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# CANADIAN CONTRACT RECORD

PUBLIC WORKS • TENDERS • ADVANCE INFORMATION • AND MUNICIPAL PROGRESS

EVERY SATURDAY

Vol. 3. Toronto and Montreal, Canada, July 2, 1892. No. 20

**THE CANADIAN CONTRACT RECORD,**  
PUBLISHED EVERY SATURDAY  
As an Intermediate Edition of the "Canadian Architect and Builder."

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64 Temple Building, Montreal.  
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Information solicited from any part of the Dominion regarding contracts open to tender.

ADVERTISING RATES ON APPLICATION.

At its Convention held in Toronto, Nov. 20 and 21, 1889, the Ontario Association of Architects signified its approval of the CANADIAN CONTRACT RECORD, and pledged its members to use this journal as their medium of communication with contractors with respect to advertisements for Tenders.

The following resolution was unanimously adopted at the First Annual Meeting of the Province of Quebec Association of Architects, held in Montreal, Oct. 10th and 11th, 1890: "Moved by M. J. Beaulieu, seconded by A. F. Dunlop, that we the Architects of the Province of Quebec vote in favour of the Convention being satisfied that the CANADIAN CONTRACT RECORD affords us a direct communication with the Contractors, — resolved, that we pledge our support to it by using its columns when calling for Tenders."

Subscribers who may change their address should give prompt notice of same. In doing so, give both old and new address. Notify the publisher of any irregularity in delivery of paper.



## NOTICE TO CONTRACTORS.

Tenders will be received by registered post, addressed to the City Engineer, Toronto, up to Eleven o'clock a.m. on TUESDAY, JULY 12TH, 1892, for the following works:

### CEDAR AND GRANITE ROADWAYS.

On Queen Street, from Bathurst Street to Gladstone Avenue, cedar block with granite tooling and cobble stone, on concrete foundation.

On Queen Street, from Brockton Road to Roncesvalles Avenue, cedar block with granite tooling and cobble stone, on concrete foundation.

The above work is to be done on the track allowance on the street.

Specifications and forms of tender may be obtained on and after July 5th, 1892, at the office of the City Engineer.

A deposit in the form of a marked cheque payable to the order of the City Treasurer, for the sum of Five per cent. on the value of the work tendered for under \$1,000, and 2 1/2 per cent. for the value of the work tendered for over that amount, must accompany each and every tender, otherwise it will not be entertained.

All tenders must bear the bona fide signatures of the contractor and his sureties (see specifications), or they will be ruled out as informal.

The committee do not bind themselves to accept the lowest or any tender.

JOHN SHAW,  
Chairman of Committee on Works,  
Committee Room, Toronto, June 30, 1892.

## TENDERS

Will be received until the 6TH OF JULY for the erection of a STONE CHURCH in St. Catharines. Plans and specifications at my office.

CHAS. J. GIBSON, Architect,  
93 Adelaide St. East, Toronto.

## FAIRVILLE WATER AND ELECTRIC LIGHT COMPANY.

Proposals will be received by the above company from persons willing to undertake the work, and supply all plant and material, necessary for the water supply of Fairville, Saint John, New Brunswick.

For further information apply to

HURD PETERS, C. E.,  
St. John, N. B.



## NOTICE TO CONTRACTORS.

Tenders will be received by registered post, addressed to the City Engineer, Toronto, up to Eleven o'clock a.m. of JULY 12TH, 1892, for the construction of the following works, viz:

### SEWERS:

Liberty Street, from Atlantic Avenue to Pacific Avenue.

Dupont Street, from St. George Street to Huron Street.

Monk Street, from Bathurst Street to Markham Street.

Barton Avenue, from Manning Avenue to Christie Street.

Chilton Street, from Barton Avenue to Yorkmouth Road.

### ASPHALT PAVEMENTS:

Yonge Street, from King Street to Hayter Street.

Yonge Street, from Grenville Street to Bloor Street.

King Street, from Sherbourne Street to Simcoe Street.

Rose Avenue, from Winchester Street to Howard Street.

St. James Avenue, from Ontario Street to Parliament Street.

Parliament Street, from Carlton Street to Winchester Street.

Devonshire Place, from Hoskin Avenue to Bloor Street.

### STONE SETT PAVEMENT:

Yonge Street, from Hayter Street to Grenville St.

### CEDAR BLOCK PAVEMENT:

Dundas Street, from Soraurin Avenue to Bloor St.

