

CANADIAN CONTRACT RECORD

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

This Paper Reaches Every Week the Town and City Clerks, Town and City Engineers, County Clerks and County Engineers, Leading Civil Engineers and Contractors throughout Canada, and Purchasers of Municipal Debentures.

VOL. 18.

TORONTO, MONTREAL — JULY 17, 1907 — WINNIPEG, VANCOUVER

No. 20

THE CANADIAN CONTRACT RECORD PUBLISHED EVERY WEDNESDAY

As an intermediate Edition of the Canadian
Architect and Builder.

THE G. H. MORTIMER PUBLISHING COMPANY
of Toronto, Limited,

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in advance.

United States, \$100 per year

CONSPICUOUS LIFE BUILDERS, TORONTO
Telephone Main 2362.

Room B34, Board of Trade Building, Montreal,
Telephone Main 2292.

780-781 Union Bank Building, Winnipeg.
Telephone 1274

Davis Chambers, 615 Hastings St., Vancouver,
B. C. Telephone 2248

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should give prompt notice of same. In doing so
give both old and new address. Notify the pub-
lishers of any irregularity in delivery of papers.

Classified Index of Advertisers, Page 15.



Temiskaming and North- ern Ontario Railway Commission

TENDERS FOR Blacksmith Shop

Sealed tenders, addressed to the undersigned and
endorsed "Tender for Blacksmith Shop," will be re-
ceived up to 5 p. m. on the 28th DAY OF JULY,
1907, for the erection of a Blacksmith Shop at North
Bay, Ontario.

Plans and specifications may be seen at the off-
ice of the Commission, 25 Toronto Street, Toronto, and
at the office of the Chief Engineer, North Bay.
A certified cheque for \$500.00 must accompany
each tender.

The successful tenderer must enter promptly into
a contract and furnish security for the amount of
\$1,500.00 for the due completion of same.
Cheques of unsuccessful tenderers will be returned
to them.

The lowest or any tender not necessarily accepted.

A. J. MCGEE,
Secretary-Treasurer.

Toronto, June 28th, 1907.

Papers inserting this advertisement without
authority will not be paid for same.

CITY OF WINNIPEG

Point du Bois Hydro- Electric Development

TENDERS FOR

CONSTRUCTION AND EQUIPMENT

Sealed tenders, on prescribed forms, addressed to
the Chairman of the Board of Control, Winnipeg,
Canada, and marked on the envelope "Point du
Bois Hydro-Electric Development, tender for.....
..... (here add the particu-
lar item or items as below), will be received at the
office of the undersigned up to noon of

Tuesday, 3rd Day of September, 1907,

for the construction of the General Works, and for
the supply and erection of the various portions of the
equipment for the Hydro-Electric Works and Station
at Point du Bois, for a Transmission Line between
Point du Bois and Winnipeg, and for a Receiving
Transformer Station in Winnipeg.

Copies of the instructions to bidders, plans, specifi-
cations and forms of tender, may be obtained at the
Power Engineer's office, Carnegie Library Building,
Winnipeg, or may be seen at the offices of Messrs.
Smith, Kerry & Chace, 124-6 Confederation Life
Building, Toronto.

Each tender must be accompanied by a certified
cheque payable to the order of the City Treasurer
for the sum called for in the corresponding "In-
structions to Bidders," which cheque will become
forfeit to the Corporation in the event of the success-
ful tenderer refusing or neglecting to sign a
satisfactory contract when called upon to do so.
Individual tenders will be received for:

- (1) Telephone System.
- (4) General Works at Point du Bois.
- (5) 4,000 H. P. Turbines (five).
- (6) 450 H. P. Turbines (two).
- (7) 3,000 K. W. Generators (five).
- (8) 250 K. W. Generators (two).
- (9) Induction Motors (one).
- (10) Step-up Transformers (five).
- (11) Generating Station, Switching and Accessory Apparatus.
- (12) Generating Station, Light, Heat and Power Systems.
- (13) Generating Station, Oil and Air Systems.
- (14) Erection of Transmission System (75 miles).
- (15) Steel Towers.
- (16) High Tension Insulators.
- (17) Electric Transmission Cable.
- (18) Terminal Station.
- (19) Step-Down Transformers (five).
- (20) Terminal Station, Switching and Accessory Apparatus.
- (21) Terminal Station, Light, Heat and Power Systems.
- (22) Terminal Station, Oil and Air Systems.
- (24) Testing Transformers and Apparatus.
- (25) Electric Travelling Cranes (three).
- (26) Turbine Governors (seven).
- (27) Auxiliary Apparatus.
- (28) Repair Shops.

An alternative lump-sum tender will be received
for the entire work, including all of the above men-
tioned items together with additional work and
equipment necessary to install a complete working
plant. As a further alternative, tenderers may in-
clude or group together one or more of the above
items providing that they have also tendered for the
individual items of such group.

The Board reserves the right to reject any or all
tenders, or to accept any tender which shall appear
advantageous to the City of Winnipeg.

M. PETERSON,
Secretary.

The Office of the Board of Control,
Winnipeg, June 8, 1907.

*The numbers are these of the different volumes
of specifications.

POSITION WANTED

First class salesman open for engagement 1st
August; good connection with architects and builders
all over Ontario; familiar with building lines. Box
111, CONTRACT RECORD, Toronto.

FOR SALE

Electric Construction Hoist, 10 H. P. For particu-
lars apply Box 112, CONTRACT RECORD, Toronto.

TENDERS FOR BRIDGES

Sealed tenders, with plans, strain sheets and
specifications, are requested by the undersigned up to
noon of FRIDAY, THE 26th JULY, 1907, for two
steel highway bridges for the County of Hastings.

Each bridge will be of two spans, and each span
say 90 feet and bridge 94 feet long, 16 feet wide in
the clear, with reinforced concrete floor on steel
joists. Bridges to be completed by 15th October,
1907, on concrete piers which will be ready for super-
structure by 1st September next.

Each bridge must be strong enough to carry a
moving load of 125 lbs. to a square foot of floor.
One bridge is to be at Poucher's Mill, in Thurlow,
about eleven miles from Belleville; the other bridge
at Sherry's old bridge, in Hungerford, about ten
miles from Tweed.

Payment when bridge is completed and accepted.

The lowest or any tender not necessarily accepted.

WM. R. AYLSWORTH,
County Clerk,

June 26th, 1907. Belleville, Ont.



DEPARTMENT OF RAILWAYS AND CANALS.

QUEBEC CANALS

NOTICE TO DEALERS IN CEMENT

Sealed tenders, endorsed "Tender for Cement,"
will be received by the undersigned, at 16 o'clock on
Monday, the 15th July, 1907, for the supply of
10,000 barrels of Portland Cement for the use of the
Quebec Canals.

Specifications and forms of tender can be procured
at the office of the Superintendent Engineer of the
Quebec Canals, No. 2 Place d'Armes Square,
Montreal, and at the office of the Chief Engineer of
the Department of Railways and Canals, Ottawa,
on and after the 3rd instant.

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

By order,
L. K. JONES,
Secretary.

Department of Railways and Canals,
Ottawa, 3rd July, 1907.

Newspapers inserting this advertisement without
authority from the Department will not be paid for it.

[FOR ADDITIONAL ADVERTISEMENTS FOR TENDERS SEE NEXT PAGE]

man Bros., general contractors; Roman Stone Company, Limited, Toronto, contractors for cut stone.

NIAGARA FALLS SOUTH, ONT.—Erection of building on Main street for A. E. Woolnough; Masonry, S. E. Miller; carpenter work, Skinner and Ferris. Estimated cost, \$10,000.

THOROLD, ONT.—The Town Council have awarded tenders as follows: foundation, gate house at intake pipe, Fraser and Ward, at \$2,050; waterwheel, Trump Wheel Company; Dayton, Ohio, at \$2,212.

MONTREAL, QUE.—Sarah Maxwell Memorial school and St. Denis Boulevard school: Purves & Henderson, general contractors; stone supplied by Roman Stone Company, Limited, Toronto; A. F. Dunlop, architect.

WOODSTOCK, ONT.—Erection of new Commercial hotel building: Masonry and bricklaying, T. Book; plastering, H. Rowe; carpentry, T. Broom; painting, E. Parmer; steam heating, I. Black; plumbing, Whitney Bros.; galvanized iron work, McKiggan & Davidson; gas fitting and electric wiring: E. Coppins.

CALGARY, ALTA.—Following are the names of the firms who tendered for erection of City Hall: Alberta Building Co., Thomas Underwood, British Columbia Contract Company. There were a couple of other tenders for part of the work. The Finance Committee will take up the work of recommending at an early date.

QUEBEC, QUE.—The City Council have awarded contracts for paving to the

wood pipe, together with hydrants, valves and cast iron fittings for the extension of the waterworks system throughout the Municipality. The amount involved is about \$22,000. The same company have also secured the order for the lock-bar steel pipe for the irrigation system of the Maddock Bros. estate, in the central Okanagan Country, B. C. This pipe is to stand a pressure of a 550 ft. head.

