

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 3, 1907 — WINNIPEG, VANCOUVER

No. 18

THE CANADIAN CONTRACT RECORD PUBLISHED EVERY WEDNESDAY

As an intermediate Edition of the Canadian
Architect and Builder.

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

Subscription Price, \$2 per annum, payable
in advance.

United States, \$3.00 per year

CONFEDERATION LIFE BUILDING, TORONTO
Telephone Main 2562.

Branch Offices

Room B34, Board of Trade Building, Montreal,
Telephone Main 2999.

700-721 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-
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PUBLISHERS' ANNOUNCEMENT.

To ensure publication of the CON-
TRACT RECORD on time, advertisers
are requested to strictly observe the
following regulations:

Copy and cuts for change of adver-
tisements must reach the publication
office in Toronto not later than Sat-
urday preceding the date of publica-
tion. The copy should show the size
of the cuts, if any, as sometimes
there is delay in transmitting them
through the mails.

Transient advertisements for Tenders
must reach the publication office
by TEN O'CLOCK A. M. ON TUESDAY,
but our patrons will confer a favor by
forwarding advertisements earlier
whenever possible.

Tenders Wanted

Town of Hawkesbury

ARTIFICIAL STONE SIDEWALKS AND MACADAMIZED ROADWAY CONSTRUCTION.

Sealed tenders endorsed "Tenders for Arti-
ficial Stone Sidewalks and Macadamized Road-
ways," and addressed to "D. Doyle, Town Clerk-
Hawkesbury, Ont.," will be received until noon on
MONDAY, JULY 8th, 1907, for the construction
of Artificial Stone Sidewalks and Macadamized
Roadways in the Town of Hawkesbury.

Plans and Specifications of the proposed work
may be seen, and forms of tender obtained at the
office of the undersigned.

The lowest or any tender not necessarily accepted.
D. DOYLE, Town Clerk.
Town Clerk's office, Hawkesbury, June 20, 1907.

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, speci-
fications 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 suc-
cessful tenderer refusing or neglecting to sign a
satisfactory contract when called upon to do so.
Individual tenders will be received for:

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

An alternative lump-sum tender will be received
for the entire work, including all of the above
mentioned 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 those of the different volumes
of specifications.

TO BUILDERS AND CONTRACTORS, ETC

Manager or assistant (age 26) seeks appointment,
well up in general management, measuring, quanti-
ties, adjusting variations and general routine, or
travel for builders merchants. Excellent English
references. Apply Box 296, Fort William, Ont.

TENDERS

will be received by the undersigned up to JULY 8th
8.30 p.m. for the construction of sewer in the town of
Welland, viz: On Franklin St., 474 ft. 10-in. pipe,
including 10 branches, and 220 ft. 8-in. pipe, 13
branches; on Dorothy St., 304 ft. 12-in. pipe, 10
branches; on Welland St., 460 ft. 10-in. pipe, 14 branches.

H. W. BOYD, Town Clerk,
Welland, Ont.

TOWNSHIP YORK, COUNTY YORK

Sealed tenders will be received by the undersigned
up to 7 p.m. on SATURDAY, THE 13th JULY
NEXT, for building about 6,000 linear feet of Con-
crete sidewalk, 4 feet wide, on Reid avenue, north of
Queen street east. Specifications, plan, &c., can be
examined at the office of the undersigned, and at the
Township office, Confederation Life Building, 108
Victoria Street, Toronto.

Any tender not necessarily accepted.

P. S. GHSON & SONS,
Township Engineers,

Willowdale, Yonge St., June 2nd, 1907.

TENDERS

Tenders, addressed to the undersigned, will be
received until Noon on FRIDAY, THE 5th OF JULY,
for building Reinforced Abutments and Concrete
Pier for a Bridge in the Village of Vienna for the
County of Elgin. Plans and specifications can be
seen at this office. A deposit of \$200.00 must accom-
pany each tender as a guarantee of good faith. The
committee do not bind themselves to accept the low-
est or any tender.

JAMES A. BELL,
County Engineer.

TO CONTRACTORS

TENDERS

Sealed tenders, in bulk, will be received until
JULY 15th, 1907, at noon, for the several works
required in building certain alterations and addi-
tions to the Collegiate Institute at Ottawa.

Sealed tenders will also be received until the same
hour and at the same place for Heating and Ventila-
tion of the same building.

Plans and specifications can be seen at the office
of Horswood & Taylor, Architects, 102 Bank Street,
Ottawa.

A marked cheque equal to 5 per cent. of tender to
accompany each tender as a guarantee of tender.

The lowest or any tender not necessarily accepted.
Tenders to be addressed to Thomas Birkett, Esq.,
Chairman of Building Committee, Room 11, Central
Chambers, Ottawa.

CECIL BETHUNE,
Secretary Treasurer Ottawa Collegiate Institute
Board.

[FOR ADDITIONAL ADVERTISEMENTS FOR TENDERS SEE NEXT PAGE]

CITY OF FREDERICTON DEBENTURES

The holders of "Fredericton Water Debentures," and "City of Fredericton Debt Debentures," falling due on July 20th and August 1st next, who wish to continue their securities, may renew same with the re-issue of City Bonds authorized at the last Session of the Legislature, running for forty years at 4% payable half yearly.

Persons wishing to continue their loans, as above, are requested to notify the undersigned without delay, stating the amount of the new bonds they are prepared to take.

I. R. GOLDING,
City Treasurer.

Fredericton, N.B., June 14th, 1907.

TENDERS

[Tenders addressed to the undersigned will be received until noon on FRIDAY, THE 27th DAY OF JULY, for building a reinforced concrete arch bridge 50 ft. span near Iona, in the Township of Southwold; also 26 ft. reinforced beam span over Kettle Creek, three miles from St. Thomas in the Township of Southwold. Plans and specifications can be seen at the office of the undersigned. A deposit in the way of a marked cheque payable to the Treasurer of the Township of Southwold for the sum of \$200.00 must accompany each tender as guarantee of good faith. The committee do not bind themselves to accept the lowest or any tender.

BELL & McCUBBIN, St. Thomas, Ont.
Engineers.

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 superstructure 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.

Belleville, Ont.
June 26th, 1907.

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 received 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 office of the Commission, 25 Toronto Street, Toronto, and at the office of the Chief Engineer, North Bay. A certified cheque for \$50.00 must accompany each tender.

The successful tenderer must enter promptly into a contract and furnish security for the amount of \$1,000.00 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.

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.

NORTH BATTLEFORD (SASKATCHEWAN)

Notice to Contractors

WATERWORKS, SEWERAGE AND ELECTRIC LIGHT AND POWER EQUIPMENT.

Sealed tenders will be received by the Secretary-Treasurer of the Town up to 8 p. m. on WEDNESDAY, 31ST JULY, 1907, for the following works:

- Contract "A"—Labour, pipe laying;
- "C"—Water Tower;
- "D"—Water Pipes and Specials;
- "E"—Fire Hydrants, Valves, etc.
- "F"—Sewer Pipes;
- "G"—Two Boilers.

Tenders for Buildings, Machinery and Electric Equipment will be called for during August.

For further information address the Engineer. Plans and specifications on file after 12th July, 1907.

J. A. GREGORY, Esq., WILLIS CHIPMAN,
Mayor, Engineer,
S. COOKSON, 103 Bay St., Toronto.
Sec.-Treas.

CONTRACTS OPEN.

CLINTON, ONT.—A three storey hotel will be built by Joseph Rattenbury.