Lucas Street, from Soraurin Avenue to Roncesvalles Avenue.

### CEDAR, GRANITE AND CONCRETE

on track allowance only.

King Street, from Sherbourne Street to River St.

Spadina Avenue, from Queen Street to Bloor St.

Specifications and forms of tender may be obtained on and after July 5th, 1892, at the office of the City Engineer.

A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 5 per cent. on the value of the work tendered for under \$1,000, and 2 1/2 per cent. for the value of the work tendered for over that amount, must accompany each and every tender, otherwise it will not be entertained. All tenders must bear the bona fide signatures of the contractor and his sureties (see specifications), or they will be ruled out as informal.

The Committee do not bind themselves to accept the lowest or any tender.

JOHN SHAW,  
Chairman Committee on Works,  
Committee Room, Toronto, June 28th, 1892.

## TENDERS

Will be received until the 6TH OF JULY for the erection of a FRAME DWELLING on Hampden Avenue.

CHAS. J. GIBSON, Architect,  
93 Adelaide St. East, Toronto.

## TENDERS

Will be received until SATURDAY, 10TH INST., for the different works required in the erection of a

### BRICK RESIDENCE

on Bathurst Street. Plans &c. may be seen at my office.

HENRY SIMPSON, Architect,  
93 Adelaide St. East, Toronto.

## Designs and Tenders.

Designs, Specifications and Tenders for the complete furnishing of the various Rooms and Offices in the new Court House at Woodstock, Ont., will be received by the undersigned up to and including

Tuesday, the 26th Day of July next.

Manufacturers desirous of submitting designs and tenders for the above will receive copies of the printed conditions under which all designs and tenders must be submitted upon applying to the undersigned, from whom any information not embodied in the conditions may be obtained.

JAMES WHITE,  
County Clerk, Woodstock.

June 22nd, 1892.

## TENDERS.

To Scene Painters, Stage Carpenters and Painters.

Tenders will be received by the undersigned up to FRIDAY, THE 15TH DAY OF JULY, 1892, for the painting of scenery, decorating, and stage carpenter work, of a new Opera House now in course of erection in the town of Lindsay.

The lowest or any tender not necessarily accepted.

All information can be obtained from W. Blackwell, Architect, Peterboro' or

F. KNOWLSON,  
Sec. L. O. H. Co. Ltd., Lindsay.

## TENDERS.

Sealed Tenders will be received by the undersigned up to THURSDAY, THE 7TH DAY OF JULY, 1892, for the supply of

### Sewer Pipe

and all connections for extension of the sewerage system.

Approximate quantities as follows  
39,085 feet of 8 inch, 12,875 feet of 10 inch,  
4,300 feet of 12 inch, 9,050 feet of 14 inch, 1,960 feet of 16 inch.

All pipe to be of the best quality, salt-glazed, vitrified.

Further particulars and conditions to be seen at the office of the City Engineer.

Each tender must be accompanied by a marked cheque or cash deposit equal to 5 per cent of the amount of the contract. The lowest or any tender not necessarily accepted.

THOS. F. MCGUIGAN,  
City Clerk,  
Vancouver, June 15th, 1892.

## ELECTRIC LIGHTING.

Tenders will be received to the 14TH DAY OF JULY for the lighting of the streets and parks of the City of Brantford, Ont., to use sixty (60) electric arc lights more or less, of not less than 97 to amperes, each tender to give particulars of the machines to be employed, and machines to be of sufficient capacity to give at least 15 lights and otherwise full particulars of the plant proposed to be put in, the proposal to be for lighting for 2, 3 and 5 years from the 10th day of September, 1892, all night and every night, the lights to be placed according to plan, particulars of which may be obtained by application to the undersigned.

Separate tenders are also invited to furnish a complete electric plant, to be put in ready for lighting and guaranteed to create at minimum capacity, sufficient power to produce, without strain, the maximum number of lights as stated above, burning all night and every night of the year but to be run by the City only. Also a tender to furnish a complete electric plant of the same capacity and put up as above, except that the City will agree to furnish all necessary motive power, but the whole plant to be run and owned by the City.

