by-law to provide \$40,000 for the installation of a sewer system.

#### Winnipeg, Man.

The Industrial Exhibition have received the offer of a free site of one hundred acres for exhibition purposes from the directors of Tuxedo Park.

On December 10 the ratepayers will vote on a by-law to raise \$200,000 by debentures for the purpose of "purchasing and equipping public recreation grounds."

An appropriation has been carried by the city council for the expenditure of another \$22,000 on the power plant.

Asphalt paving is to be constructed on Higgins street at a cost of \$5,000.

Tenders will be received by M. Peterson, Secretary, Board of Control, until November 30th for supply of 5,000 tons of cedar block paving. Specifications at office of City Engineer.

### CONTRACTS AWARDED.

#### Battleford, Sask.

The Government have awarded the contract for the substructure of the projected bridge over the Saskatchewan river to Newman & Company, of Regina.

#### Chambly, Que.

Francois Lemoine, of Lafontaine Park, was the successful tenderer for the masonry work on the new bridge at \$31,000.

#### Hamilton, Ont.

The Eagle Spinning Company have awarded the contract for a large addition to their works in this city to the Provincial Construction Company, of Toronto.

#### Halifax, N.S.

Brookfield Limited, of this city, successfully tendered, at \$25,000, for the work of enlarging the county courthouse.

M. Brookfield, Limited, have also been entrusted with the erection of the new Anglican cathedral, the estimated cost of which is \$125,000.

#### Peterborough, Ont.

The contract for the redecoration of St. Paul's Church has been let to the P. C. Brown Co., of Toronto.

The Department of Railways and Canals have awarded the contract for the first section of the Ontario-Rice lake division of the Trent Canal to Lewis P. Nott, of Montreal.

#### Strathroy, Ont.

Nagle & Mills, of Ingersoll, Ont.,

were the successful tenderers for the new armoury at \$13,000.

#### Victoria, B.C.

A. W. Gleason, of this city, has been awarded the contract by the B.C. Electric Railway for the addition to their car sheds at \$10,000.

#### Walkerville, Ont.

The contract for the McGregor Banwell Fence Company's new reinforced concrete building has been awarded to the Concrete Engineering Company, of Toronto, Ont., at about \$20,000.

### NEW COMPANIES.

Bathurst Lumber Company, Limited, Bathurst, N.B., incorporated, capital \$100,000. Incorporators, Angus McLean, M. E. Preisch, B. F. Jackson, C. M. Carrier, and Hugh McLean, all of Buffalo, N. Y.

Canada Tool Company, Limited, Montreal, Que., incorporated, capital \$20,000. Incorporators, W. R. Hitchcock, C. H. Cline, F. J. MacLennan and Robert Cline, all of Cornwall, Ont.

Canadian Colored Marbles, Limited, Montreal, Que., incorporated to manufacture and carry on construction work in cement and its products, capital \$375,000. Incorporators, O. Gervais, C. A. Duclos, J. E. Coulin, R. Leroux and E. Desfosses, all of Montreal, Que.

A. McCall Company, Limited, Toronto, Ont., incorporated as builders and general contractors, capital \$20,000. Incorporators, F. Rielly, J. B. Bartram, D. F. Hannigan and Andrew McCall, all of Toronto.

Standard Automobile Company, Limited, Toronto, Ont., incorporated, capital \$40,000. Incorporators, A. R. Bickerstaff, T. A. Silverthorn and others.

Bice Regulator Company, Limited, London, Ont., incorporated to manufacture and deal in boiler equipment and supplies, capital \$70,000. Incorporators, Gordon Russell, of Toronto, Ont., and A. W. Bice, J. Bice, Michael Owen, A. Westman and D. A. Bice, all of London, Ont.

Geo. H. Rundle & Son Company, Limited, Windsor, Ont., incorporated as manufacturers of drugs and medicines, capital \$200,000. Incorporators, G. H. Rundle, A. G. Rundle, L. Frazier and others.

Soss Invisible Hinge Company, Limited, Toronto, Ont., incorporated, capital \$40,000. Incorporators, J. Soss, of New York City; S. King and F. Watts, of Toronto, and others.