WINNIPEG, MAN.—Erection of the Luxton school building: J. Saul, successful tenderer, at \$67,194. — James Chisholm, architect, this city, has recently awarded following contracts: Four storey brick and stone warehouse 75 by 100 feet to cost \$48,000 for Walter Woods & Company; C. H. Simpson & Company, contractors; brick and stone residence on Academy road to cost \$22,000 for J. W. Guest; Carter-Halls-Aldinger Company, contractors.—The Board of Control have recommended that tenders be accepted as follows: Supply of three 50 light C. C. transformers and panels and 12 lightning arrestors, Canadian General Electric Co., Toronto, \$2,810; Supply of 100 arc lamps and cut outs, Packard Electric Co., St. Catharines, \$2,700.

TORONTO, ONT.—Bank of Montreal: Peden & McLaren, architects; contractors for cut stone, Roman Stone Company, Limited.—Sovereign Bank, King and George streets: G. W. Gouinlock, architect; general contractors, Dancy Bros.; stone supplied by Roman Stone Company.—The Board of Control have awarded the following contracts for new police station on Pape avenue: Mason work, John McLeod, \$14,510; carpenter work,

FIRES.

Buildings of the Manitoba Peat Co., near Fort Frances, Ont., totally destroyed. Loss \$20,000.—Residence in course of erection at Chateaugay Basin, Que., for G. Coomb, New York. Loss \$20,000.—Dominion Steel Company's pier at Bell Island, Nfld. Totally destroyed.—Roller rink building at Quebec, property of the Canadian Roller Rink Co. Totally destroyed.—The St. Louis Hotel, which adjoins the roller rink building, was also damaged.—Dye house of the St. Croix Cotton Mill, Milltown, N.B. Loss \$7,000.

BLAST FURNACE SLAG IN REINFORCED CONCRETE.

Does blast furnace slag used in concrete have an injurious effect on the steel rods used as reinforcement? In answering this question, Sanford E. Thompson says: "The only ingredients in slag which might affect the reinforcing steel in concrete are the compounds of sulphur which may occur in it. The amount of sulphur in slag is variable, but analyses show that ordinarily it contains but a very small percentage, less, in fact, than cinders. Experiments by Professor Norton prove conclusively that sulphur in cinders cannot affect the steel if the concrete is of ordinary richness and

IMPORTS OF CEMENT INTO CANADA.

Where From	January		February		March		April	
	Quantity in cwt.	Value in Dollars.	Quantity in cwt.	Value in Dollars.	Quantity in cwt.	Value in Dollars.	Quantity in cwt.	Value in Dollars.
Great Britain.....	27,425	\$9,630	4,305	\$1,472	4,300	\$1,636	47,359	\$17,327
United States.....	9,227	4,482	21,334	7,558	89,885	35,574	59,141	22,204
Belgium.....	.....	.....	.....	.....	7,822	2,521	850	259
Other countries.....	418	145	.....	.....	1,134	417	396	137
Total.....	37,070	\$14,257	25,639	\$9,030	103,141	\$40,148	107,746	\$39,927

Sicily Asphalt Co., Montreal, as follows: Cote d'Abraham, \$4.27 per sq. yd.; Desfosses street, \$2.61 per sq. yd.; Dalhousie street, \$5.17 per sq. yd. Other bidder, J. Bilodeau, as follows: Cote d'Abraham, \$4.95; Desfosses street, \$2.91; Dalhousie street, \$5.37.

FORT WILLIAM, ONT.—Contracts for grading have been awarded as follows: Minnesota street, E. C. Hacquoil, at \$2.05 per rod; Arthur street, J. Fraser, at \$3.75 per rod. Following is complete list of bidders: Minnesota street, J. Otway, \$2.50; F. Stewardson, \$3.65; E. C. Hacquoil, \$2.05; J. Fraser, \$3.25; J. Smith, \$3.50; D. McDougall, \$3.00. Arthur street, J. Otway, \$5.00; F. Stewardson, \$5.50; J. Fraser, \$3.75; J. Smith, \$5.25.

OTTAWA, ONT.—Contract for asphalt pavement on Sussex street has been awarded to J. Foley Construction Co., this city, at \$91,788.66.—The Dominion Government have awarded contracts for some 22 locomotives and a large number of freight cars of various kinds for the Intercolonial Railway. The former were ordered from the Kingston and Montreal locomotive works and the latter will be built principally by the Crossen Car Co., Cobourg, and the Rhodes, Curry & Co., Amherst.—Erection of apartment house on Elgin street for Real Estate & Security Co., Toronto: G. A. Crain, contractor; W. H. George, architect. Estimated cost, \$75,000.

NEW WESTMINSTER, B. C.—The Dominion Wood Pipe Co., this city, have secured the contract for supplying the City of Armstrong and the Municipality of Spallumcheen, B. C., with 15,000 ft. of 4-in. and 15,000 ft. of 10-in-

W. Davidson & Co., \$5,100; galvanized iron and roofing, Wheeler & Bain, \$555; gas fitting and plumbing, F. Armstrong Co., \$1,032; heating, J. E. Gray, \$1,225; electric wiring, Worrell & Keats, \$230; plastering, Hanna & Nelson, \$794; tiling, Brooks-Sanford Co., \$268.80; painting and glazing, J. R. Robinson, \$435; total \$24,139.80.

BRANTFORD, ONT.—The City Council have adopted the report of the Board of Works which recommended acceptance of following contracts in connection with sewerage extensions: Rawdon street extension; City Engineer, \$8,750; Main sewer extension; City Engineer, \$2,442; Eagle Place extension; T. A. Cowan and Co., \$9,670; Pumping station, P. H. Secord and Sons, Ltd., \$10,567. Following is a complete list of bids received: Rawdon street extension; City Engineer, \$8,750; T. A. Cowan & Co., \$10,937; J. H. McKnight Construction Co., Toronto, \$11,529; Main sewer extension, City Engineer, \$2,442; T. A. Cowan & Co., \$3,368; J. H. McKnight Co., \$3,493; Eagle Place and West Brantford extension; City Engineer \$9,437; T. A. Cowan & Co., \$9,670; Factory and Holmedale section 2 City Engineer, \$4,797; Factory and Holmedale section 2, City Engineer, \$8,944; Pumping station, City Engineer, \$8,840; Pumping station, Schultz Bros., Ltd., \$13,307; P. H. Secord & Sons, Ltd., \$10,567.

B. Mundell, builder, etc., Erin, Ont., has advertised his business for sale.

laid wet, so that the mortar will coat the steel and produce a dense concrete. We may therefore draw the conclusion that sulphur in ordinary slag will not affect the steel."—Concrete Review.

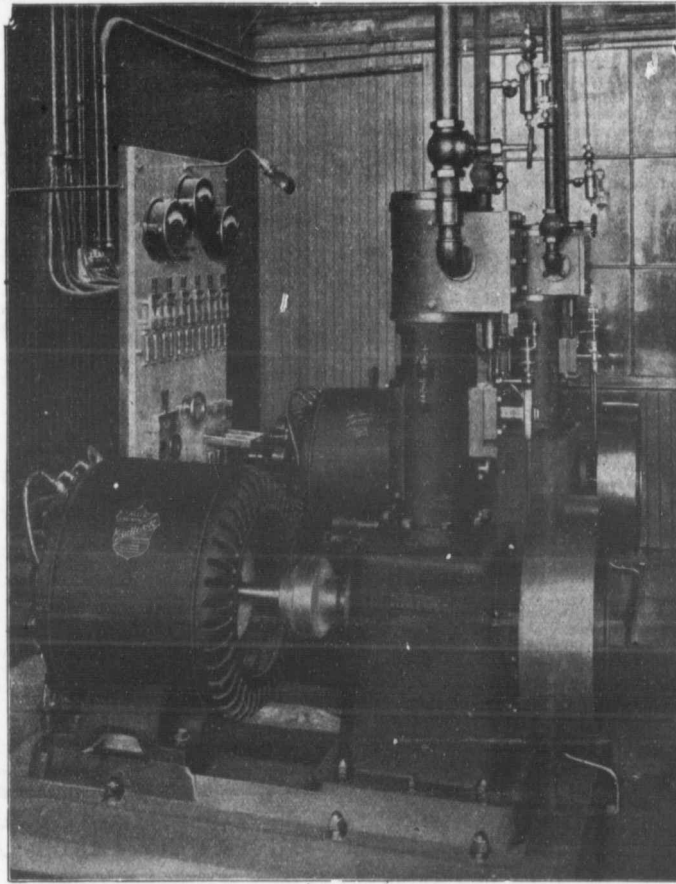
TO OUR READERS.

We wish to make the **CONTRACT RECORD** of the greatest possible value to subscribers, and to that end we ask their co-operation. Each subscriber is requested to consider himself a correspondent of the paper and to send us intelligence regarding proposed works of construction and contracts awarded in his vicinity.

We cannot hope to learn, through our regular channels of information, of all work contemplated throughout this vast Dominion, but by the co-operation of our readers we may more nearly approach the maximum efficiency in the service given.

Correspondence sent to our head office at Toronto or to our branches at Montreal, Winnipeg or Vancouver, will receive due attention and be much appreciated.

Electric Light Plants



Two of our 12. K.W. Generators and Auxiliary Apparatus, forming the lighting plant of Dow's Brewery, Montreal. The base of each set is only 57 1/2 in. x 32 in.