C. H. WATEROUS,  
Chairman of Committee

## SALT FOR WHITED BRICK WALLS.

In an interesting article, published in *The Builder*, on the efflorescence of brickwork, H. C. Standage suggests a very cheap and simple remedy. He says that the white discoloration that appears on the surface of brick walls is derived from soluble salt of sodium in the mortar. Mr. Standage says: "Acting on the hint conveyed by the fact that the excess of soda hydrate in soap making is expelled from the soap by salting it, i. e., strewing the surface of the soap as it floats on the lye with common salt (sodium chloride), the writer applied a solution of common salt to the white efflorescence on some bricks that were badly stained therewith. In every instance where such fluid was applied the white efflorescence was instantly removed, and, what is more, has never re-appeared. In obstinate cases, three applications or one application well saturating the bricks with the common salt solution, has sufficed to effect the desired result."

A new method of constructing fireproof floors is proposed by Mr. C. F. Terney, of 59 East One Hundred and Sixth Street, New York. According to this method the space between the floor beams is to be filled with cement beton containing elliptical concrete tubes running parallel to the floor beams.

The beton will be composed of the best Portland cement, clean screened sand and finely-screened coal ashes, mixed in the proportion of 1 to 2 and of 1 to 2 to 3 for the remainder of the filling. The elliptical tubes, made in the same manner as the lower part of the concrete flooring, are made in two halves cemented together into lengths as required, the upper and lower halves breaking joints vertically. After the lower layer of the beton is put in place on flat centers hung from the floor beams, the tubes are laid in position and thoroughly grouted with liquid cement mortar. The remainder of the beton filling is then put in around the beams and tubes and lightly tamped into place. Mr. Terney claims that in this way a reduction of from 30 to 40 per cent. is made in the weight of the floor without a reduction in strength.

**CONTRACTS OPEN.**

**ADORA, ONT.**—Mr. F. J. Dewis is making preparations to erect a new residence.

**GLENCOL, ONT.**—Messrs. Wm Simpson and W. J. Simpson will each erect new dwellings shortly.

**OTTERVILLE, ONT.**—Mr. Robert Plaxton, banker has purchased a site on which to erect a brick block to cost about \$5,000.

**NEWMARKET, ONT.**—The Reeve has been authorized to order pipe, valves and hydrants at once for water works extension.

**PICTON, ONT.**—Several directors of the C. O. Railway recently surveyed a proposed line of railway from this town to Sandbanks.

**COLLINGWOOD, ONT.**—Tenders for a system of steam heating for the municipal offices of the town will be received up to July 29th. Plans at Town Clerk's office.

**VICTORIA, B. C.**—The Chief Commissioner of Lands and Works invites plans and estimates of cost for the construction of certain Provincial Government buildings.

**KINGSTON, ONT.**—The ratepayers will probably be asked to raise the sum of \$20,000 for grading the streets for the electric railway. Granolithic walks will also be constructed on a number of streets.

**SIMCOE, ONT.**—C. Dickenson, County Clerk, will receive tenders until the 25th day of July for the erection of a Registry office in this town for the County of Norfolk. Plans may be seen at the Court House.

**WINNIPEG, MAN.**—N. Hewitt, Maintou, will receive tenders until the 7th inst., for the erection of the Winram Memorial church, to be constructed of stone. Plans at the office of C. H. Wheeler, architect, this city.

**BROCKVILLE, ONT.**—Mr. W. H. Davis has purchased a site opposite the St. Lawrence Hall on which to erect a residence.—The Ontario Government has selected a site for the new asylum at Picken's Point, at the east end of the town.

**PORT ELIZABETH, ONT.**—B. Cummings, Reeve of Saugeen, will receive tenders until Friday, the 8th inst., for the construction of a steel bridge over Mill Creek in this town; the bridge is to consist of two spans, 150 feet and 40 feet respectively, with concrete piers.

**MONTREAL, QUE.**—The City Clerk will receive tenders until Wednesday, the 6th inst., for paving the following streets with asphalt: Notre Dame street, from McGill street to Inspector street; Chaboulez square throughout; Ontario street, from Papineau avenue to Amherst street.

**HAMILTON, ONT.**—The Council of the Board of Trade has decided to petition the Dominion Government to grant a further sum of \$7,500 for the proper dredging of the harbor.—Ground has been broken for a new church for St. Peter's parish to be erected on the corner of Main and Burlington streets.

**TORONTO JUNCTION, ONT.**—The High School Board have been informed that the establishment of the high school has received the approval of the Government. It has been decided to proceed at once to purchase a site and erect a building, the Council having granted the sum of \$25,000 without submitting the question to the ratepayers.