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**FIRES**

G.T.R. station, elevator and other property at Caledonia, Ont., loss \$15,000.

Foundry building of Stevenson Doiler Works, Petrolea, Ont., loss \$4,000.

Factory building of A. L. David, Montreal, Que. loss \$2,000.

Store and dwellings of H.E. Landry and others at Casselman, Ont., loss \$16,000.

**BUSINESS NOTES.**

In connection with the scheme for developing tremendous power on the Shuswap, in the district of Kamloops, B. C., notice is given that application will shortly be made for the incorporation of a company under the name of The Western Improvement Company.

Application will also be made for the incorporation of the Dominion Lumbering and Power Development Company, Limited, notice of which is given by L. J. Beique, solicitor, Montreal.

The Saskatchewan Power Company will seek incorporation for the purpose of generating electricity from the River Saskatchewan in the Saskatoon District.

A charter has been obtained by A. McCall Company, Limited, general contractors and builders, capitalized at \$20,000, with head office at Toronto.

The Brandon school board have disposed of \$49,000 worth of five per cent debentures to the Neeven Company, of Chicago, at 90.

A thirty-day option has been given to Wood, Gundy & Co., Toronto, on \$250,000 thirty-year debentures of the City of Calgary at 89 net. In the event of the sale going through the money will be spent upon the completion of public works.

It is reported that the contracting firm of Beaton & Hallett, Edmonton, Alta., have dissolved.

Limoges & Carrieres, builders etc., Montreal, have registered.

The assets of George R. Tomlinson, Kingston, Ont., dealer in electrical supplies, are advertised for sale.

C. J. Barrett's planing mill at Weyburn, Sask., has been purchased by L. J. Walstead & Co.

The efforts of the shareholders of the Raven Lake Portland Cement Company, Limited, of Raven Lake, Ont., to save the concern from liquidation proved futile. A winding-up order has been granted and the Trusts & Guarantee Company, Ltd., have been appointed provisional liquidators.

Late registrations of building firms at Montreal, Que., include E. Godman & Co., Labelle & Neven, and A. Lemaire and Company.

**BUILDING NEWS.**

The Portage la Prairie school board recently received an application for a new school building from the Galicians of that town. This they were disposed to consider. Upon enquiry however, it was discovered that while a few progressive spirits were really anxious to get the school, the greatest apathy was evinced by the majority, who, if anything, seemed to prefer the present limited means of educating their children, and so the application was accordingly set aside.

Western enterprise has been well illustrated by the town of Langham, Sask., who quite recently purchased a site for municipal buildings and entered upon construction work last week. The new buildings will include a town hall, fire hall, police station and town clerk's office.

In real estate circles at London, Ont., and in many other cities throughout the Dominion, it seems to be the general consensus of opinion that the number of small houses now being erected is entirely inadequate to meet the growing demands of the settler. "It I had 50 small houses," said a prominent real estate agent of the Forest City, "I could rent them in no time. Everybody who comes along these days is asking for small houses. By a small house I mean one for which the rent does not exceed ten or twelve dollars a month."

Tenders have just closed for the construction of Calgary's street railway system which it is hoped will be completed within a year.

October building permits at Victoria, B.C., eclipsed the figure for September by \$20,000. The total was \$81,875 against slightly over \$60,000 for the previous month.

That the city of Vancouver is rapidly expanding is evidenced in the report recently submitted to the civic water commission by Superintendent Madison showing that during three months no less than 500 new water systems were installed and nearly seven miles of mains laid.

So great is the demand for medium-priced houses in Vancouver, that, according to a leading real estate man of that city, syndicates are being formed for the construction, next season, of whole blocks of the desired class of property. Many new arrivals have been coming in from the North West and in addition to these there is

a constant influx of the better class of immigrants. While for the present these people are contented with renting and rooming it is anticipated that a hitherto unprecedented demand for homes will be made next year and it is thought that the proposed syndicates will be a great relief to the situation.