"Allis" Mining, Saw Mill and Flour Mill Machinery, Engines, Pumps, Steam Turbines, Turbine Water Wheels.

"Bullock" Electric Apparatus.

"Ingersoll" Air Compressors, Coal Cutters and Rock Drills.

"Lidgerwood" Hoisting Engines

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District Offices :

MONTREAL: Sovereign Bank Bldg.
 NEW GLASGOW: N.S. Telephone Bldg.
 WINNIPEG: 251 Notre Dame Ave.

TORONTO: Traders Bank Bldg.
 NELSON: Josephine St.
 VANCOUVER: 416 Seymour St.

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ber of dwellings.—The Civic Property Committee have decided to invite competitive designs for the extensive alterations necessary to convert a building recently purchased by the Municipality into a public library building.

VANCOUVER, B.C.—Among the recent building permits issued are the following: Vancouver School Board, brick school building, corner Boundary avenue and Keefer street, cost \$67,000; Vancouver School Board, brick school building, Bidwell, Comox, Carders and Pendrill streets, cost \$67,000; Brown & Harvey, brick storehouse, Cordova street, cost \$5,000; J. J. Dissett, dwelling, cost \$8,000; Boyd & Clendenning, alterations to Blackburn Hotel, cost \$16,000.—A 16-mile logging railway will be constructed this summer on Theodosia Arm by Thos. Merrill, of Daluth.

OTTAWA, ONT.—F. Gelinas, Secretary Department Public Works, this city, will receive tenders up to August 5th for construction of protection works and excavation of channel at Bay St. Lawrence, Victoria County, N.S., according to a plan and specification to be seen at the offices of C. E. W. Dadwell, Halifax, N.S.; E. G. Millidge, Antigonish, N.S.; Postmaster, Bay St. Lawrence, N.S., and at the Department of Public Works, this city.—Recent building permits issued include the following: Mrs. C. Monk, double brick veneered dwelling, Gloucester street, cost \$4,500; Argue, McCall & Son, coal shed, stables and weigh scales, First avenue, cost \$6,000; St. Germain & Fraas, double brick veneered dwelling, James street, cost \$4,000; F. C. T. O'Hara, solid brick dwelling, Wurtemberg street, cost \$8,500.

WINNIPEG, MAN.—The C.P.R. have taken tenders for erection of station and freight shed at Saskatoon and engine house at Sutherland Station.—Tenders have been taken for several trades required in erection of church building corner McDermot avenue and Monkman street for the First German Baptist congregation. G. G. Teeter is the architect.

—The Board of Control took tenders up to last Saturday for installation of plumbing in several residences.—Hooper & Walker, architect, accepted tenders up to last Friday for erection of church building.—H. Matthews, architect, wants bids up to July 19th for erection of residence for D. N. Stevens.—The Chairman Board of Control wants tenders as follows: Up to to-day for construction of pump house at well No. 5. Plans at City Engineer's office; up to July 24th for supply of from 1,000 to 3,000 cords of cedar for block paving. Specifications at City Engineer's office.

TORONTO, ONT.—The City Architect has issued the following building permits during the past week: Mr. Collins, alterations to hotel, Queen and Esther streets, \$5,000; J. V. Hunter, pair 2 storey semi detached roughcast dwellings, 6-8 Muir avenue, \$3,000; A. B. Coleman, 3 storey brick apartment house, 1485 Queen street west, \$10,000; M. E. Sheir, 3 storey brick store and dwelling, Queen street, cost \$4,000; Miss S. M. Mercer, 2 storey brick dwelling, Rusholme road, cost \$3,800; E. M. Hoare, 2 detached 2½ storey brick dwellings, Admiral road, \$10,000; A. E. Burgess, 2 storey and attic brick dwelling, Dundonald street; J. Inglis Company, 1 storey brick and steel machine shop, 14 Strachan avenue, \$40,000; H. Clemes, 2 storey brick dwelling, 63 South Drive, \$10,000; R. A. Graydon, 2½ storey brick dwelling, St. George street, \$5,000; G. J. Castle, 3 attached 2 storey brick veneered dwellings, Melville avenue, \$3,000; A. C. Thompson, 2 storey brick store and dwelling, 800 Dundas street, \$3,000; T. M. Horten Company, electric scenic railway, Exhibition Grounds, \$12,000; G. Roper, pair 2 storey semi detached brick veneered dwellings, Grand View avenue, \$3,800; L. Shers, 2 storey brick dwelling, 273 Leslie street, \$3,000; D. Lavine, 2 storey and attic brick dwelling, Beverley and Baldwin streets, \$6,500; Rev. W. A. McCann, 2 storey brick Presbytery,

Greene and Arthur streets, \$8,000; pair 2½ storey semi detached brick dwellings, College street, \$8,000; G. A. Harper, 2 storey and attic brick dwelling, St. Clair avenue and Dunnegan road, \$4,000; W. Colwell, 2½ storey brick dwelling, 242 Delaware avenue, \$3,500; J. Wood, pair 2 storey semi detached brick veneered dwellings, Crawford street, \$3,000; Shirley & Derrett, 1 storey brick structure, Bartlett avenue, \$3,500; J. A. Harvey, (in trust) 2 storey and attic brick dwelling, Rusholme road, \$4,500; W. Roberts, 2 storey brick dwelling, Ossington avenue, \$3,000; R. Dale, 3 attached 2 storey and attic brick dwellings, Grace street, \$6,500; J. Hogan, pair 2 storey semi detached brick dwellings, St. Helens avenue, \$4,000; J. Crany, pair 2 storey and attic semi detached brick dwellings, \$5,000; M. Morex, 2½ storey brick dwelling, Jamieson avenue and Leopold street, \$4,500; W. H. Carter, pair 2½ storey semi detached brick veneered dwellings, Dufferin street, \$3,500; H. H. Sydam, 2 storey and attic brick dwelling, Admiral road, \$6,500; G. Reedy, 2 storey and attic brick dwelling, 154 Madison avenue, \$6,000; Canadian Pacific Railway, 1 storey brick and iron addition to freight shed, Lake street, \$6,500.

CONTRACTS AWARDED.

WELLAND, ONT.—Erection of residence for Geo. Pettit; Ellsworth & Vanderburg, contractors.

CAMPBELLTON, N.B.—Erection of new Orange Hall; D. S. Stewart, successful tenderer. Cost about \$7,000.

VANCOUVER, B.C.—The Canadian Pacific Railway Co. have awarded contract for construction of a large pier to Capt. Bisset and Evans Coleman.

BRANDON, MAN.—Erection of four storey warehouse for Wm. Gray & Sons, Chatham, Ont., and Manson Campbell Fanning Mill Co.; Giddings & Wyman, contractors.

ST. CATHARINES, ONT.—Sovereign Bank; Bond & Smith, architects; New-



You Cannot Afford to Take Chances

Poor Sewer Pipe is a menace to health and very expensive to replace. Purchase the best and get it when you want it. Ask for full information at the nearest of our three factories.

THE CANADIAN SEWER PIPE CO. HAMILTON, ONT. TORONTO, ONT. ST. JOHN'S QUE.



THE CANADIAN STANDARD

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THE CANADIAN PORTLAND CEMENT CO., LIMITED

502 TEMPLE BUILDING, TORONTO

203 BOARD OF TRADE BUILDING MONTREAL

PLUMBERS' AND STEAMFITTERS' SUPPLIES

Iron Pipe 1-8 in. to 12 in. carried in stock

Malleable Fittings Cast Iron Fittings

Lead Traps and Bends

Valves Tools Lead Pipe Pig Lead

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Somerville Limited

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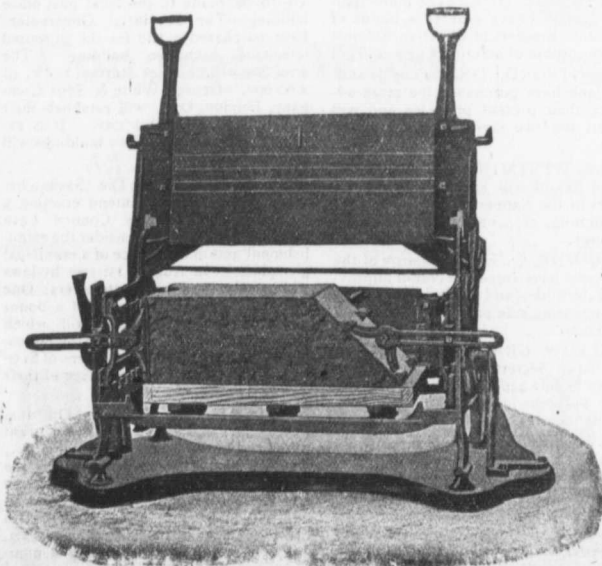
... Speaks For Itself ...

THE MILES CONCRETE BUILDING BLOCK MACHINE

Makes 40 Different Sizes of Stone in Any Design, as well as the Specials, viz.:

Water Table, Gable, Circle, Angle, Chimney, Cornice, Pier Blocks, etc.

Catalogues and Information Cheerfully Furnished.



This Machine makes all blocks face down—"the only practical way"—allowing of a richer and finer facing, producing blocks that are perfect in appearance and impervious to moisture.