**OTTAWA, ONT.**—E. F. E. Roy, Secretary Department of Public Works, will receive tenders until Monday, the 4th inst., for the erection of a post office at St. Hyacinthe, Que. The Secretary will also receive tenders until Wednesday, the 27th inst., for the erection of a Land and Registration office at Edmonton, N. W. T.—The following items appear in the supplementary estimates for the year ending June 30th, 1893: Petroleum, public building, to complete, \$7,500; Orillia, public building, \$7,000; Peterboro, Custom House, \$4,000; Trenton, harbor dredging, \$3,000; Belleville, harbor, \$3,000; Toronto, har-

bor, \$75,000; Owen Sound, dredging, \$15,000; Port Arthur, repairs to North pier, \$8,000; Goderich, harbor dredging, \$15,000; Rainy River, improvements, \$2,200; River Beaudet, clearing channel, \$5,000; Port Rowan, wharf, \$6,000; Midland, harbor dredging, \$2,500; Penetang, dredging, \$2,500; Port Arthur, dredging, \$5,000; Trent Valley Canal towards bulging and maintaining a swing bridge at Fenelon Falls, \$10,000; Monument to the late Sir John A. Macdonald, \$10,000.—The Medical Health officer has reported in favor of having plans prepared for the drainage of Stewarton.

**TORONTO, ONT.**—At a recent meeting of the Central Presbyterian church on Bloor street, it was decided to make extensive improvements to the interior of the building, at a probable cost of \$6,000. A new heating apparatus will be among the improvements.—Mr. Hamilton, Superintendent of Waterworks, has recommended the laying of companion twelve inch water mains on King street, south side, between Shearbourne and Simcoe, and on Yonge street, east side, between Queen and Bloor streets, at a cost of \$11,943 and \$18,968, respectively.—The City Engineer has recommended the construction of the following works: Cedar block pavements on Bloor street from Dufferin to Dundas street, cost \$35,730; on Ottawa avenue from the end of the present pavement to the railway tracks, cost \$700; on Delaware avenue, from College to Bloor street, cost \$14,420; a macadam roadway on Centre road, Crescent road and a portion of South Drive, Rosedale, cost \$10,234; a cobble stone pavement on lane on south side of Queen street, between Tecumseth and Niagara, cost \$1,924; on lane in rear of John street, cost \$480; on Edmund street, from C. P. R. tracks to Royce avenue, cost \$2,500; a cement concrete sidewalk on Dundas street, from 67 feet north of Humbert street to Argyle street, cost \$892; a 15 inch tile sewer on Barton avenue, from Manning avenue to Christie street, cost \$1,112.—Three new houses are to be erected on the Bedford Park estate, Yonge street.—The congregation of St. Andrews church, at a meeting held on Wednesday last, decided to proceed with the removal of the building, providing the finances would permit.

**FIRES.**

The Grand Trunk station and freight shed at Craigville, Ont., were burned on the 25th ult., loss \$6,000. The kiln house of the Hamilton and Toronto Sewer Pipe Company, at Hamilton, Ont., was destroyed by fire on Saturday last.—A dwelling house on Head street, Chatham, owned by Mrs. E. E. Spahett, was destroyed by fire on the 26th inst. On the 28th inst., Messrs. Hay Bros. flour mill at Lastowel, Ont., was completely destroyed by fire. The estimated loss on the mill and machinery is \$20,000, insurance \$12,000.—The residence of Mr. E. E. Mann, of the *Jewelers' Guide*, Montreal, was destroyed by fire on Tuesday last.

**CONTRACTS AWARDED.**

**WINDSOR, ONT.**—Messrs. Curry & Robinet, of this place, have been awarded the contract for supplying the brick for the Port Arthur post office.

**WALKERVILLE, ONT.**—The contract for the new Methodist church has been awarded to Mr. E. C. T. Doole, of Toronto. The contract price is \$7,000.

**PORTSMOUTH, ONT.**—Michael Sullivan, of Kingston, has secured the contract for the erection of the new Catholic church at this place. The estimated cost is \$12,000.

**STRATFORD, ONT.**—The contracts for additions to Romeo Ward separate school have been awarded as follows: carpenter work and painting, Wm Dayly, \$1,935; masonry and plastering, E. Jacobs, \$1,475; ironwork, Jeffrey Bros., \$118.

**WINNIPEG, MAN.**—Messrs. McBain & McBain have been awarded the contract for the erection of the new Baptist church,

the price being in the neighborhood of \$30,000.—Messrs. Gray Bros. have received the contract for the erection of Mr. Fould's new store on Main street, at the price of \$5,200.