MANOR, SASK.—It is proposed to erect a four-roomed school at a cost of \$10,000.

PRINCE ALBERT, SASK.—Plans have been prepared for a heating system for the city hall.

BRITANNIA, ONT.—It is probable that steps will be taken to construct a sewerage system.

SACKVILLE, N.B.—M. Wood & Sons have purchased a lot on which to build a warehouse.

SMITH'S FALLS, ONT.—The new High school to be built here is expected to cost about \$45,000.

SUSSEX, N.B.—The Presbyterians intend erecting a new church. Rev. Frank Baird, pastor.

ST. CATHAKINES, ONT.—The Welland Bale Mfg. Co. will greatly increase their plant here.

ARNPRIOR, ONT.—Plans are being prepared for developing a water power on the Madawaski river.

STRATHCONA, ALTA.—The Provincial University of Alberta will be built on the Simpson estate.

DUCK LAKE, SASK.—The Bank of British North America will erect a new building to cost \$4,000.

NORWOOD, ONT.—John E. Roxburgh, Treasurer, requests bids by 13th inst. for purchase of debentures.

REGINA, SASK.—H. S. Meurill has purchased a lot on Eleventh avenue on which he will build a brick block.

KENORA, ONT.—George Drewery will receive tenders up to 10th inst. for erection of addition to warehouse.

HAVELOCK, ONT.—The School Board have asked the Council for \$4,000 to build an addition to the school.

NEEPAWA, MAN.—The ratepayers will vote on a by-law on the 9th inst. to provide \$25,000 for a water supply.

FERNIE, B.C.—The Great Northern Railway are having surveys made for an extension of the railway to M'chel.

SYDNEY, N.S.—Tenders for erection

of a county jail will be received by D. M. Currie, County Clerk, up to 15th inst.

LOUISBURG, N.S.—The Sydney Foundry & Machine Works are considering a proposition to remove to this town.

COBALT, ONT.—A water supply is to be obtained from Clear Lake. A pumping plant will probably be installed.

COOKSHIRE, QUE.—Arthur Clement has purchased property on Ingle avenue on which to erect a new building.

HURONVILLE, SASK.—J. Harvey Lane, Sec.-Treas., will receive bids up to July 19th for purchase of \$1,500 debentures.

LONDON, ONT.—The Travellers' Club have purchased property at 128 Fullerton street on which to build a club house.

PARRY SOUND, ONT.—The Council have approved of the plans of a bridge to be built over Waubeek street by the C. P. R.

MIMICO, ONT.—Industrial School Trustees have decided to spend \$14,000 in enlarging and improving some of the cottages.

BRANTFORD, ONT.—Tenders are invited up to 15th inst. for erection of bank building for the Canadian Bank of Commerce.

ALLISTON, ONT.—Lloyd & Buchanan have submitted a proposition to the Council to establish a sash and door factory here.

WOODSTOCK, ONT.—Revised plans have been prepared for the Y.M.C.A. building and tenders will be invited immediately.

SYDNEY, N. S.—St. Andrew's Presbyterian congregation have decided to postpone for the present the erection of a new church.

MAISONNEUVE, QUE.—The Canadian Spool Cotton Co. have plans under consideration for the erection of extensive mills.

CHARLOTTETOWN, P. E. I.—Tenders are invited by the Intercolonial Railway up to 10th inst. for erection of a freight shed here.

CHATHAM, N.B.—Peter Archer is asking for tenders up to Wednesday, 10th inst., for the plumbing and heating of new hotel here.

BLEVALE, ONT.—Tenders are invited by John Burgess up to July 15th for construction of a drain in the township of Turnberry.

BRADFORD, ONT.—A by-law will be submitted to the ratepayers on July 22nd to raise \$7,000 for construction of granolithic sidewalks.

WELLAND, ONT.—The ratepayers of Grantham County have carried a by-law to raise \$20,000 to drain and macadamize leading roads.

LITTLE BRITAIN, ONT.—The Western Bank of Canada will erect a brick bank on property purchased from the James Blewett Estate.

ST. THOMAS, ONT.—The City Council will probably grant a bonus of \$50,000 to the St. Thomas Car Co. to assist in building works.

OSHAWA, ONT.—Plans have been prepared for additions to the Centre street school, including steam heating system, to cost about \$13,000.

VERMILLION, ALTA.—Norman Murray, Secretary-Treasurer, is prepared to consider offers for the purchase of \$12,775 6 per cent. debentures.

YELLOWGRASS, SASK.—The ratepayers have voted on a by-law to borrow money for waterworks and other improvements. Result not learned.

ST. JOHN, N.B.—H. H. Mott, architect, is this week taking tenders for

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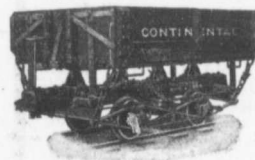
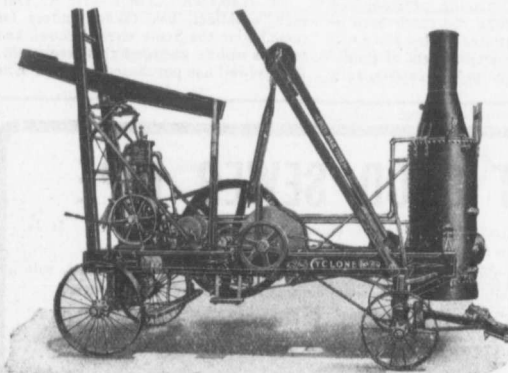
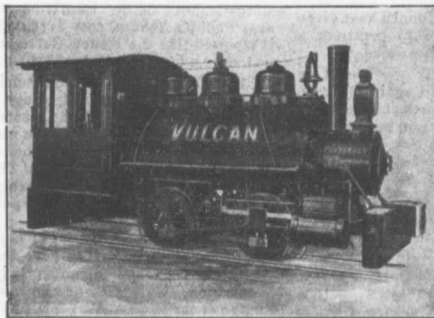
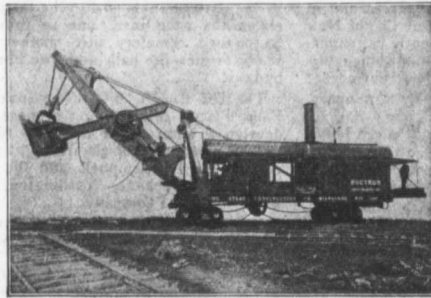
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erection of a brick school building, corner of Wentworth and St. James streets.

PRESTON, ONT.—The ratepayers have voted in favor of giving a loan of \$10,000 to Clayton E. Hurlburt, of Toronto, to establish a shoe factory here.

TORONTO JUNCTION, ONT.—The estimates of the Property Committee include \$5,000 for a new fire hall and \$2,000 for improvements to the old hall.

WELLAND, ONT.—J. A. Hughes has bought the old Baptist church property on Church street and intends erecting several modern brick houses thereon.

SHERBROOKE, QUE.—The ratepayers on June 24th voted in favor of raising \$200,000 for installation of a municipal electric plant at Westbury Basin.

MEDICINE HAT, ALTA.—The Rosery Flower Co. purpose establishing three greenhouses here, each 300 feet long and 30 feet wide, also an office and boiler house.

NELSON, B.C.—W. B. Sherman has purchased the Auditorium rink at Calgary and intends building a large addition.—Geo. Harrison purposes building an addition to his hotel premises on Vernon street.