Let us tell you how the "Miles" will pay for itself over any other machine in three months' operation.

Manufactured and Sold by

VINING BROS.

M'fg. Co.

Niagara Falls, - Can.

Sales Agent for Quebec:

T. A. CHADBURN, 242 St. James Street, MONTREAL.

July 17, 1907
\$8,000; pair
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TO CONTRACTORS

Tenders will be received by the undersigned up to FRIDAY, NOON, JULY 19TH, for the purchase and removal of buildings Nos. 6 and 8 Adelaide Street East. Further particulars can be had at the office of the Architect.

The lowest or any tender not necessarily accepted.
GEORGE W. GOULINLOCK, Architect,
 1108 Temple Building, Toronto.

Tenders For
Railroad Grading

The undersigned is prepared to let, in sections, good earth work, between St. Mary's and Embro, Ontario.

JOHN E. WEBB, Contractor,
 Union Bank Building,
 Toronto, Ont.

To Pump Contractors

Sealed tenders will be received by the City Clerk, Calgary, Alta., until 12 o'clock at noon on MONDAY, THE 27TH DAY OF JULY INST., for supplying and erecting on foundation to be built by the City, one Turbine Pump, direct connected to a 150 H. P. motor, mounted on same base and supplied with necessary starting box. The pump to have a capacity of 2½ million gallons in 24 hours when pumping against a head of 251 feet.

For further particulars apply to the City Engineer's office, Calgary.

Contractors to state the date they will undertake to have above machinery erected and ready for use. The lowest or any tender not necessarily accepted.

R. E. SPEAKMAN,
 City Engineer.

TENDERS

Tenders, addressed to the undersigned, will be received until noon, FRIDAY, THE 19TH INST., for the building of Reinforced Concrete Abutments and concrete floor for a bridge to be erected over Bear Creek on the town line between the Town of Petrolia and the Township of Enniskillen, for the County of Lambton. Plans and specifications can be seen at the home of the undersigned, or at the office of Bell & McCubbin, Civil Engineers, St. Thomas, Ont. A deposit of \$200.00 must accompany each tender as a guarantee of good faith. The committee reserves the right to reject any or all tenders.

THOMAS ACTON,
 Reeve of Enniskillen,
 Petrolia, Ont.

The Board of Education
TORONTO

Tenders Wanted

Sealed tenders addressed to the Secretary-Treasurer of the Board will be received until

Tuesday Noon, July 23rd, 1907,

For the several works required for the enlargement of

GRACE STREET SCHOOL

PAPE AVENUE SCHOOL

PERTH AVENUE SCHOOL

And alterations to

JARVIS STREET COLLEGIATE INSTITUTE

Also for

BALANCE OF MIDSUMMER REPAIRS

Specifications may be seen and all information obtained at the offices of the Board, City Hall. Each tender must be accompanied by the deposit mentioned in the said specifications and forms of tender. The lowest or any tender will not necessarily be accepted.

W. C. WILKINSON,
 Secretary-Treasurer

HERBERT A. E. KENT,
 Chairman of the Board

TOWN OF GALT
CEMENT WALKS

Notice to Contractors

Sealed tenders, marked "Tender for Cement Walks," will be received by the undersigned up to noon, FRIDAY, AUGUST 2ND NEXT, for the construction of about 40,000 square feet of cement concrete sidewalk in the Town of Galt for the current year.

Specifications and form of tender may be had on application at the office of the Town Clerk. The lowest or any tender need not necessarily be accepted.

JOSEPH MCCARTNEY,
 Town Clerk.

CONTRACTS OPEN.

KINCARDINE, ONT.—T. Morgan wants bids up to July 20th for improvements to his building.

CALGARY, ALTA.—The Georjesson Company, Limited, intend to add two storeys to their warehouse.

EMERSON, MAN.—The Town Council have just taken tenders for erection of a cement block fire hall.

LONDON, ONT.—It is understood that the Hon. Adam Beck intends erecting a large factory on Trafalgar street.

VICTORIA, B.C.—The ratepayers have voted in favor of borrowing \$50,000 with which to extend the sewerage system.

MEDICINE HAT, ALTA.—Prof. R. McNaughton, of McGill University, has purchased property on which to erect four dwellings.

NEEPAWA, MAN.—The ratepayers have defeated a by-law to spend \$25,000 for providing a water supply for fire-fighting purposes.

DIDSBURY, ALTA.—The Town Council have decided to expend \$15,000 for five hall, fire fighting appliances, local improvements, etc.

ST. CATHARINES, ONT.—The plans of A. C. Nicholson, architect, this city, for the proposed Isolation Hospital building have been accepted.

FERGUS, ONT.—J. Beattie wants bids up to July 22nd for alterations and additions to the House of Industry and Refuge. Plans at Mr. Beattie's office.

BRADFORD, ONT.—On July 22nd the ratepayers will vote on a by-law to issue debentures for \$7,000 with which to construct and repave concrete sidewalks.

LONGUEIL, QUE.—The municipality of Longueil have granted a bonus of \$3,000 to Brothers of Christian Schools for the purpose of erecting a new college.

BRANTFORD, ONT.—The Standard Bank have purchased the store adjoining their present premises and will convert the two stores into a banking office.

NEW WESTMINSTER, B.C.—The School Board will call for tenders for repairs to the Sapperton school and for kalsomining, etc., on two other school buildings.

LACHINE, QUE.—A majority of the ratepayers have voted in favor of improving waterworks and sewerage services and increasing side path areas at a cost of \$50,000.

YELLOW GRASS, SASK.—J. A. Hill, Town Secretary-Treasurer, invites bids up to July 22nd for purchase of \$20,000 7 per cent. and \$5,000 7 per cent. town debentures.

NEW LISKEARD, ONT.—Mr. T. McCamus has had plans prepared for a residence to be built of brick and stone and finished throughout in hardwood. The estimated cost is \$10,000.

CAMPBELLTON, N.B.—The Water and Sewer Committee have presented a

report to Council recommending purchase of the Smith Lake property with a view to increasing the water supply.

WELLAND, ONT.—Beamiss Bros' Bag Co., Boston, Mass., will establish a large plant in this city. They have been granted a free sight of 25 acres and estimate the initial cost of their plant at \$400,000.

PARIS, ONT.—J. McCosh, Town Clerk, wants bids up to July 22nd for construction of cement sidewalks.—J. Wheeler wants bids up to July 19th for erection of brick dwelling house. Plans at electric light station.

WOODSTOCK, N.B.—R. G. Fulton wants bids up to July 20th for erection of superstructure of Methodist church. Plans at Methodist parsonage.—The Town Council will issue debentures for \$6,000 for permanent improvements to the waterworks system.

ST. THOMAS, ONT.—J. L. Thomas, C.E., architect, this city, wants bids up to July 20th for erection of St. John's Episcopalian church.—G. K. Croker and M. H. Penhale have purchased the old drill shed which they will have razed and three or four dwellings erected on the site.

MOOSE JAW, ALTA.—A by-law to raise \$125,000 by 50 year 5 per cent. debentures has been carried by the ratepayers.—By-laws have been introduced in the City Council to issue debentures for \$17,000 for the construction of certain granolithic walks and \$2,700 for construction of wooden side walks.

MONTREAL, QUE.—L. O. David, City Clerk, will receive tenders up to July 18th for alterations to No. 17 fire station. Specifications at office of Chief of Fire Department, City Hall.—A scheme is on foot to purchase the block between Phillips square and Dorchester street and Beaver Hall Hill and Union avenue for an arcade for retail stores and offices.

SARNIA, ONT.—A proposition to establish a pulp mill in this town is being considered by Michigan pulp manufacturers.—The ratepayers have ratified by-laws granting concessions to the Standard Chain Co., Pittsburg, and Jenks & Dresser, bridge and structural steel manufacturers. Plans for the plant of the former concern have been completed and work is expected to commence shortly.

BRANDON, MAN.—Improvements are to be made to the local post office building.—The Provincial Government have purchased a site for the proposed telephone exchange building. The structure will be three storeys, brick, 46 x 60 feet.—George White & Sons Company, London, Ont., will establish their western branch in this city. It is expected that work on their buildings will commence shortly.

REGINA, SASK.—The Saskatchewan Upholstering Co. intend erecting a warehouse.—The City Council have passed a resolution to consider the establishment and maintenance of a municipal gas plant.—On August 1st two by-laws will be submitted to the ratepayers. One will provide for the granting of a bonus of \$20,000 to the Grey Nuns with which to erect an hospital, the other the bonusing of the Y.M.C.A. to the extent of \$15,000 to be devoted to the erection of their new building.

PETERBORO, ONT.—The taxpayers have endorsed a by-law to grant a free site to the Colonial Weaving Co., who are having plans prepared for the large buildings they will erect.—J. Gray has secured property and will build an addition to his lath mill. He will also erect a number of small dwellings.—Mr. J. T. O'Connell intends erecting a num-

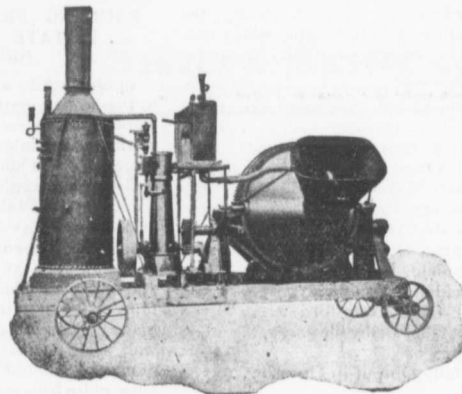
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THE CEMENT INDUSTRY IN CANADA.