In order to divert new industries to Peterborough, Ont., the Central Ontario Power Company, who own the power rights at Burleigh Falls, have made an advantageous proposition to the municipal committee for the supply of power. Negotiations that have been laid aside will be re-opened and it is expected that if the project is realized quite an impetus will be added to manufacturing in this locality.

The contractors of Vancouver during the past season have had to contend against a serious shortage of brick, which has considerably delayed their building operations. There is every probability, however, that next year will see a greatly improved situation owing to the mammoth plant which the newly-formed Sechelt Brick and Tile Company are constructing. The plant will be the finest on the Pacific coast and will have a daily capacity of 40,000 by next April, and an ultimate output of 80,000 bricks a day.

During the transit of a freight train over the C.P.R. bridge last week at Eastman, Que., the structure collapsed with fatal results to the engineer and fireman of the train.

The Moncton, N. B., Board of Trade have passed a resolution expressing their unanimous approval of the scheme to construct a tunnel beneath Northumberland Strait. It is estimated that this project would cost ten million dollars.

Contractor F.G. Wilson, of London, Ont., whilst superintending work on the Adelaide street Baptist church, met with what might have been a serious accident by falling nearly 30 feet from a scaffold. Fortunately his descent was checked by the braces and he escaped with a severe shock and bruising.

The new C.P.R. bridge at Parry Sound has just been completed. The structure is 120 feet high and 1,900 feet long without the approaches.

At a meeting of the Montreal Business Men's League held last week it was generally conceded by the members that the great lack of hotel accommodation was a serious impediment to the work of the league and that many large conventions were lost to the city on this account; also that the condition of the streets and thoroughfares in Montreal have militated strongly against the support of the league.

## THE FACTOR OF COST IN ESTIMATING.

(Continued from last week's issue)

As will be seen when we take up the matter of pricing the items, each one of these catalogue numbers has a list price given in the catalogue, so that it will not be a difficult matter to figure the material in the finish for a frame, and after having figured and put two or three jobs through on a satisfactory basis, a price may be established for sides of trim of various character, so that after a while the estimator's work will become easier if he keeps his records.

After all the openings have been disposed of, the base, base mould and shoe or quarter-round should be figured up, as also the wainscot cap or dado mould, picture moulding, and all outside moulds, brackets, columns, balustrades, screens and any other millwork in the building except the stairways, which should be listed separately.

### LISTING WINDOW SCREENS.

When listing window screens, care should be taken to bill them the same length as they will have to fill in the frames, and the estimator having the plans and details before him will be able to give the opening size of the screen, for the length of window screens vary greatly in different details of frames. Specifications as to the kind of wood, thickness, style of wire and number of meshes to the inch, color of paint, whether sliding or hinged, buttoned or nailed on, should be jotted down in the estimate. If the job is a large one it will make considerable difference in money whether the job is done one way or another, and then if the order is placed, the work can be turned into the screen department and move off with that celerity which means a pleased customer, foreman, superintendent, manager and company, to say nothing of the workmen and the estimator.

### STAIRS.

When listing stairs it is a good plan to begin with the newels and give the size and style of the starting newel, and then follow with the angle and landing newels which are usually an inch or two smaller. It often occurs that an angle newel will

extend nearly from floor to ceiling, especially if the platform is high and the walls under the rake of the strings are paneled. These long newels should be figured considerably higher than the regular 5 foot newel, so that the length of newels should be given in the list.

It often happens that the newel shown in the drawings is like one carried in stock, but when the stair comes to be put up it is discovered that the stock newel is one riser too short, and this should have been discovered by the estimator unless the builder has varied from the plan.

After listing the newels, put down the number and dimension of the treads, risers and nosings. If the stair is a hardwood one it is no more than safe for the mill to figure the flooring for the platforms, as it is likely it will have to furnish the same under a blanket bid.

The string boards should be listed as so many running feet, and if the outside is a closed string with a foot rail it should be listed as so many lineal feet of that material separately from the wall string. The base boards for the platforms should be included and the well hole casings, angle mouldings, scotia under the nosings, base moulding over the wall strings and under the skirt board. Put down the lineal feet of hand rail, stating its size, give the number and size of balusters, also stating whether square or turned.