BRANDON, MAN.—It is proposed to remodel the interior of the City Hall.—Harry Johnson states that he will next year erect a modern hotel on the site of the Brunswick.

WALKERTON, ONT.—Tenders will be received by the Department of Public Works, Ottawa, up to Friday, 12th inst., for construction of an armoury here. Plans at post office.

STRATHAVEN, ONT.—D. McLaughlan is asking for tenders up to July 8th for painting and decorating the Baptist church. Plans at office of George Menzies, Owen Sound.

WHALEN, ONT.—Bids will be received by Francis Morley up to 13th inst. for construction of drainage work in the townships of Osborne and Hibbert. Plans by John Roger, O.L.S.

OWEN SOUND, ONT.—The County Council last week decided to construct a reinforced concrete bridge with 18 foot roadway over the Pottawatamie river at a cost of \$3,200.

GESTO, ONT.—A. C. Atkinson, Township Clerk, will receive tenders up to July 12th for construction of silex stone sidewalks on the east side of Main street, in the village of McGregor.

INGERSOLL, ONT.—It is the intention of the new owners of the Woodstock, Thames Valley & Ingersoll Electric Railway Co. to reconstruct the line between Ingersoll and Woodstock.

SAULT STE. MARIE, ONT.—James Thompson, architect, of Toronto, has been commissioned to prepare plans for the building of a technical school here, to cost in the neighborhood of \$20,000.

LETHBRIDGE, ALTA.—W. Oliver proposes to erect a two-storey brick

wood-working factory at a probable cost of \$30,000. He will also install a plant for the manufacture of cement blocks.

HALIFAX, N.S.—A representative of the Oriental Silk Thread Co., of New York, was in Halifax recently in connection with the proposed establishment of a branch mill in the Maritime Provinces.

VICTORIA, B.C.—F. M. Rattenbury, architect, has prepared plans for an apartment house to be built in the James Bay district, four storeys, steam heated, elevators and all modern improvements.

LINDSAY, ONT.—The Kennedy & Davis Co. will erect a brick wood-working factory 60 x 72 feet, two storeys.—J. Carew contemplates building a residence on Elgin street 30 x 50 feet, cost \$10,000.

EDMONTON, ALTA.—Plans have been accepted for the new Archibald block to be built on Jasper avenue, three storeys, 32 x 80 feet, brick, ground floor fitted up as a drug store and upper floors as offices, cost \$22,000.

CLINTON, ONT.—The building to be erected by the Clinton Thresher Co. will be one-storey, of cement, with metal roof.—The Municipal Council have given notice of the intention to construct a number of granolithic sidewalks.

HAMILTON, ONT.—The City Council have decided to again place on the market \$422,000 worth of debentures.—The Laidlaw-Ainslee Lumber Co. have purchased a site in this city on which to build an office furniture factory.

OKOTOKS, ALTA.—G. W. Gordon, architect, of Calgary, has submitted to the Town Council here plans for a new town and fire hall, and it is probable that a by-law to raise \$5,000 for the purpose will be submitted to the ratepayers.

OXFORD CENTRE, ONT.—Bids are requested by F. G. Jackson, Clerk of East Oxford, by July 8th, for furnishing material and constructing the Butler drain just east of the City of Woodstock, also the Hopkins drain near Beaconsfield.

PORT COLBORNE, ONT.—Tenders for supply and placing of stone and concrete blocks along the south base of the western breakwater at this place will be received at the Department of Public Works, Ottawa, up to Wednesday, 24th

inst. Plans on application to Louis Coste.

NIAGARA FALLS, ONT.—Four by-laws will be submitted to the ratepayers on the 22nd inst., one to provide \$9,500 for a cemetery site, another for \$8,700 for new fire hall, and two library by-laws.

TROUT LAKE, B.C.—The Spokane Falls Placer Mining Co. propose to develop a water power near this place for the generation of electric light and power. J. B. Campbell and V. K. Wagner, of Spokane, Washington, are interested in the company.

ST. CATHARINES, ONT.—Arthur Nicholson, architect, has prepared plans for the proposed hospital building. The main building, which will be built first, will be of brick, two stories, 26 x 31 feet, cost \$2,200; 4 additional wards will cost \$2,800 extra.

MONTREAL, QUE.—The S. Carsley Co. have purchased property for the purpose of extending the Scroggie store building purchased a few months ago.—Mark Workman is about to erect a six storey building on St. Catharine street, near Phillip's Square, cost \$125,000.—It is reported that the Heney Carriage Co. will build a factory in Cote St. Paul.

CHATHAM, ONT.—The Council will likely take early steps to extend the waterworks and electric light plants.—J. L. Wilson & Son, architects, are preparing plans for the renovation of the A. I. McCall block.—The trustees of School Section No. 2½, Harwich Township, will issue a loan of \$2,000 for the purpose of building a school.

MOOSE JAW, SASK.—The building committee of the Y.M.C.A. have decided to erect the new building under their own supervision, with George Latimer in charge of the work.—A by-law has been introduced in Council to raise \$125,000 for extension of waterworks and sewerage systems.—A motion has been introduced in the Council to submit a by-law to raise \$90,000 for extensions to the light and power plant.

ST. THOMAS, ONT.—N. R. Darrah, architect, has taken tenders for remodelling the Scott street school, and tenders will be awarded this week.—W. E. Maxwell has purchased a lot on Erie

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Those requiring sewer pipe should see that they get the best. It is the cheapest in the end.

We manufacture the best and cheapest. It is steam pressed, salt glazed, vitrified, absolutely non-absorbent and once laid will last forever.

THE CANADIAN SEWER PIPE CO.

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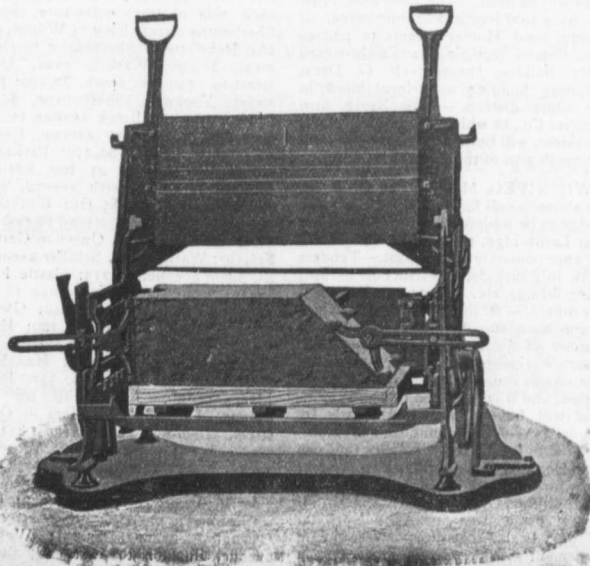
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Makes 40 Different Sizes of Stone in Any Design, as well as the Specials, viz.:

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

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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.

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street on which to build a residence.—Arthur Leaky and Dr. C. K. Geary last week interviewed the City Council with regard to a proposed half-mile race track to be located on the Ellison property, estimated expenditure \$10,000.

PORT ARTHUR, ONT.—By-laws are being voted on to-day to provide funds as follows: \$253,000 for construction of a system of waterworks; \$60,000 for construction of dams on the Current river; \$15,000 for purchase of two additional street cars, and one car body; \$15,000 for construction of a permanent bridge across McVicar's Creek; \$12,000 for erection of a police station; \$6,000 for bridge on Court street.