**OTTAWA, ONT.**—At a joint meeting of the City Board of Works and the County Roads and Bridges Committee, held last week, it was decided to award the tender for the ironwork in the construction of the new bridge across the Ottawa river to the Central Bridge Company, of Peterboro. This company agrees to supply a bridge weighing 198,000 pounds, for \$9,122.

**MUNICIPAL DEPARTMENT.****PROTECTION OF EXPOSED WATER MAINS CROSSING BRIDGES.\***

These two facts struck me very forcibly as to possibility of combining both, with a view of protecting water pipes from loss due to radiations of heat and oxidation, or rust. I at once conceived the idea that it was practical to whitewash over with Portland cement a water main laid in a trench, then cover it with 3 to 4 ins. of plaster of paris and sawdust, apply an outside thin coating of cement mortar, producing a covering when dry that would be a preservative to the iron, a good non-conductor of heat, and, what is very desirable, at a reasonable cost. This scheme did not strike me very favorably in cases where the pipe is entirely exposed, a bridge crossing for instance.

The best non-conductors make a loss in any event, some more and some less. Prof. Ordway's tests show that cotton and wool wadding make the least loss, while an air space pure and simple, or asbestos, rank very low, not much better than sand. Asbestos is a mineral fibrous substance which when separated bears a close resemblance to cotton, or perhaps more nearly to silk fibre. Trace it back and we find it is simply aluminum or clay, but in a different form, and while possessing the property of being non-combustible, probably owes all its non-conducting properties to the confined air held between the fibres. The province of asbestos is simply to protect the more combustible materials, which are the real non-conductors, from being charred or destroyed. Prof. Ordway, in his paper, remarks in regard to asbestos:

"Asbestos is commonly supposed to have wonderful virtue in resisting heat, but there is really no magic power in the mineral fibre. It is a non-conductor only when it is in a light, downy condition and full of air. It was observed that in those cases in which asbestos paper is put between the pipe and hair felt, the asbestos fails to prevent the scorching of the hair. Incombustibility should not be confounded with non-conducting power. And then again, experiments Nos. 47 and 50 show that a wrapping of asbestos paper does not insulate so well as the same thickness of mere air. The popular confidence in asbestos partakes of the character of a superstition."

An airspace pure and simple ranks low, due to mobility. Prof. Ordway says:

"Air alone, as is shown by experiment No. 50 in the tables, transfers much heat when it can move about in a closed space. The usefulness of mere air spaces has been much overestimated, for they can rarely be placed so as to render much service. The air no doubt slides much more freely over smooth particles. It is

not unlikely that the great difference between wool and asbestos is largely due to the smoothness of the soapy mineral fiber asbestos. It is hard to conceive of anything better fitted to counteract the mobility of air than the irregular twists of flattened cotton fiber, the crinkles and scaliness of wool, the fringed edges of down filaments, or the feathered angles of snow-like crystals. When more and more organic fiber is crowded into a given space, the thickness of the stratum remaining the same, the transmissive power appears to be diminished till a certain limit is reached beyond which there comes an increase. Probably, then the mobility of the air has been brought to a minimum and the proper conducting power of the fiber begins to act more decidedly."

The Prof. Ordway experiments show that we must look in the direction of cotton and wool fiber for the best non-conductors, but with water pipes it has seemed to me that we must go a step further. We must find some substance or substances in combination that will supply back again the increment of heat test. With steam, the boiler supplies this. A water main is constantly losing some heat from the water with the very best non-conductor pure and simple, and the only ordinary remedy is a more free circulation to bring new particles of the water into the exposed pipe to be acted upon. Where the circulation is rapid and constant through the whole 24 hours, this plan, in connection with a good non-conductor, fills the bill.

Unfortunately, however, during the hours of the night there is usually very little legitimate consumption, and resort must be had to waste pipes to maintain rapid circulation during the night hours. This means a loss of water, and as it cost money to produce the water in the mains, it is also a financial loss.