An interesting contrast the cement industry of Canada presents to-day with its early difficulties of promotion, its struggles to get on its feet, and costly experiments.

At the present time the mills of Ontario are turning out in round figures ten thousand barrels of Portland cement per day. The aggregate output on this basis, allowing 300 working days to the year, is 3,000,000 barrels. The industry in this province at the mills and marl beds gives employment to 1,000 men, supporting, therefore, on the usual basis of computation, 5,000 people. It is probably one of the greatest consumers of coal among the manufacturing industries of the province. The combined mills are importing annually from 200,000 to 250,000 tons of slack and three-quarter lump bituminous coal from Pennsylvania. They pay for this from \$2.80 to \$4.25 per ton, or, at an average of \$3.50 per ton, over \$700,000. The handling of this coal at the docks and sidings creates labor also for, probably 200 more men during eight months of the year.

The cement mills are well distributed over the province. The following is the list, giving the location and approximate daily output in barrels of plants in operation:

Owen Sound, Shallow Lake	1,200
National, Durham	1,200
Grey & Bruce, Owen Sound	500
Sun, Owen Sound	500
Imperial, Owen Sound	600
Hanover, Hanover	500
Atwood, Atwood	100
Ottawa, Ottawa	1,800
Lakefield, Lakefield	1,000
Canadian, Deseronto	1,500
Blue Lake, Brantford	700
Belleville, Belleville	900

Daily Output in Ontario. . . 10,500

There are other mills in Ontario nearing completion, and which should soon be in operation. These include the Colonial at Warton and Superior at Orangeville.

Elsewhere in Canada the cement business has been gaining a foothold. Among other mills might be mentioned the Exshaw plant, west of Calgary, which will soon be in operation; the Calgary mill, which is again in operation, having been rebuilt after the fire some months ago, and the Todd Inlet mill near Vancouver.

The west takes about 25 per cent. of the output of the Ontario mills, which is as much as they can afford to take away from the home market. The business on the whole is now giving satisfactory financial returns, and dividends last year were the rule. The Canadian demand is ahead of the supply and the plants are nearly all in operation

day and night. Prices range, according to quantity, at from \$1.60 to \$1.70 per barrel at the mill, giving a satisfactory margin of profit. The value of the output at the average price is, in round figures, \$5,000,000. Canadian marl and limestone is clearly a source of national wealth.

The manufacture of cement has created a new source of business for Canadian machine shops and foundries. American mills were so busy looking after the local field that orders have been undertaken by shops in this country for engines, dredges, pulleys and even the ponderous rotary kilns. The building of the mills has created work for the structural steel mills, for in nearly all steel roof girders and supports are used.

The amount of capital invested in the cement plants of Canada would approximate \$7,000,000, of which over \$5,000,000 has gone into the mills in Ontario.

A demand for cement has been created in many new directions. It is being used to-day for reinforced concrete buildings, cement walks, cement bridges, railroad culverts, cement arches, in foundations and floors for barns and cellars.

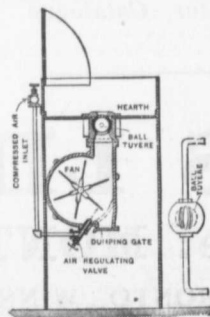
PAINTING BRICKWORK TO IMITATE PRESSED BRICK

In replying to a correspondent as to the proper method of repainting an old brick house where the brickwork was in bad shape, there being some hard and some soft brick, the desire being expressed to have an imitation of Philadelphia pressed brick, a recent issue of The Painters Magazine presents the following suggestions: At the outset the statement is made that three to four coats of paint are required to make a good job of a painted brick wall such as that described. The first coat should be made up of pure white lead and dark Venetian red in oil, equal parts by weight, thinned with raw linseed oil, a small quantity of brown japan and a little turpentine.

When this coat has thoroughly dried, a second coat of the same material, thinned with two parts raw linseed oil and one part turps

and drier, is given, and when this has dried all open joints and other imperfections are puttied up with glaziers' linseed oil and whiting putty, stained with Venetian red to match the color of this second coat of paint. If only three coats are to be given, the putting is done on the first coat. The third coat should be made up of dark Venetian red and yellow ochre in oil and thinned with equal parts of kettle boiled linseed oil and turpentine, with the necessary drier. This coat should always follow the putting, whether a three-coat or four-coat job is under way. The finishing coat must be flat, or, at any rate, not more than a faint egg shell gloss. To make 1 gallon of this paint, mix 5 pounds French yellow ochre, ground in japan; 4 pounds Venetian red, also ground in japan; 3 pounds finest Cliffstone whiting, dry; ½ pint boiled linseed oil; beat up well and thin with ½ gallon of pure turpentine; pass through a fine paint sieve or cheese cloth and apply one coat only, taking small stretches and cutting in, so that there will be no laps or holidays. Test this paint on a painted board to see whether it is not to flat. If it is to flat or lacks binder, add sufficient boiled oil. For penciling in the joints use pure white lead in oil, thinned with turps and a little pale drier for white, and lampblack ground in japan, thinned with turpentine and a very little boiled oil, for black.—Improvement Bulletin.

The Canadian Pacific Railway Co. took tenders up to Monday last for about 14,000 cubic feet of wooden piles, which will be required in the building of the substructure for a new bridge over the Belly river at Lethbridge, Alta. The bridge will consist of 67 spans totaling 5,327 feet in length from face to face of masonry ballast walls. The superstructure of the bridge will be of steel trestle with a height for about two-thirds of its length of approximately 290 feet to 325 feet from base of rail to ground line. The steel work will weigh about 10,000 tons and will be manufactured and erected by the Canadian Bridge Company of Walkerville, Ont.



Compressed Air Forges

EVERYWHERE COMPRESSED Air is available the saving of time and labor is apparent. Can be used with high or low pressure.

Send For Special Leaflet.

Canadian Buffalo Forge Co.
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Office and Works, MONTREAL

NEW COMPANIES.

Chrome Calf Company, Limited, Montreal, Que., incorporated to manufacture leather and leather goods, capital \$40,000. Incorporators, R. A. E. Greenshields, E. Longiedoc, A. C. Calder, C. T. Jette and J. Jenkins, all of Montreal.

Acton Shoe Company, Limited, Acton, Que., incorporated, capital \$20,000. Incorporators, D. A. Lambert, H. Labrecque, both of Montreal, D. Lemay, C. Lemay and J. A. Lemay, all of Acton.

C. A. Maher Company, Limited, Saint-Hugues, Que., incorporated to operate a brick yard, capital \$5,000. Incorporators, J. E. Pfanuef, I. Pfanuef, F. Pfanuef, A. Lefebvre and C. A. Maher, all of Saint-Hugues.

British-Canadian Smelters, Limited, Toronto, incorporated, capital \$400,000. Directors, J. E. Wilkinson, J. E. Black, J. A. Irvine and others.

Canadian Lithographic Stone Company, Limited, Montreal, Que., incorporated, capital \$500,000. Incorporators, R. B. Hutcheson, F. W. Hibbard, W. J. Ross, all of Westmount, Que., and others.

United States & British Columbia Timber Company, Limited, Calgary, Alta., incorporated, capital

\$2,500,000. Incorporators, W. P. Taylor, R. B. Bennett, W. H. McLaws, all of Calgary, and others.

North Bay Opera House Company, Limited, North Bay, Ont., incorporated to erect an opera house and other buildings, capital \$50,000. Directors, P. McCool, T. Reynolds, B. M. Mulligan and others.

A license has been granted the American Street Lamp and Supply Company to transact business in the province of Ontario. Capital used not to exceed \$40,000. S. C. Smoke, Toronto, has been appointed attorney.

Ontario Timber and Land Company, Limited, Sarnia, Ont., incorporated, capital \$100,000. Incorporators, J. H. Fairbank, Petrolia; W. D. Lummis, Toronto; J. H. Kittermaster, C. O. Stillman, and F. F. Pardee, all of Sarnia.

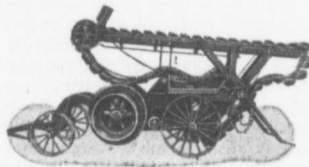
Strong Lumber Company, Limited, Toronto, incorporated, capital \$200,000. Incorporators, T. F. Strong, Ogdensburgh, N. Y.; G. Gordon, Sturgeon Falls, Ont.; H. J. Bartlett, Orillia, Ont.; W. Foster and H. Vigeon, both of Toronto.

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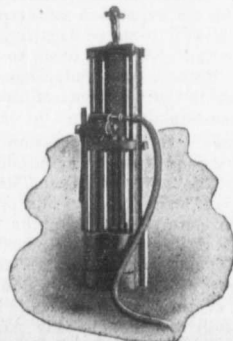
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Georgian Bay Engineering Works MIDLAND, ONT.

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Reducing Dust and Hardening Roads by Surface Applications.