LONDON, ONT.—The ratepayers will shortly vote on the following schemes for a water supply: High pressure river water scheme, with Springbank water, for domestic purposes, cost \$325,000; Pomoka scheme, \$660,000; river water scheme, advocated by Engineer Maury, cost \$430,000; Titus artesian well scheme, by which the city would pay about \$75,000 per annum and take over the plant at the end of five years.—The Board of Works have decided to call for tenders for an asphalt pavement on Dundas street.

GODERICH, ONT.—The Light and Water Commission will ask the Town Council to provide \$27,836 to improve the waterworks and lighting systems. It is proposed to construct a new intake and a sedimentation basin.—J. W. Moves, C.E., of Toronto, has interested himself in the proposition for the development of electric power from the Maitland river and the construction of radial railways in the vicinity of Goderich. The Council will likely submit a by-law guaranteeing the bonds of the company. The Goderich Wheel Rigs, Limited, have purchased a site on which to build a two storey factory 60 x 300 feet.

NEW WESTMINSTER, B.C.—The Burrard, Westminster & Boundary Railway have applied for right of way along Front street. The company is an offshoot of the Stave Lake Power Co.—The British Columbia Electric Railway Co. have purchased a site on Clarkson street on which to erect a new building for an exchange.—The Board of Directors of the Columbian Hospital have decided to commence work this month on the new maternity wing of the nurses' home.—Chappell Bros. are negotiating for a site for a shipbuilding plant. An effort is being made to secure a strip of land in the vicinity of the Small & Bucklin Lumber Co.'s mill.—C. H. Clough, architect, this city, has prepared plans for a tourist hotel at Quilchena, to be of wood, stone foundation, three stories.

CALGARY, ALTA.—The City Clerk will receive tenders up to July 8th for the erection of a new city hall in accordance with plans prepared by W. M. Dodd, architect.—The C.P.R. is asking for tenders for erection of a station here from plans by the Company's architect, W. S. Painter.—Local capitalists have formed a company for the purpose of building a flour mill to cost \$20,000.—A company has been formed here for the promotion of an irrigation scheme in the Upper Columbia Valley near Windemere. J. McLatchie, of Nelson, B.C., has recently been making surveys in connection with the project.—George McNeil has completed negotiations for building a seven storey apartment block, to be of brick with steel frame, Indiana stone trimmings, size 125 x 110 ft., cost \$150,000.

OTTAWA, ONT.—Cecil Bethune will receive tenders up to July 15th for alterations and additions to the Collegiate Institute. Plans at office of Horwood &

Taylor, architects, 102 Bank street.—C. P. Meredith, 193 Sparks street, has prepared plans for addition to St. Ann's school.—The Fire & Light Committee have appointed a sub-committee to report upon a site and secure plans for a new fire station to replace No. 4 on York street.—The Methodists of Ottawa South have decided to erect a new church in that district. Particulars from Rev. F. G. Robinson.—The competition for plans for the new Government block closed this week. The building is estimated to cost in the neighborhood of \$3,000,000.—Mulligan Bros. will spend about \$45,000 on improvements to the Russell House.—The Board of Works have authorized the City Engineer to call for tenders for a municipal asphalt plant.

PETERBORO, ONT.—At a meeting of the County Council last week John E. Belcher, C.E., recommended the construction of the following bridges: Steel structure of 75 feet span, with reinforced concrete floor and concrete abutments, over the River Ouse, on Victoria street, Norwood; steel bridge 100 feet span, concrete abutments, between the eight and ninth concessions, lot 23; 75 to 80 feet steel structure, concrete abutments, to replace the bridge on the concession line between concessions No. 6 and 7, lot 14, township of Asphodel.—John E. Belcher is asking for tenders by Tuesday, 9th inst., for erection of a stone church and sacristy on Romaine street.—It is stated on reliable authority that contracts will shortly be awarded for the southern portion of the Trent Canal.

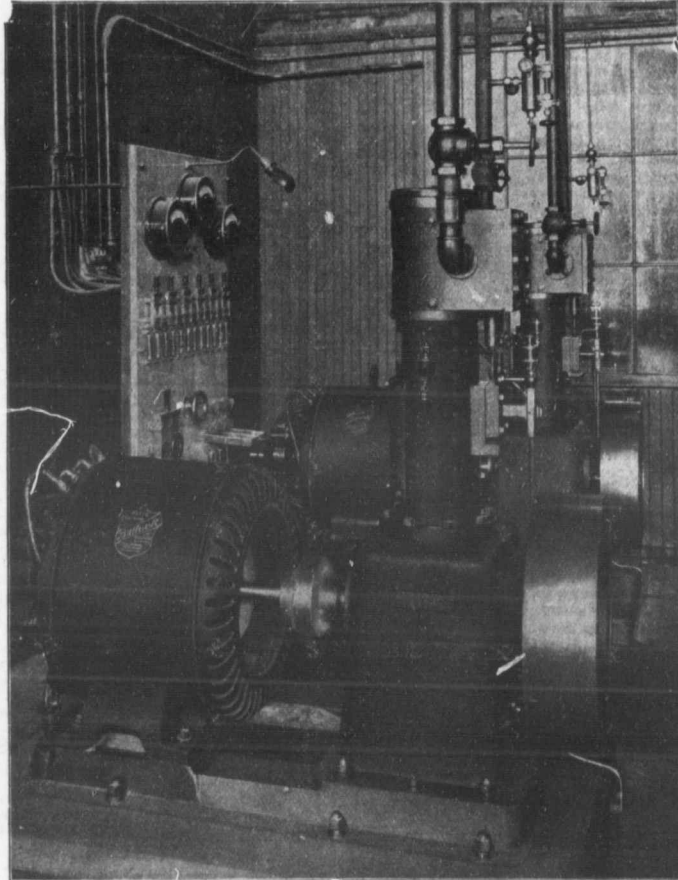
VANCOUVER, B.C.—City Engineer Clement has submitted plans for an extensive sewerage system.—Supt. Madison, of the waterworks, has recommended the construction of another main across the First Narrows.—The Board of Park Commissioners have deposited with the Minister of Public Works, Ottawa, plans of a proposed wharf.—J. C. Scott has purchased 75 feet of land at corner of Westminster avenue and Park lane on which he intends erecting a six storey building.—Cavanagh & Holden have sold 200 feet on Dufferin street to a Montreal man for manufacturing purposes.—The C. P. R. have announced their intention of making extensive additions to their wharf facilities. They will invite tenders immediately for dredging and the building of stone walls. The proposed wharf will be 670 feet long x 162 feet wide and it is said that Australian piles will be used.—The Dominion Trust Co. have sold four lots at the corner of Pender and Homer streets to parties who intend erecting an eight-storey office building thereon.—P. G. Drost purposes building a business block in the same district.—The North Arm Lumber Co., of which R. H. McKee is President, will build a large saw mill on the north arm of the Fraser river.