The question of spontaneous combustion then suggests itself. Water pipes in winter, or even at any time, are always at a low temperature, with a certain amount of moisture or sweat on the outside. Spontaneous combustion under these conditions will hardly, if ever, take place, in fact, it may be assumed never. Again, all chemical changes, even decay, which is a chemical change, produce heat, and I turned my enquiries in that direction. I found that at all the knitting mills there is a waste product called wool waste, being composed partly of wool and cotton fiber; that this waste, due to the progress of manufacture is partly saturated with oils, and when placed in a pile slowly generates heat and finally decays. The best grades are sold to the paper makers, and lowest grades thrown away. The best grades vary in price from 1 to 2 cts. per pound. This material, then, just fills the required conditions of being, first, the best class of non-conductor of itself, and also having in combination a partial saturation of oil, which promotes decay, hence heat. I determined to use this material as a filling around the water pipes crossing the bridges and as wool laid with the fibers parallel, and in no case with the ends of the wool at an angle with the pipe to prevent the mobility of air through the cells of the wool, is a very good non-conductor as well as a cheap outside covering. I determined to make a box

**MUNICIPAL ENGINEERS, CONTRACTORS, AND MATERIALS.**

surrounding the pipe of 1 1/2 in. pine plank, so constructed as to be 6 ins. away from the pipe at any point. The top of the box I made roof shaped with an outside top stringer of wood covering the joints of the roof boards on top. Where the side plank join together, I butted the ends and nailed an inside cleat or batten on to cover the air space. The pipe I rested on blocks of wood set about 4 ft. apart, filled in the space in the box with the wool waste, tightly rammed in, protecting the outside butts of the side and roof planks with strips of tin nailed close.

I also tapped in two 1 1/2 in. wastes, one on each end of the bridge, to be used in case of an excessively cold spell of weather. The bridge coverings have now run about six years, and with perfect success. I used the wastes the first years, but for two seasons past the waste was not opened, and even where there was a very small consumption the water has run free until late this spring, when one of the pipes on a bridge gave out. On examination I found that decay had progressed so far with the wool waste as to render it valueless for the purposes intended. This has taught me the additional lesson that five years is about the lifetime of the effective working of the wool waste non-conductor in connection with water mains.

I have also had another experience with wool waste as a non-conductor and generator of heat protecting water pipes. In the Little Falls Water-Works system there are two series of pressure valves cutting down the pressure from 240 to 140 lbs. to the square inch. The valves are Ross pressure valve, which are essentially a balanced valve or piston with three working disks, and regulated by a small pressure valve, 3/4 in. in diameter. In very cold weather, if the 3/4 in. pipe should freeze, or a thin film of ice form on the barrel of the valve, it would work badly. To prevent freezing, I placed the first valve set in a house and arranged for a fire during the winter. When it was found desirable, a second feed line was constructed from the distribution reservoir to town. This line was so located of necessity that it was impracticable, without a heavy expense, to place the valve in a house, but a well in the road was the best plan that could be adopted. As the bridges had then worked a year satisfactorily, I designed a well enclosing the pressure valve and determined to depend upon the wool waste covering the valves, in bulk, for protection, in lieu of a fire. This plan has worked satisfactorily to date. This valve has never frozen, and when the well has been opened in very cold weather the air inside has always been found warmer than the surrounding atmosphere. The wool waste I remove every spring, send it up to the distribution reservoir grounds and bring it back in the fall, again, each year adding a little new waste. The scheme has been a perfect success. It is but fair to add that this well is connected to the sewer leading down the hill and it may be that a portion of the hot air comes from the sewer.

In conclusion, I feel safe in saying that for pipes laid under ground with a partial depth or protection of earth, the Calumet & Hecla mine plan of a protection of a whitewash of cement on the pipe as also

on the outside of the non-conductor is, in my judgment, the best and cheapest method of construction to provide against freezing, while for bridges or any above ground pipes, a wooden box filled with wool waste, which is partially saturated with oil, is by far the best protection of which I have any knowledge; it combines both the non-conducting and the slow generation of heat. I trust that my researches in this direction may be of service to other members of the American Water-Works Association

Established 1841.

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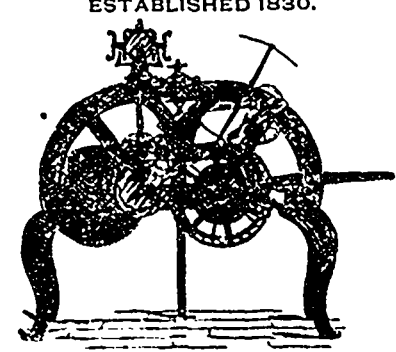
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Table listing prices for cement, plaster, and lime in Toronto and Montreal.

Table listing prices for hardware, nails, and steel in Toronto and Montreal.

Table listing prices for cold cut, blued, and other materials in Toronto and Montreal.

Table listing prices for finishing nails in Toronto and Montreal.

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