It is the road dust problem which is now receiving the attention of the best engineers and road makers in all civilized countries.

Suppression of road dust has become a necessity for health and wealth, because of the damage it does to goods, crops, real estate values and the rapid raveling of the road itself.

This paper is confined to the treatment of earth, sand, gravel and macadam roads by surface applications only.

Sprinkling with water is too expensive for thousands of miles of roads. Water sprinkling is only a temporary help. Where done continuously it costs more than any of the other methods.

Sprinkling with salt water is more effective than fresh water, because the salt accumulates on the road and retains moisture. The accumulated salt, when dry, hurts throats and eyes, damages clothing, furniture and to some extent the feet of horses.

The principle of the method of sprinkling with water and calcium chloride is that this salt is hygroscopic and when mixed into the road surface (by means of having it in solution in the water of the sprinkling cart) it absorbs additional water from the atmosphere. It also has a feeble chemical action which unites some of the silicates of the macadam. To produce the best results on macadam requires about three pounds per gallon of water. It costs, including labor, about 10 cents per square yard for an average season of nine months.

Sprinkling with a Mixture of Water and Saponified Oil.—This is practically a mixture of water, oil and alkali (as ammonia or potash); practically a liquid soap.

There are several patented or proprietary compounds on this principle. These soapy compounds are of but temporary benefit, but have their use on gravel and macadam in a limited number of places. But where climate is as variable and distances are so great and labor is so high, as in America, we must seek substances for laying dust which last longer and need attention only at long intervals.

Impregnating Roads with Special Crude Oils.—The application of certain oils to roads practically began in California in 1894, when crude oil from summerland oil wells was used on the Ortega Road, five miles from Santa Barbara. It was sprinkled to lay the dust of the soft soil of the road. A slight hardening of the road was observed from the repeated applications of the thick maltha or asphaltic oil. A few other roads in California were sprinkled until about 1900, when

the use of its oils on roads rapidly extended from the many oil centres in that State, until today oil is used for suppressing dust and hardening roads, with varying success and failure, in about forty counties of California to an extent of a little more than 2,056 miles.

Probably the best constructed and maintained oiled road of California is the driveway of Golden Gate Park near San Francisco. The oil when cold is between 14 and 16 degrees Beaumé. It was heated to about 300 degrees Fahr., sprinkled while hot on the road, men followed closely and stirred the oil into the road with rakes. The road, of course, was first properly graded and shaped. Its surface was made smooth, then soaked with water to loosen it. It was next well dried to a depth of at least 1 inch and the oil applied as stated during warm, dry weather. Repairs are constantly made by promptly sweeping out any little hole that forms, putting in a little oil, adding gravel and stone dust to absorb the oil and tamping until firm. The oil costs 72 cents per barrel, and 400 barrels per mile of 16-foot road were first applied. Since then 300 barrels per mile have been applied twice each year, or 600 barrels per year. The tendency is to form into ruts and to a slight lowering of the whole road surface. This last is caused by rain water working through the surface and carrying away the road material from under the asphaltic oil crust. Although expensive, it is so important a drive out of San Francisco that it is worth all it costs.

General Rules for Oiling Roads.—I learned from Californian practise that the crown of a road of soft materials (for it is doubtful if any crude oil really helps macadam) to be oiled must be high and its sides well drained, because water with or without freezing floats much of the oil or gets under the oiled crust and softens it. The hotter the oil when applied, the warmer the weather and dryer the road, the better. When heating crude oil allow for an expansion of 15 per cent. Heat it between 225 to 300 degrees Fahr. Use oil of 14 to 16 degrees Beaumé and containing at least 35 to 50 per cent. of thick maltha or liquid asphalt.

In regard to the suppression of dust by means of oil, it is impossible to prescribe any formula. There are a great many kinds of oils produced by nature. The naphtha or light oils of Russia, and the paraffin oils of Pennsylvania, Ohio, and elsewhere will not do and I doubt if any of their products can be successfully and economically used. The Texas, Kentucky and Kansas oils and some others may possibly

be used if specially prepared or applied in special ways. The California maltha or asphaltic oils are successful with the loamy, sandy and alluvial soils in that and like climates, but not yet with macadam. The use of crude oil is a local question for each place and requires careful investigation and the best of advice before undertaking its use; also careful supervision when used and instruction as to prompt repairs.

Impregnating Road Surfaces with Special Coal Tar Products.—The use of coal tar and its products as ingredients of pavements and roads has been undertaken in many ways for about fifty years, but with no success until quite recently.

It is used in the general group of pavements called tar macadams, composed of hot crushed stone and specially prepared tar or bituminous cement, mixed while hot and compressed in place. Of this group that which is known as bitulithic pavement seems the most successful for streets; and in lighter form I believe it is known as bitrock for suburban roads and the interior of villages and small towns.

We must know the difference between a tar macadam and tarring a macadam road. A tar macadam, as stated in general, is a mixture of heated crushed stone and specially prepared adhesive tar cement, mixed by machinery, spread and compressed. The best type of a tar macadam at present is the one devised by the late F. J. Warren. He made it clear that not only his pavement, but all macadam pavements should have voids between the larger crushed stone so filled with smaller and smaller broken stones that they mutually sustain themselves in position as a solid mass and do not depend upon the adhesion of the tar product or any binding substance to hold them in place. The cement acts simply as a final filler of small pores and a waterproofing material within and upon the macadam.

The tarring of a macadam road means sprinkling, painting or covering its surface with a soft tar specially prepared for that purpose, and which will penetrate the macadam and make it waterproof and retard the formation of mud and dust. A prepared tar which is sufficiently fluid to lay dust and penetrate the surface of the macadam can not be a binding material to hold together any portion of that macadam, except the finest particles and dust.

Before tarring, the macadam must be brought to grade and then filled with fine stone screenings, rolled and subjected to traffic about a month, or until consolidated and

firm. The mechanical bond of the macadam should be as perfect as possible and not rely upon the prepared tar to do the binding as already described. Crude tars must not be used, as they contain water, ammonia and sometimes other objectional substances, according to their origin from different coke ovens and from many kinds of coal. If crude tars are purchased, they must be prepared by the buyer.

The work should be done only in warm, hot and dry weather. The macadam should be first swept clean and sometimes washed, but should be allowed to become perfectly dry to a depth of at least 1 inch before applying the tar product. The tar should be spread uniformly under competent supervision. It should be allowed to stand and percolate for at least several hours after being spread and then be covered preferably with sand or with uniform fine-grained stone screenings, containing no earthy matter nor dirt. The tar should be applied as hot as possible at about 200 degrees Fahr. After the sand or screenings have been spread, it is best to wait several hours before rolling with a steam roller. During the rolling additional sand or screenings must be added if any tar squeezes up through them. It is a good plan to keep traffic off of the finished rolled road for a short time after rolling. This is because the work is done in warm weather and it is wise to let the tar continue to penetrate and become cool before opening to traffic.

The mixing of crude tar and hard pitch is not a good method, nor does it make that which is necessary for properly tarring macadam roads. A study of sections of roads which have been tarred convinces me that the tar at the surface of the road is oxidized by the air and other elements and leaves the adhesive ingredients of the tar, such as anthracene, paraffin and naphthalene, in the road surface, and the softer oils below remain to give life to the lower strata. Because this oxidation takes place the road is hardened and made more durable. In time, as stated, the tarring must be repeated to supply new life by adding small amounts at proper long intervals.

Each locality is a separate problem as to what available materials to use for constructing roads and what methods to adopt for reducing dust. Water alone, or mixed with salts or with alkali and oil, has a very limited application. Certain adhesive asphaltic oils for soft road materials and specially prepared coal tar products for hard macadam and similar roads seem to be the present solutions of dust problems for thousands of miles of highways.—J. W. Howard, C.E., before the American Road Makers' Association.

THE LAWS OF PROPORTIONING CONCRETE.

A valuable paper on this subject was presented by Messrs. Wm. B. Fuller and Sanford E. Thompson at the meeting of the American Society of Civil Engineers, held on April 17. The investigations recorded in the paper were undertaken at the request of the Aqueduct Commission of the City of New York, and experiments were conducted at Jerome Park Reservoir in order to ascertain the effect of different aggregates upon the density, strength and permeability of concrete, and also to determine the exact sizes of aggregate, which, incorporated with a given proportion of cement, would form the best concrete. Two classes of materials were embodying some of the results of his experience, dating from the crushers at the reservoir, and Cow Bay sand and gravel dredged from the river. From the tests made many conclusions were drawn, the more important of which follow.

Stone of the largest maximum size makes the strongest concrete under both compression and transverse loading. A concrete in which the graded aggregate runs to 1 in. in maximum size will require for equal strength about one-sixth more cement, and with an aggregate running to ½ in. maximum size about one-third more cement than concrete with an aggregate in which the maximum size is 2¼ ins.

The largest stone makes the densest concrete.

Round material like gravel, under similar conditions, gives a denser concrete than broken stone.

Sand produces a denser concrete than screenings of similar size grains.

A concrete with an angular coarse aggregate, such as broken stone, is stronger than one with a rounded aggregate, like gravel, although the rounded aggregate produces greater density, thus indicating a stronger adhesion of cement to broken stone than to gravel. However, if the sand is also angular, like screenings, but with its grains of the same sizes as the sand, the concrete with both rounded coarse and fine aggregate is the stronger, probably because of its greater density.