WINNIPEG, MAN.—The C. P. R. are about to call for tenders for a steel bridge to be built across the Kipp river near Lethbridge, the cost of which will be approximately \$1,000,000.—Tenders close July 11th for construction of post office fittings, etc. Plans at office of J. Greenfield.—A meeting of the Water Commission was held last week for the purpose of discussing with the board of expert engineers plans for the proposed new water supply. Progress was reported, and it is expected that the engineers will have their report ready by August 1st.—A sub-committee has recommended to the Board of Works that the City Engineer be instructed to prepare plans for a subway for both the Canadian Northern and Grand Trunk Pacific crossings at Main street, near the Norwood bridge. It also recommended that in the agreement with the Grand Trunk Pacific

provision be made for two overhead bridges over the tracks between Cambridge and Pembina streets and for a subway at Cambridge street.—Plans of the bridge over the Winnipeg river will be submitted to the Dominion Government resident engineer in Winnipeg for his approval, after which the work will be proceeded with.—The City Power Committee have recommended the purchase of rails, ties and track materials for the 2½ miles of the power tramway between Lac du Bonnet and the location of the bridge to be built over the river.—Mrs. C. A. Crump, of Riverside, California, has purchased property, corner of Main and Jarvis streets, on which to erect a block costing \$45,000.—M. Peterson, Secretary Board of Control, will receive tenders up to 10th inst. for construction of sewer on Salter street and asphalt pavement on portions of Bell avenue and Wood street.

TORONTO, ONT.—It is reported that a local syndicate has made a good offer for the Caer Howell property, and that, if the deal is consummated, the purchasers will erect a \$500,000 hotel on the site.—E. J. Evans, proprietor of the Strand, has leased the Richardson property on the east side of Victoria street, south of Richmond, with the intention of erecting a new hotel thereon.—It is probable that additions will be built to the General Hospital at a cost of \$40,000.—The Board of Control have decided to submit the new waterworks by-law to the ratepayers on Saturday, September 4th. The amount asked for will be about \$800,000.—The City Engineer has been instructed to report upon the feasibility of constructing a trunk sewer by which the present unsanitary method of depositing sewage in the bay may be brought to an end.—The Massey Harris Co. have purchased another block of land immediately east of their present King street property with the intention of extending their works.—E. E. Sheppard will erect a building for the Women's Art Association at corner of Jarvis and Charles streets, to cost \$5,000.—The sale of the Brunswick Hotel at corner of Brunswick avenue and Bloor street has been confirmed by the Court. Mr. Jackson has had plans prepared for a three storey hotel.—The City Engineer has recommended the construction of the following pavements: Asphalt—Montrose avenue, from Bloor street to 1,000 feet north, \$5,701; Mutual street, Carlton to Maitland, \$4,728; Conduit street, Dundas to west city limits, \$4,967; Parliament street, on each side of track allowance, \$5,685; Sherbourne street, King to Wilton, \$12,264; Duke street, Sherbourne to Parliament, \$9,695; Waverly road, Queen street to 1,050 feet south, \$7,550; Bloor street, Yonge to Sherbourne, \$9,120; Lindsay avenue, Brock avenue to Dufferin, \$6,572; Marjory avenue, Gerrard to Sproatt avenue, \$2,459; Parliament street, Wellesley to 45 feet north of Howard, \$8,101; Perth avenue, Bloor street to south end, \$5,426; Bitulithic—Alcorn avenue, Avenue road to east end, \$2,900; Seaton street, Queen to Gerrard, \$16,597; Warrin road, Schiller avenue to St. Clair avenue, \$7,713; Castle Frank avenue, from Mackenzie avenue to east limit of lot No. 17, \$8,949; Gwynne avenue, King to Queen, \$8,129; Hiron street, Sullivan to Grange avenue, \$2,307; Castle Frank avenue, Hawthorne avenue to Dale avenue, \$7,332; Poolar Plains, Edmund street to St. Clair avenue, \$11,458; Macadam—Queen street, Woodbine avenue, for 1.824 feet west, \$8,764; Queen street, Woodbine avenue to east city limit, \$27,242; Queen street, from Greenwood avenue to east side of Kington road, \$11,323; Brick—Burnfield avenue, Shaw street to Ossington avenue, \$3,731; Wascana avenue, Sumach to east end, \$1,641;

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Vitrified block — Lane, first east of Yonge, from Wilton to Gould, \$3,535.— Building permits have been granted as follows: J. Hill, 2 storey and attic brick dwelling, Clinton street, cost \$3,000; J. Kyle, 2 detached 2 storey brick dwellings, 66-68 Galley avenue, cost \$3,000; J. Champion, 2 storey roughcast dwelling, brick front, corner Hogarth and Logan avenues, cost \$1,200; R. S. Smith, 3 attached 2 storey brick stores and dwellings, Queen street, cost \$8,500; F. Holt, 2 storey brick veneer dwelling, 66 McGee street, cost \$2,000; J. M. Cowan, 3 pair semi detached 2 storey brick dwellings, corner Sorauere avenue and College street, cost \$13,000; A. Wylie, 2½ storey brick dwelling, Geoffrey street, cost \$3,600; G. F. Clare, 2 storey and attic brick dwelling, 101 Woodlawn avenue, \$3,500; Rapp & Shackleton, pair semi-detached 2 storey and attic brick dwellings, 55-57 Heward avenue, cost \$5,000; Louisa H. Hyde, 2 storey brick store, corner Dupont and Huron streets, cost \$2,500; S. H. Hurst, 2 storey brick dwelling, Geoffrey street, cost \$3,500; C. W. Chadwick, pair semi detached 2 storey and attic brick dwellings, Parliament street, cost \$6,000; W. R. Drummond, 2 storey roughcast dwelling, Shaw street, cost \$1,300; R. H. White, 2 storey and attic brick dwelling, Westmoreland avenue, cost \$2,500; T. J. Edwards, alterations to hotel building, King street east, cost \$3,000; W. E. Long, 2½ storey brick dwelling, Liszt avenue, cost \$5,000; Mrs. Hatherly, 2 storey roughcast dwelling, brick front, Russett avenue, cost \$1,300; Hudson Bros., 2 detached 2½ storey brick dwellings, 220-222 St. Clarens avenue, cost \$6,000; J. Joss, 3 attached 2 storey brick dwellings, 10 to 14 Armstrong avenue, cost \$6,000; M. Black, 2 storey frame dwelling, Kenilworth avenue, cost \$1,300; Geo. E. Baycroft, pair semi detached 2 storey roughcast dwellings, Franklin avenue, cost \$3,600; F. S. Duff, 2½ storey brick dwelling, 95 Beatrice street, cost \$3,500; Symons & Rae (in trust), 2½ storey brick dwelling, corner Crescent road and Lampport avenue, cost \$12,000; W. W. Hiltz, 3 pairs semi detached 2 storey brick dwellings, 1 to 11 Hogarth avenue, cost \$15,000; Wm. Hodgkinson, 2 storey and attic brick dwelling, De Grassi street, \$2,600; Somerville Limited, 2 storey brick and steel factory, St. Helens avenue, cost \$40,000; R. L. Godkin, 2 storey brick dwelling, 6 Garnet avenue, \$2,500; Eden Mann, 2 storey cement brick dwelling, 256 Bartlett avenue, cost \$1,800; W. Slemin, 2 storey roughcast dwelling, brick front, Muir avenue, cost \$1,500; J. Waghorn, 2 storey brick dwelling, Howard Park avenue, cost \$3,500; Newman & Roberts, 2 detached 2 storey brick dwellings, Pearson avenue, cost \$3,000; Nellie Fenton, 2 storey roughcast dwelling, 145 Barton avenue, cost \$1,000; C. Heelin, 2 storey brick store and dwelling, Bloor street, cost \$2,800; J. Raine, 2½ storey brick dwelling, 187 Wright avenue, cost \$3,000; W. Williams, 2 storey roughcast dwelling, brick front, 487 St. Clarens avenue, cost \$1,200; W. Wilson, pair roughcast dwellings, brick fronts, Christie street, cost \$3,500; S. B. Coon, 2½ storey brick dwelling, Roxborough street, cost \$5,000; Geo. Hesk, 2½ storey frame store and dwelling, Queen street east, cost \$2,500; C. E. Mills, chute-the chutes, Exhibition Park, \$20,000; A. Stewart, 2 storey brick dwelling, 869 Collège street.