### EXTRA WORK.

If there are any bent risers, circle end treads, easings or crooks in the rail, winders instead of platforms or any other features calling for more than ordinary expense, make complete notes of the same, for it is the object of an estimate to find out how much it will cost to get out the job according to the plan and specification. Of course it is hardly necessary to add that the estimator should in every case state what kind of wood the job is to be finished in. If it is all one kind it will make the work easier, but if there are several kinds of wood in the finish it will be necessary to make a list of finish openings for each kind of wood. Where one room is one thing and the adjoining room another, it is necessary to know which

way the door between them swings in order to determine which wood to use in the jamb. Such complicated jobs are subjects for careful, patient work rather than for the exercise of unusual ability, and a finish bill made out in a compact and comprehensive manner, although comprising many openings of many kinds of wood, is a thing to be proud of and a money-maker for the mill.

### STORE FRONTS.

If the building includes a store front or several of them, it becomes necessary to list it in order to affix the necessary figures. Depending upon the style of the front, we would first list the sash for the main plates, stating the size of the plates and the thickness of the sash. Next would be the recess sash, the transom over the whole front if it is a flush transom, the doors, transom over the doors, the posts jambs around the whole opening, panels and sills under the plates, and sufficient mouldings to stop in the whole front.

It is becoming quite common of late to make the front sash extend to the floor line and put in a bottom rail about a foot wide, but, of course, the listing of a front will depend upon the specific detail or plan submitted in connection with the whole job. The main idea is to get a complete list of all the items comprising the millwork, and put it in such shape that it will not only be easily priced but be as easily billed out to the various departments in case the job is secured.

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### WIND ANCHORS FOR SKY SCRAPERS.

A skyscraper in New York is provided with wind anchors so that it may be firmly braced against every gale. The new devices, which, for the first time, are being employed in any structure are found in the caisson piers which form the foundations of the new Singer building in Broadway, near Liberty street.

Skyscrapers of the ordinary type are not intended to withstand any uplifting strain. Their own weight prevents them from being disturbed. The new Singer building is to rise to

a height of 625 feet, and is to have sure, on account of the structure's great altitude, will be tremendous, and for that reason the building is to be literally tied to its foundations by an ingenious arrangement of steel rods. They will be three and a half inches in diameter and descend for nearly fifty feet into the concrete which form the caissons on solid rock eighty-five feet below the curb.

These rods, which are bolted together, are in lengths of from six to ten feet each, and the devices are put in before the cement is placed in the caisson. The lowest rod has on the end of it a great anchor plate, to which it is secured, and on the other

end are bolted the two rods of the second section. The third section has four steel rods bolted alternately to those of the section below and connected with four rods above. The four rods are made to converge so that they may be carried through the grillage beams at the top of the caisson and the iron base of the column. They are then run up into the hollow column, which they are intended to support, for a distance of five feet and bolted into position. The column which is thus tied is built up to the very top of the structure. The strength of these rods is ample to counteract the effect of severe storms. forty-one storeys. The wind pres-



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**NOTES ON BRIDGE CONSTRUCTION.**