Aggregates in which particles have been especially graded in sizes so as to give, when water and cement are added, an artificial mixture of greater density, produce concrete of higher strength than mixtures of cement and natural materials in similar proportions. The average improvement in strength by artificial grading under the conditions of the tests was about 14%. Comparing the tests of strength of concrete having different percentages of cement, it is found that for similar strength the best artificially graded aggregate would require about 12% less cement than like

mixtures of natural materials. The strength and density of concrete are affected but slightly, if at all, by decreasing the quantity of the medium-size stone of the aggregate and increasing the quantity of the coarsest stone. An excess of stone of medium size, on the other hand, appreciably decreases the density and strength of the concrete.

The strength and density of concrete are affected by the variation in the diameter of the particles of sand more than by variation in the diameters of the stone particles. An excess of fine or of medium sand decreases the density and also the strength of the concrete, as will also a deficiency of fine grains of sand in a lean concrete.

The substitution of cement for fine sand does not affect the density of the mixture, but increases the strength, although in a slightly smaller ratio than the increase in the ratio of cement.

It follows from the foregoing conclusions that the correct proportioning of concrete for strength consists in finding, with any percentage of cement, a concrete mixture of maximum density, and increasing or decreasing the cement by substituting it for the fine particles in the sand or vice versa. This important law, however, requires further tests for confirmation.

In ordinary proportioning with a given sand and stone and a given percentage of cement, the densest and strongest mixture is attained when the volume of the mixture of sand, cement and water is so small as just to fill the voids in the stone. In other words, use as small a proportion of sand and as large a proportion of stone as is possible without producing visible voids in the concrete. The term "sand" is a relative one. With 2¼-in. stone, the best sand would range in size from 0 to 0.22 in. in diameter, while the best sand for ½-in. stone would range in size from 0 to 0.05 in. in diameter.

The permeability or flow of water through concrete is less as the percentage of cement is increased, and in very much larger inverse ratio.

The permeability is less as the maximum size of the stone is greater. Concrete with maximum size stone of 2¼-in. diameter is, in general, less permeable than that with 1-in. maximum diameter stone, and this is less permeable than that with ½-in. stone.

Concrete of cement, sand and gravel is less permeable than concrete of cement, screenings and broken stone; that is, for equal permeability, a slightly smaller quantity of cement is required with rounded aggregates like gravel than with sharp aggregates like broken stone.

Concrete of mixed broken stone, sand and cement is more permeable than similar concrete of broken

stone, screenings and cement; that is, for water-tightness, less cement is required with rounded sand and gravel than with broken stone and screenings. The permeability decreases materially with age; increases nearly uniformly with the increase in pressure; and increases as the thickness of the concrete decreases, but in a much larger inverse ratio.

SUCCESSFUL PLACING CONCRETE IN FREEZING WEATHER.

In the construction of the power plant of the Billings (Mont.) Water Power Company, described in the Sibley Journal of Engineering, practically all of the concrete work above the main floor level was put in during weather so cold that it was necessary to heat both the gravel and water used. A sand heater was constructed of four 15-foot lengths of 1½-inch cast iron pipe, two in series, and the two sets placed side by side. This gave a total length of 30 feet for heating, making it possible to use the gravel from alternate ends and rendering the heating process continuous. The gravel was dumped directly on the heater, thus avoiding the additional expense of handling it a second time. The heater pipes were laid somewhat slanting, the fire being built in the lower end. A 10-foot flue furnished sufficient draft for all occasions. With this arrangement it was possible to heat the gravel to a temperature of 80° or 90° F. even during the coldest weather. Steam for heating the water was available from the plant. The temperature at which the concrete was placed in the forms was kept between 65° and 75° F. This was regulated by the man on the mixer platform by varying the temperature of the water to suit the conditions of the gravel. When the ingredients were heated in this manner it was found advisable to mix the concrete "sloppy," using even more water than would be commonly used in the so-called "sloppy" concrete. No difficulty was experienced with temperature cracks if the concrete,

when placed, was not above 75° F. All cracks of this nature which did appear were of no consequence, as they never extended more than ½-inch below the surface. The concrete was placed in as large masses as possible. It was covered nights with sacks and canvas and, when the walls were less than 3 feet in width, the outside of the forms was lagged with tar paper. An air space was always left between the surface of the concrete and the covering. Under these conditions there was sufficient heat in the mass to prevent its freezing for several days, which was ample time for permanent setting. On several occasions, owing to improper covering, a thin surface layer of from 2 to 4 inches would freeze. This was always removed and the surface warmed with hot water before placing new material. Each day portions of the work of the four previous days were broken off and tested for freezing by keeping them at a high temperature for several hours.

TO MEASURE WATER IN CONCRETE MIXING.

The following method was employed in measuring the amount of water required for any batch of concrete used in constructing a pier, tells Engineering Contracting. The water was pumped into a 1,000-gallon tank sufficiently elevated on the mixer plant staging to give ample head in delivering to the mixer. An ordinary oil barrel was placed between the mixer and the supply tank and was connected with both by a 2-inch pipe. This barrel was arranged with a 2-inch pipe sliding through a 2½-inch pipe with a stuffing box fixed in the bottom of the barrel. The upper end of the pipe was left open so the amount of water to be discharged depended upon the height of the 2-inch pipe inside the barrel. The end of this interior pipe was made adjustable as to height by means of a rod and lever, and the values for each elevation or depression of the pipe were determined and marked on the gage, the index being the top of the rod which elevated or depressed the

pipe. In this way a definite amount of water could be run into the mixer at will. When it was desired to run water into the batch the mixer operator pulled a rope which opened a valve between the barrel and the mixer and at the same time closed a valve between the supply tank and the barrel, thus allowing all water above the top of the sliding pipe in the barrel to be discharged into the mixer. When the pull on the valve lever was released a weight counterpoise pulled it back,

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This is very pleasing to us, but the demand has been so steady that we cannot guarantee immediate shipment to new customers — WE WILL SHIP WHEN WE SAY, but would advise orders to be placed as early as possible in order to avoid disappointment so we can't ship all at once.

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thus allowing the barrel to fill ready for another charge. Head pressures were maintained in the barrel by a one-inch pipe which extended upward to the top of the supply tank.—Improvement Bulletin.

CRACKS IN CONCRETE.

Cracks in concrete structures of any kind are always more or less disturbing. It is ordinarily expected that a material so substantial will show absolutely no sign of weakness. Cracks in stone masonry, particularly rubble or quarry-face work, are less noticeable than in concrete, and cause less comment, but very commonly appear immediately after the work is completed. Cracks are of two classes, the one of little moment, the other of a serious character. Under certain conditions cracks of the former class are unavoidable, and result from expansion and contraction under differences of temperature, from a slight irregularity of settlement or other unforeseen cause. Such partings of the material as a rule do not detract from the value of the structure except in appearance. Where the cause of the cracks, however, is due to defects in design, and where the stability of the structure is evidently insufficient, cracks are of serious consequence. But cracks of themselves, while they are necessarily objectionable to the eye and should be avoided as much as possible, yet they do not necessarily imply defect in design, workmanship or material.

The use of concrete, however, and concrete reinforced with steel, is growing to such an extent that a warning is advisable. Arch bridges in particular are not a structure

which "practical" men are to be trusted to design. Span, rise, depth of fill, character of foundation, strength of reinforcement, and many other details are all so important in their relation to the proper design of an arch, that only a man with the mathematical training of an engineer is capable of proportioning an arch to the stresses to which it will be subjected. It is a remarkable fact with regard to the arch, that if not properly designed, even if of apparently sufficient thickness, the strains may be so situated that the arch cannot support its own weight. Concrete arch bridges are growing greatly in popularity, and their great durability marks them as the coming bridge. But they stand in a class with steel, that requires much care in design. The average man understands timber, in a practical way he can build a wooden bridge, and he knows when it is safe. But steel and concrete are materials requiring a mathematical training and scientific knowledge when used in bridge construction.—Municipal World.

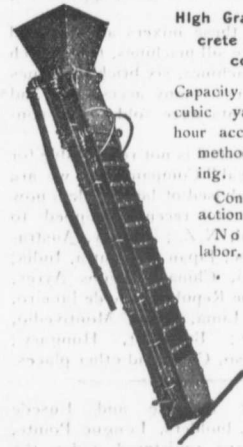
The Macleod Builders' Supply Co., Macleod, Alta., commenced business last week. The concern besides handling a full line of building materials will manufacture cement blocks.

The Canadian Pipe Company, of Vancouver, B.C., has been awarded the contract to supply the City of Vancouver with 72,000 steel bands for the new continuous stave wooden pipe-line which the city proposes building at Seymour Creek. In addition to this, the company are busy on their contract for the supply of 10-inch by 12-inch wood

stave pipes for the extension to the waterworks system of Moose Jaw, Saskatchewan, and also on their order from the city of Saskatoon, Alberta, for further extension to the waterworks system there. Both these towns have previously installed this company's pipe.

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"IDEAL" MACHINERY.