FIRES.

Flour mill of L. H. Stevens, Campbellford, Ont., loss \$4,000.—Acid plant of the Dominion Pulp Co., Chatham, N.B., loss \$15,000.—Fire at Springfield, Ont., on the 25th inst., destroyed the departmental and

hardware stores of H. Chambers, at a loss of \$30,000.—Depot of the Wabash Railway at Thamesville, Ont., totally destroyed, loss \$5,000.—Sawmill of the Imperial Packing Co. at Woodstock, N.B., loss \$6,000.

CONTRACTS AWARDED.

BELMONT, MAN.—New municipal building: D. Spaulding, contractor.

GRAND FALLS, N.B.—New Catholic church: James McVey & Son, contractors.

PRINCE ALBERT, SASK.—McKay & Adam block: Hotson & Leader, contractors.

PERTH, ONT.—Alterations to interior of Bank of Montreal: Wesley James, contractor.

WEYBURN, SASK.—Granolithic sidewalks: George Beach, successful tenderer, \$4,800.

MARKDALE, ONT.—Cement-concrete walks: Frost & Nichol, Brookholme, contractors.

QU'APPELLE, SASK.—Brick veneer residence for F. G. Whiting: Wilson & Lowings, contractors, cost \$3,000.

VICTORIA, B.C.—Annex on Trounce Alley for W. & J. Wilson: Thomas Catterall, contractor, cost about \$12,000.

UXBRIDGE, ONT.—Construction of granolithic walks: Maple Leaf Co., London, Ont., successful tenderers at 11 cents per foot.

PETERBORO, ONT.—Finnie & Gordon have secured the contract for the Bell Telephone Co.'s new building. McGregor & Reid will do the plumbing.

WINNIPEG, MAN.—The tender of the Imperial Oil Co. has been accepted for supply of 500 to 700 tons of flux for the asphalt plant, at \$22.50 per ton.

NIAGARA FALLS, ONT.—Richard Spong has been awarded the contract for cement walks at 10½ cents per square foot for walks and 8½ cents per lineal foot for curb.

ST. CATHARINES, ONT.—Alterations to Central school: Masonry, Newman Bros.; carpenter work, E. Hudson; plumbing, A. A. Riddell; painting, Charles Chapman.

WALKERVILLE, ONT.—Cedar block pavements on Niagara and Ontario streets and Walker, Monmouth and Devonshire roads: N. Conn, successful tenderer, \$31,855.

FREDERICTON, N.B.—Residence on George street for C. H. Waddell: Moses Mitchell, contractor.—Two steel spans for highway bridge: T. C. Brewer, Woodstock, successful tenderer.

SASKATOON, SASK.—Erection of post office: J. McDiarmid Co., Winnipeg, successful contractors.—Warehouse for Massey Harris Co.: J. T. McDonald, Regina, successful tenderer, \$14,000.

VANCOUVER, B.C.—Cement curbs: Lawrence & Hull, successful tenderers, 54 cents per running foot.—New fire halls

in Cedar Cove and West Fairview: C. P. Schindler, contractor, \$6,500 and \$6,700 respectively.

REGINA, SASK.—Building of new lands titles office: May, Sharpe Construction Co., Winnipeg, successful tenderers.—Mayor Smith has let the contract for a large new business block to cost \$35,000. Plans by Storey & Van Egmond.

ST. THOMAS, ONT.—Yarmouth Township Council have awarded the contracts as follows for erection of Brick's bridge: Concrete work, C. Stafford, \$1,493; steel superstructure, Petrolia Bridge Co., \$1,710. The Hamilton Bridge Co. tendered at \$1,850, the Ontario Bridge Co. at \$1,950, and the Stratford Bridge Co. at \$2,020.

PORTAGE LA PRAIRIE, MAN.—Addition to Hudson Bay Co.'s stores: Charles Jeffrey, contractor, cost \$17,000.—New building for Bank of Montreal: Charles Jeffrey, contractor.—Addition to Rossin House: Brick and stone work, H. & J. Jeffrey; carpenter work; A. McLarty; plumbing and tin-smithing, Burns Bros. & Grassie; electrical work, W. Bell. Building will be three stories, 68 x 54 ft.

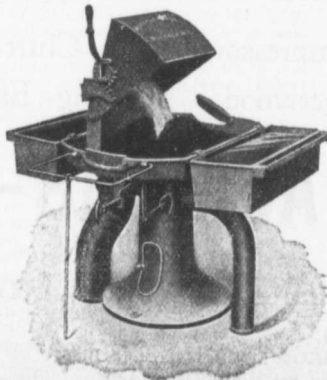
OTTAWA, ONT.—By the readjustment of the dredging contracts awarded by the Dominion Government, and which were based on a second call for tenders necessitated by the numerous low bids of the Dominion Dredging Company, of Ottawa, the following contracts are included in the revised list: Mr. Weddell, of Trenton, secures the work at Thornbury and Meaford; the Canadian Dredge and Construction Company, of Midland, the Midland harbor work; the Owen Sound Dredge and Construction Company, the Midland (Tiffin) work; and A. F. Bowman, of Southampton, the work at Warton, Penetanguishene, Waubausene and Owen Sound.—The Separate School Board have accepted the tender of Knox Bros., 119 Bank street, for the heating, plumbing and ventilation of St. Patrick's school, boys' and girls', the Lyceum and St. Matthews', at \$5,500, and that of Martel & Langelier for St. Bridget's, at \$2,760.—Asphalt pavement on Belmont avenue: Barber Asphalt Co., contractors, \$6,968.

BIDS.

NIAGARA FALLS, ONT.—Tenders have been received as follows for sewers on Peer and Main streets: P. Lorenzo, \$3,030; Fraser & Ward, \$3,355; S. Quagliariello & Sons, \$3,487.50.

OTTAWA, ONT.—The Transcontinental Railway have received four tenders for the construction of eight miles of road from a point near Chipman, N.B., eastward toward Moncton. They are from the Grand Trunk Pacific, M. J. O'Brien and Z. J. Fowler, Ottawa; W. Kitchin Company, Fredericton; J. W. McNanus Company, Memramcook, N.B.

The dissolution is announced of Brown & Davis, contractors, Nanton, Man.



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All overhead hoods can be done away with and all overhead pipes replaced by underground tile pipes chemically proof against the action of the gases.

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NEW COMPANIES.

United Paint Company, Limited, incorporated by the New Brunswick Government, capital \$100,000. Incorporators, A. J. Chapman, Dorchester; Frederick J. White, Moncton; S. E. Baughan, St. Martin's, and others.

Ontario Metal Novelty Manufacturing Company, Limited, Toronto, incorporated, capital \$100,000. Provisional directors, Edward Currie, McAllister Campbell and John S. Woodhouse.

Broughan & Grattan Telephone Company, Limited, Dacre, Ont., incorporated, capital \$5,000. Directors, Joseph Legree and Philip Bradley, of township of Broughan, and Robert Steele, John Livingstone and W. A. Hurd, all of township of Grattan.