Attention is directed by the En-  
gineering Times to the enormous la-  
bor and expense connected with the  
widening of the Blackfriars Bridge  
now in course of operation in old  
London. When this work is complet-  
ed the width between the parapets  
will be 105 feet, the roadway will be  
73 feet and the footpaths will each  
be 16 feet wide, making the structure  
the widest road bridge over the  
Thames. Electricity is the motive  
power of the cranes used for hauling  
the excavated material, and note is  
made of the increasing popularity of  
this power in such work. Steam until  
quite recently was considered both  
more expeditious and more economi-  
cal. The widening of a bridge of this  
magnitude, continues the writer, pre-  
sents many difficulties to the engin-  
eer. One of the greatest difficulties  
arises in the construction of the founda-  
tions, especially when a portion of  
the existing work has to be cut away  
to form a bond for the new. This has  
frequently to be done in the case of  
widening river bridges. In the case  
of a tidal river like the Thames, where  
there is constantly a heavy flow of  
water, the difficulty of obtaining a  
water-tight connection between the  
dam surrounding the site of the new  
pier and the existing work, becomes  
considerable. Sometimes a dam con-  
sisting of stout sheet piling is found  
advantageous, but more frequently a  
steel caisson, large enough to contain  
the new pier, and sunk on its site, is  
found to give better results. In the  
latter case, of course, the new work  
cannot be attached to the old until  
the pier is above low water level, when  
an arch can be turned, connecting up  
the new with the old. The engineers  
who have built bridges over the  
Thames have, in the majority of cases,  
been particularly fortunate with their  
foundations, and this may be explain-  
ed by the fact of these being, within  
a few feet of the bed of the river, an  
extremely thick layer of blue clay of  
great density and compactness. This  
forms a reliable foundation upon  
which any structure may be permit-  
ted to rest with certainty of its safety  
and non-settlement. The sinking of  
the caissons or cylinders, however, for

the purpose of laying bare the bed of the river to proceed with the excavation in the dry, is often interrupted by beds of septarian nodules, which are frequently encountered in the clay, and which constitute a formidable impediment to the progress of the caissons. A large caisson having a good cutting edge will usually sink by its own weight through ordinary material, but its advancement is most effectually arrested on coming in contact with such an obstruction as that above referred to. The writer has on more than one occasion been confronted with difficulties of this nature. In one case the caisson stopped moving, and it was decided to force it by the employment of four 100 ton hydraulic "jacks" pressing down on the top ring from loaded beams slung across the caisson from staging to staging. The caisson in this particular case was of cast iron and was peculiarly shaped, the outer end forming a semi-circle, while the inner end near the existing bridge had square corners. With all this pressure it was obvious that if the obstruction were slight it would soon be cut through. The obstruction, however, proved more substantial than the caisson, with the result that cracks appeared in the plates at the square corners, and this method of forcing had to be abandoned in order to save the caisson from destruction.

**TESTING BUILDINGS TO THE BREAKING POINT.**

The wisdom of testing a building to the breaking point to determine how much the construction will stand is rather questionable, to say the least. It is well and proper that a structure shall establish its strength to the point of the requirements of the specifications, but as this point is well within the factor of safety, the policy of seeing how much further it will endure does not seem to have much to commend it. The breaking of a panel of concrete construction, for instance, at a point well beyond the weight which the specifications required, merely established the fact that it had that much excess strength. But it is questionable if it does not tend to weaken the construction to a degree to have a section broken through, even though the break will be carefully replaced.

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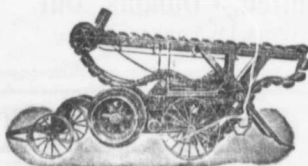
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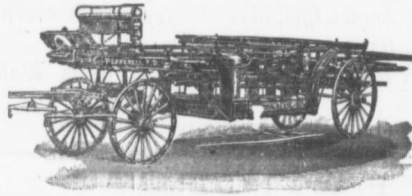
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## PROOF AGAINST RUST.

Consul Albert Halstead, of Birmingham, reports that an option on the American rights to a patent process called "sheradizing," which it is asserted makes iron and steel rustproof and has been used successfully in England for a little time, has been sold to a firm in New York. He adds:

"It is claimed for this process that it coats iron and steel with zinc as well as or better than ordinary wet galvanizing, and that the iron and steel thus coated can be brilliantly polished. In the process zinc dust is placed in a cylinder which has been brought to a temperature of 400 degrees to 500 degrees F.; that is, below the melting point of zinc. The articles it is desired to 'sheradize' are put into the cylinder, which is then revolved. The zinc in this process is not actually melted, but forms an alloy through the surface of the articles absorbing the zinc, and then a coating covering the whole visible surface is deposited to any desirable thickness. Articles thus treated are said to have an even and adherent coating, which wears excellently and does not strip, and that by the use of a lime mop are easily polished. It had been found that the use of the wet galvanizing process upon articles on which threads are cut made it necessary afterwards to recut the threads. This, it is claimed, is obviated in the new process, thus avoiding both the additional work of recutting the threads and also making the threads themselves rustproof. Another advantage claimed is that because articles are not heated to a high temperature the temper of the steel is little affected, while its tensile strength and that of iron remains the same. The owners of the process assert that it will obviate the necessity of using brass in the manufacture of many articles that may rust, an important development in view of the high cost of brass. Aluminum and antimony can be substituted, it is said, for zinc, with success, while when copper and its alloys are subjected to this process their surface is so hardened as to even turn the edge of a steel tool."