Our readers will recall an announcement a few months ago, to the effect that the Ideal Concrete Machinery Company, of South Bend, Indiana, had closed up what was said to be the largest contract for concrete machinery ever secured, the contract involving \$250,000 worth of "Ideal" block machines.

From time to time we have had additional evidences of the progress of this company, and are now advised that within the past six months they have shipped six full carloads of "Ideal" machinery into one Spanish-American country, and it may also be of interest to note that in the last shipment were included eight "Ideal" continuous batch mixers, fully equipped with power.

With these mixers are included two large sill machines, ten 24-inch block machines, six brick machines and a great many accessories and attachments were sold to one concern.

This record is not remarkable for the "Ideal" Company, and we are further advised of large orders now in hand and recently shipped to Auckland, N.Z.; Sydney, Australia; Kobe, Japan; Calcutta, India; Shanghai, China; Buenos Ayres, Argentine Republic; Rio de Janeiro, Brazil; Lima, Peru; Montivedio, Uruguay; Budapest, Hungary; Valparaiso, Chili, and other places.

Arthur Deguise and Eusede Meloche, builders, Longue Pointe, Que., have registered under the firm name of Deguise & Meloche.

Mr. Adam Dawson, the well-known contractor of Peterboro, Ont., died in that city recently, at the age of 59 years. He had served as an alderman for 13 years.

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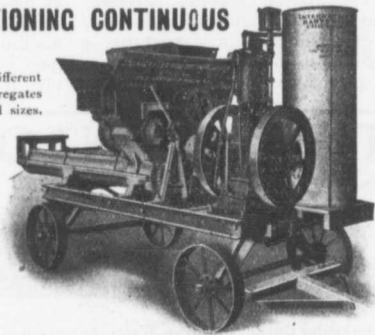
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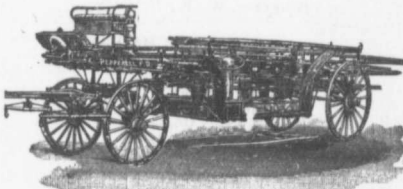
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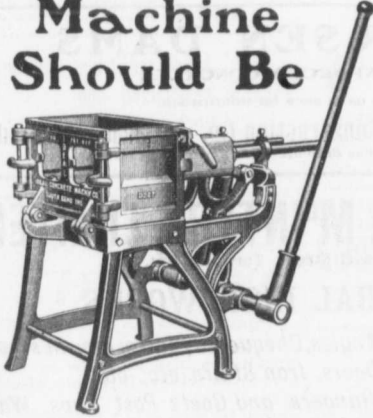
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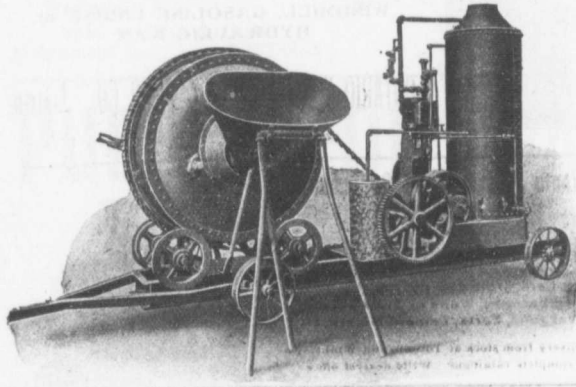
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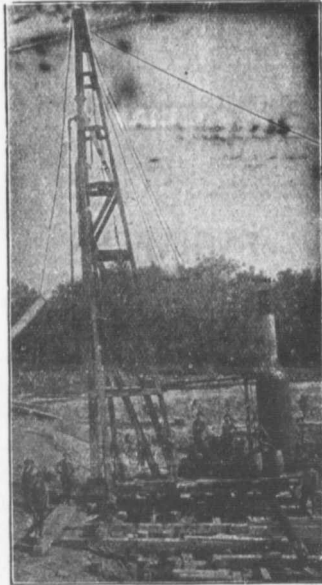
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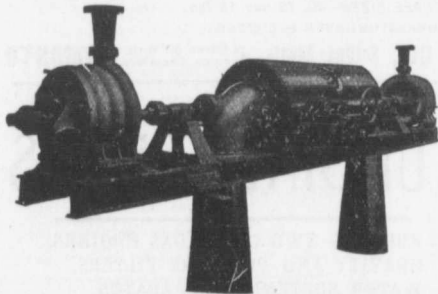
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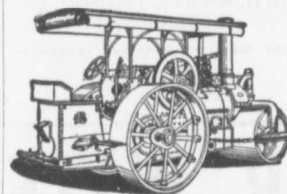
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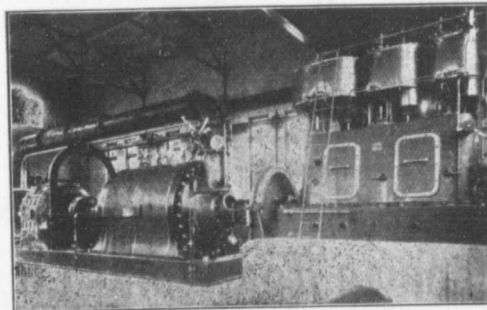
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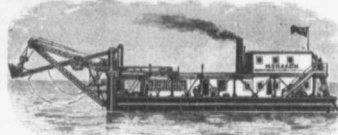
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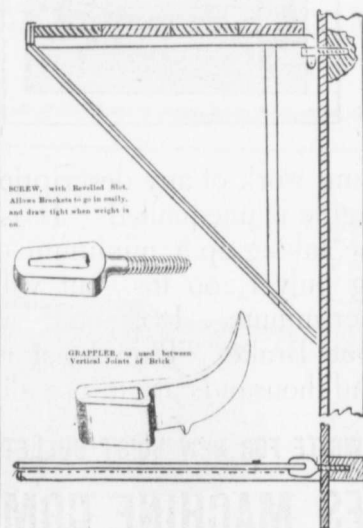
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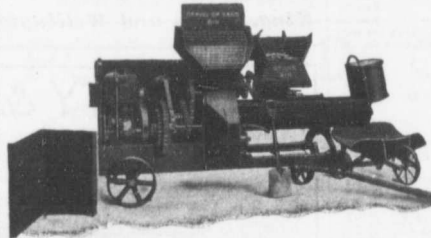
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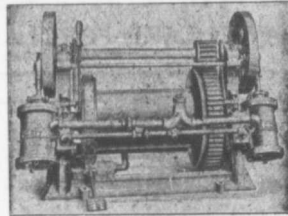
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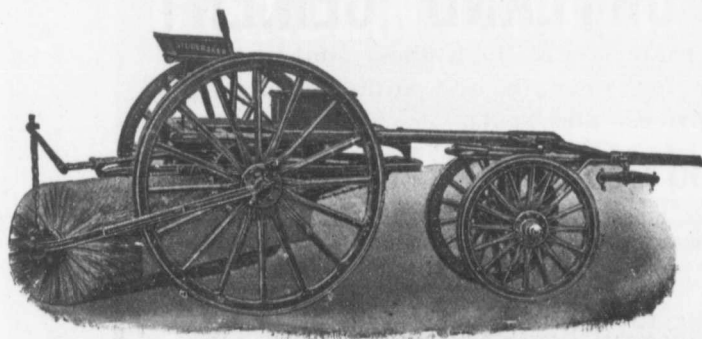
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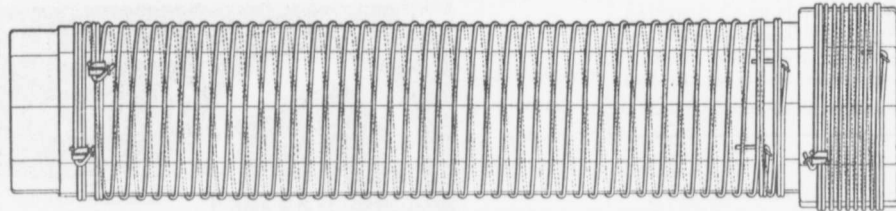
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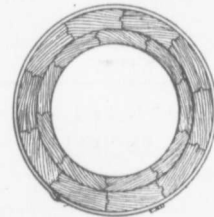
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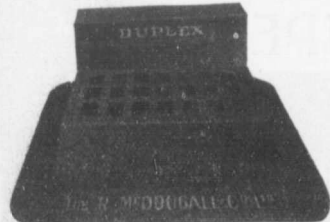
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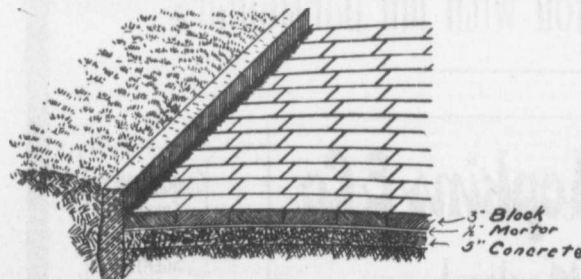
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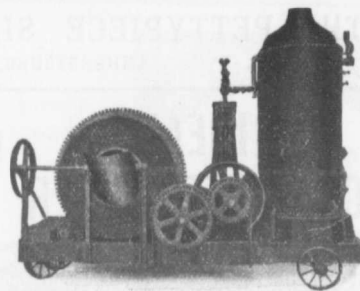
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