Hydro - Electrical Construction Company, Limited, Toronto, incorporated, capital \$50,000, to carry on the business of contractors and hydraulic and electrical engineers. Directors, Alexander Keith, A.G.F. Lawrence and W. R. Wadsworth.

Empress Transportation Company of Midland, Limited, incorporated, capital \$200,000. Directors, James Playfair, D. L. White and J. W. Benson.

Canada Photo Supply & Manufacturing Company, Limited, Toronto, incorporated, capital \$40,000.

Directors, T. H. Barton, J. H. Sinclair, N. Harvey, and others.

Galeta Electric Power & Milling Company, Arnprior, Ont., incorporated, capital \$100,000. Directors, Thomas Moran, M. Sullivan and John Brennan.

Boston Lumber Company, Limited, Everett, Washington, licensed to carry on business in British Columbia.

Bird's Hill Sand Company, Winnipeg, Man., incorporated, capital \$150,000. Directors, Elisha F. Hutchings, Daniel D. Wood, Robert

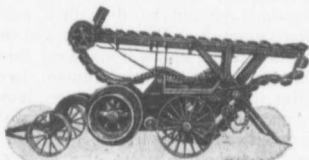
Wilson, William Dryden and W. J. Young.

Columbia Lumber Company, Portland, Maine, registered in British Columbia as an extra provincial company. L. L. Dickerman, Vancouver, attorney.

The Laing, Ritchie Co., of Essex, Ont., have been appointed selling agents for the Asphalt Ready Roofing Company, of New York, for their gravel surfaced asphalt ready roofing.

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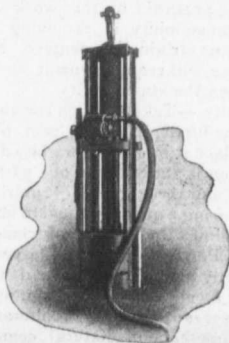
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- They usually leave the pile so that it need not be cut off.
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 MIDLAND, ONT.

v: C. P. l \$6,700

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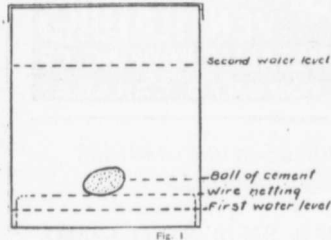
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DU RIGHT Forge Co. NTREAL

Simple Methods for Testing of Cement

W. Purves Taylor, engineer in charge of the Philadelphia Municipal Testing Laboratories, has contributed a valuable little treatise on simple tests for cement that will be appreciated by the layman and small user the world over. The methods he recommends he does not claim are infallible, but he does claim that they will show the user enough to enable him to determine whether any given cement is safe to use. His method has been deemed so valuable that it has been sent out by the Association of American Portland



Cement Manufacturers. Mr. Taylor's methods are as follows:

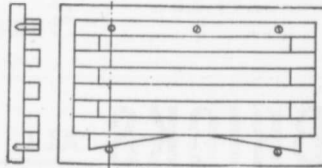
Soundness.—Take about half a pound of cement, place it on a clean surface of metal or glass and form it into a crater. Into the centre of the crater pour about a fifth of its weight of water and mix thoroughly by hand or with a trowel for a couple of minutes until a stiff and uniform paste is obtained. Make a ball of the paste about 2 inches in diameter and drop it on the table from a height of about 2 feet. If the ball flattens more than half its depth the paste is too wet; if it cracks badly it is too dry. Add more cement or more water, mix thoroughly and test until the right consistency is obtained, then mold two balls about 2 inches in diameter.

Take a tin can, which has a tightly fitting cover, and bend into it a piece of wire netting, as shown in Fig. 1, about 2 inches from the bottom. Put about an inch of water in the bottom of the can, place one of the balls on the netting, cover the can, and put it away in a cool place for twenty-four hours. Then fill the can with water to cover the ball, remove the cover and place it on a stove at such a heat that the water will boil in about half an hour. Let it boil gently then for three hours. Have a second vessel of boiling water beside the can and as the water evaporates replace it with the boiling water. Never add cold water. After boiling three hours, remove the ball and examine it.

A good Portland cement will always pass this test, and the ball will remain sound and hard. If the ball is disintegrated, or if it is checked or cracked it generally indicates inferior quality and untrustworthy

material. Sometimes failure in boiling is caused by the material being too fresh, and a second test made a month or so later will pass, showing that the expansive elements have become hydrated and thus inert. In general, however, it is on the safe side never to use cement that fails in boiling. If it fails at first store it away for a month and then test again. If it still fails it is better not to use it.

Time of Setting.—Put the second ball, made as previously described, in a place protected from the sun or any other source of heat, and from any strong current of air. At the end of twenty minutes examine it, then put it away and examine it again in ten hours. The ball at twenty minutes should be still soft and pliable, damp on the surface, and should not feel warm. At ten hours it should be dry, firm and hard enough so that a firm pressure of the thumb nail will make no impression on it. If the cement begins to harden or feel warm in less than twenty minutes, it is generally inadvisable to use it, since setting will have begun before the mortar



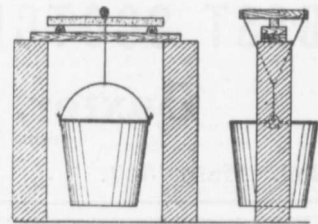
or concrete is molded, and the result will be a weak and easily disintegrated product. It is, of course, possible to re-temper such cement and obtain excellent results, but this process requires considerable skill and experience and therefore is not usually to be recommended. Quick setting cement often becomes slow on a storage of a month or two, so that it is better to keep this material than to attempt to use it earlier at the risk of poor results. A cement that does not harden in ten hours may ultimately give good results, but the slow setting will much delay the progress of the work and may cause injury in removing the molds or striking the centers. Safe practice will require cement to set between the stated limits.

Purity.—Take as much cement as may be lifted on a five-cent piece and place it in a china or glass dish. Pour on it a mixture of one part of water and three parts of muriatic acid, using a quantity equal to about three times the volume of cement. Pure Portland cement effervesces violently a second or two and then forms a yellowish jelly. A continued effervescence shows adulteration with limestone or natural cement. Cinders or sand is shown in a sediment at the bottom of the jelly. The presence of slag is shown by the

characteristic putrid odor of hydrogen sulphide. Cement containing any of these adulterations should not be used.

Strength.—It is very difficult to determine the strength of a cement mortar by any simple method and obtain results of even approximate accuracy. The following, however, is probably the best method: Make a mold, as shown in Fig. 2, of a planed board, and some one inch strips of wood. Fasten the top strip to the board and place the others on loosely, holding them in place by the wedges at the bottom, thus forming molds for three prisms of mortar 1 inch by 1 inch by 12 inches long. Take special care that the cross sections of the prisms are exactly one inch.

Take mortar from the mixing box, or make some of one part cement and three parts sand, thoroughly mixed dry and then wetted to form a stiff mortar, and fill the molds, pressing the material in firmly and smoothing the top with a trowel. The molds should be oiled slightly to prevent the mortar from sticking. Put the mold away in a cool and, if possible, damp place for twenty-four hours. Then remove the prisms of mortar and place them in fresh water, neither hot nor cold, for six or for twenty-seven days. Any prisms that are chipped or otherwise defective should be discarded. Make the apparatus shown in Fig. 3 with a board, a round piece of wood about an inch in diameter, and a pail. The bottom knife edges are made by cutting the round piece of wood in half, and are fastened to



the board exactly 10 inches apart, center to center. The center knife edge is a round piece of wood from which a pail is suspended by a cord.