**SEPTIC TANK SYSTEM OF SEWAGE DISPOSAL.**

(Continued from page 17.)

upon the ground. The gutters also serve to hold the tile in place, when the tile trench is being back filled, and act as a permanent bed, so that the tiles at any future time may be removed for cleaning and relaid in their original position and grade. Over the point where two tiles meet is placed a cap of the same material. This is to prevent the entrance of earth, stones, etc., into the tile when the trench is refilled."

**PREVENTION OF THE COLLAPSE OF BRICK WALLS AT FIRES.**

We condense the following from the London Builder's Journal. Firemen and insurance surveyors know from experience of fires that brick buildings almost invariably collapse outwardly, due to the inner face of the wall expanding more than the outer face, forcing the wall outward. Chief Officer Ditman of the Bremen fire brigade, mentions two distinct instances confirming this theory, which occurred during the present year, of walls expanding as above stated, and the method applied to counteract such expansion. The first case was that of a 9 inch external brick stable wall 33 feet high. This wall after the roof had burned away overhung to such an extent that the streets were cleared of spectators under the momentary expectation that the wall was about to fall into the roadway. Then two spray nozzles were brought into action on the inner face of the wall, and within ten minutes the wall righted itself and again became perpendicular. This wall is now in use. On May 1st in the case of a very large fire, a brick wall 30 feet high overhung about 18 inches at the top with a tendency of immediate collapse. When six streams of water were directed near the inner face of this wall with the object of cooling down the temperature between the wall and the burning interior, after which the water was thrown directly upon the inner face of the wall. In fifteen minutes the wall was brought back to perpendicular. This wall is also again in use.

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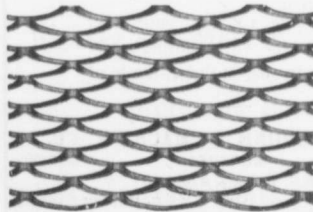
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(Abstract from "Specifications for Portland Cement," issued by the United States Navy Department, June 12, 1905.)

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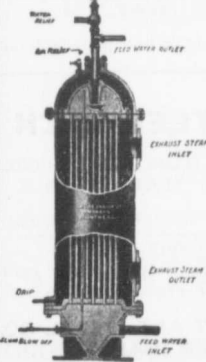
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### THE HUDSON TERMINAL BUILDING, NEW YORK.

"It is estimated that the Hudson Company's Terminal Building, which when completed will occupy two blocks, will have office accommodation for 10,000 souls," says the Architects' and Builders' Journal of Baltimore, Md.

"From this can be drawn the comparison that the building will be populated in an equal number with such cities as Portsmouth, N.H.; Helena, Mont., or Middletown, Conn., and will exceed in population the largest towns in four states—Arizona, Idaho, New Mexico and Nevada.

"There will be thirty-nine elevators in the building, and it is estimated that about 182,000,000 persons will pass through the building in entering or leaving trains in the course of a year. The new Grand Central Station is designed to handle 100,000,000 persons a year, and the new Pennsylvania station, at Thirty-third street, will be built to accommodate 146,000,000. The South Station, in Boston, only takes care of 30,000,000 a year, and the Broad Street Depot in Philadelphia, handles 20,000,000.

"From this new terminal building one will be able to go to most any corner of the country, as the trains running into it will connect with all subways, and consequently with all the big railroads. The trains arriving from the tunnels under the North River and connecting with the various city subways will enter and depart thirty feet below the street level. There will be five loading tracks and six huge platforms to avoid crowding. A great deal of attention has been paid to safety, and elaborate plans have been laid to eliminate any possibility of a tie-up. Careful provisions have been made for the possibility of fire. All the cars of the trains will be of steel and the terminal building is so constructed that should a fire start in any one room of the building it will be hardly likely to spread to another.

"The huge steel frame of the building weighs more than 24,000 tons, and rests on foundations extending to bed rock, 80 feet below the street. At no point will this steel frame be exposed. Every inch will be covered with one



or more courses of hollow terra cotta blocks, which form enclosed air spaces about all parts of the frame. In the San Francisco fire the exposed steel frames of buildings did not burn, but they buckled, wrecking the structures and causing much injury and loss. Before being placed about the frame the hollow blocks are heated to a temperature of 2,000 degrees. This terrific heat leaves the terra cotta in a perfect porous state, capable of resisting practically any heat without danger of disintegration.

"If all the terra cotta blocks used on the building were built into a line it would stretch along for 28 miles. Above the curb line there will be used a total of 16,300,000 bricks and 520,000 square yards of plastering. There will be over 16 miles of plumbing pipe, 29 miles of steam pipe and 95 miles of electrical conduit in the building when completed. Each floor of the building will provide an acre of office space, so that the entire structure will afford 22 acres for business purposes."

**KELSEY COMPANY GETS PRELIMINARY INJUNCTIONS.**

The "Post-Standard," of Syracuse, N.Y., under date of October 27, 1907, says: "Preliminary injunctions on account of alleged infringements of patents against the Richardson & Boynton Company and the Graff Furnace Company have been granted to the Kelsey Heating Company of this city, by United States Judge Archibald, of the Central Pennsylvania district. Attorney Howard P. Denison appeared for the Kelsey Heating Company, Judge Archibald rendering his decision from the bench at the close of the argument.

"Last month a decision on final hearing was given by Judge Archibald in favor of the Kelsey Heating Company and against the James Spear Stove & Heater Company of Philadelphia in proceedings which had been conducted for a long time and in which the Syracuse company claimed that its patents had been infringed."

The James Smart Manufacturing Company of Brockville, Ont., are the exclusive makers of the "Kelsey" warm air generator in Canada.

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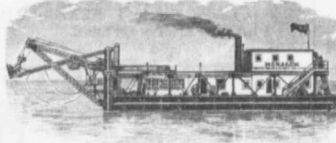
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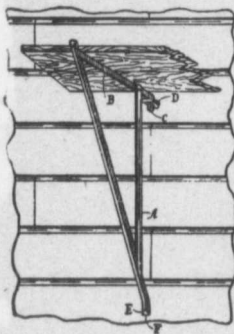
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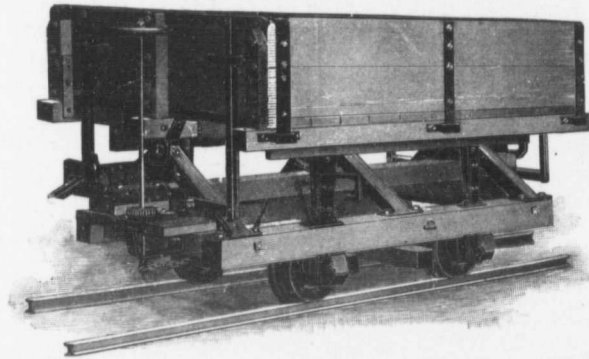
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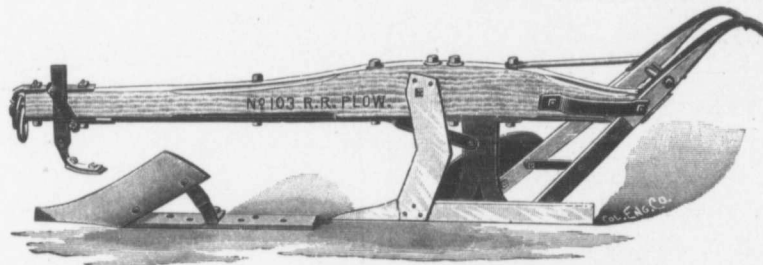


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