When the test pieces are seven or twenty-eight days old place them, still wet, on the apparatus as shown in the cut, taking care that the upper strip is exactly in the centre and at right angles with the prism. Adjust the pail so that it is just off the ground and exactly under the specimen, and then slowly pour sand into it until the prism breaks. Carefully weigh the bucket with the cord and strip still attached. If the prism is not exactly one inch square correct the weight by dividing it by

the product of its width times the square of its depth in inches.

The approximate strength of the mortar may then be computed as follows:

Tensile strength equals centre load multiplied by 10.

Compressive strength is load multiplied by 50.

If the average of three prisms tested in this manner shows a tensile strength of less than 120 pounds at seven days or 180 pounds at twenty-eight days, on 1:3 mortars, something is radically inferior and wrong with either the cement or the sand, and the fault should be thoroughly investigated.

Tests made by this method are, of course, far from being accurate, but they nevertheless give a very fair indication of the value of the material. In determining the relative value of different sands intended for use they will often give most valuable and useful information. These tests described are, of course, crude in the extreme, but are vastly superior to no tests at all, and should be of much assistance to the small user in securing good material. Insist on cement that will boil and set normally and most of the dangers of inferior cement will be avoided.

UNCLE SAM A AS CEMENT MANUFACTURER.

In the March number of Forestry and Irrigation there is an interesting article which describes the United States Government's entrance into the field as a cement manufacturer. Those who are conversant with the project of reclaiming the Arizona desert by the construction of the big Roosevelt dam at the Salt river remember that when the Government asked for bids for the cement to be used in the concrete work in the dam, which is 294 feet high and 800 feet long, all tenders were rejected because the location of the site, sixty-two miles from a railroad, made it impossible for cement manufacturers to bid less than \$4.89 a barrel for the 240,000 barrel contract. Figuring the lowest rates for rail and wagon haul, this bid could not have been more than sixty cents a barrel, which could not be regarded as exorbitant in view of the fact that Western mills are getting \$2.00 a barrel from the Government for cement in other localities.

Then some expert of the Reclamation Service discovered a ledge of limestone which outcropped above the dam site and at a convenient distance a deposit of clay. With the materials at hand the Government decided to manufacture its own cement, and a mill with a capacity of 350 barrels a day was installed, the equipment being furnished by the Allis-Chalmers Co. Describing the operations of the mill Forestry and Irrigation says:

"Constant and careful tests of the product have proved the excellent quality of the cement, and the accurate cost-keeping methods employed show conclusively that Uncle Sam actually will save about half a million dollars on the cost of the project by reason of this experiment. The following table summarizes the cost of manufacture for the months of October and November, during which period the mill was working at one half capacity:

	Oct.	Nov.
Salaries and labor.....	\$0.75	\$0.70
Maintenance material....	.14	.15
Quarry explosives.....	.015	.02
Clay digging.....	.03	.034
Clay hauling.....	.08	.074
Miscellaneous supplies.....	.05	.04
Miscellaneous labor and materials.....	.01	.016
Fuel wood.....	.01	.006
Fuel oil.....	.89	.89
Electric power.....	.15	.20

Total..... \$2.125 \$2.13

"The average cost of \$2.13 per barrel is a trifle less than the Government is now paying for cement f.o.b. mills in several parts of the west. With the Government plant working full capacity it is estimated that the cost of manufacturing will not exceed \$1.80 per barrel. Up to the present time the mill has turned out 70,000 barrels of cement. Much of this has been utilized in canal lining, headworks, pressure pipes, aqueducts, and crossings. Now that the dam has been erected to river grade it is expected that the mill will be running at full capacity in the near future."

CRUSHED BRICK FOR CONCRETE.

Loren E. Hunt, a Government engineer in charge of the testing station at the University of California, in Berkeley, reports that he has proved by experiments that bricks taken from the fire debris in San Francisco, crushed and screened, when mixed with cement in proper proportions, make a strong building material. The structural association of San Francisco, composed of engineers, builders and architects, has been co-operating with Hunt in these tests, extending over a period of several months. Some of the bricks were used without being cleaned and others were cleaned before crushing. The latter gave much greater efficiency. The screened brick concrete averaged high in strength. Hunt says that this great strength is due to the fact that the surface of a broken brick is such that an excellent bond is obtained between mortar and brick. It is not necessary to soak

the crushed bricks before making the mixture if a wet concrete mixture is used. It is said that a hole can be drilled in a floor or wall of the brick-concrete with much less danger of shattering the surrounding mass than is the case with rock mixtures. Engineer Hunt says that he is certain that the brick mixture will not weaken with age, and he will make further tests to demonstrate this more thoroughly.

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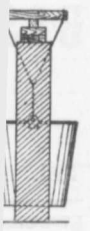
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SELECTING THE PROPORTIONS FOR CONCRETE.*

By WILLIAM B. FULLER.

The growing use of concrete for structures in which great care must be taken to have only the best material and workmanship has stimulated investigations into the effect of varying the relative proportions of sand and stone in the mix, the proportion of cement to the total remaining the same, and the result has demonstrated very conclusively that the proper grading and relative proportion of the ingredients has a great influence on the quality of the concrete produced. To demonstrate this great effect the writer made up a set of beams 6 in. sq. and 6 ft. long, varying these relations very widely from almost all stone to almost all sand, and broke the beams after 30 days with results given in the table below. It will be seen that although the amount of cement in each of the beams was the same (namely, 1 to 9 of the total material), some of the beams were over 700% stronger than others.

Proportions.	Modulus of rupture, lbs. per sq. in.
1 : 2 : 6.....	319
1 : 3 : 5.....	285
1 : 4 : 4.....	209
1 : 5 : 3.....	151
1 : 6 : 2.....	102
1 : 8 : 6.....	41

In investigating this subject over a term of years, it has been found that there is one combination of any given sand and stone which with a given percentage of cement makes the strongest concrete and this is the proportion which also gives the densest concrete, that is, the concrete which contains the least percentage of voids; or otherwise, that which weighs most per cubic foot. It is found also that this dense concrete is least permeable to water and consequently is the most durable, and it is also found that as a practical advantage such concrete is most easy to place, working easily and filling up all voids and bad corners.

The above stated law that the densest concrete is also the strongest gives a very easy way of proportioning the materials at hand so as to obtain the best and strongest concrete possible with these given materials. That is, to obtain these proportions by trial, as follows:

Procure a piece of 8 to 12 in. steel pipe about a foot long, and close one end; also obtain an accurate weighing scale. Weigh out any proportions selected at random, of cement, sand and stone, and of such quantity as will fill the pipe about three-quarters full; mix thoroughly with water on an impervious platform, such as a sheet of iron. Then, standing the pipe on end, put all the concrete in the pipe, tamping it thoroughly, and

when all is in, measure and record the depth of the concrete in the pipe. Throw this concrete away, clean the pipe and tools and make up another batch with the total weight of cement, sand and stone the same as before, but with the proportions of the sand to the stone slightly different. Mix and place as before and measure and record the depth in the pipe, and if the depth in the pipe is less and the concrete still looks nice and works well, this is a better mixture than the first. Continue trying in this way until the proportion has been found which will give the least depth in the pipe. This simply shows that the same amount of material is being compacted into a smaller space and that consequently the concrete is more dense. Of course, exactly similar materials must be used as are to be used on the work, and after having in this way decided on the proportions to be used on the work it is desirable to make such trials several times while the work is in progress, to be sure there is no great change, to determine the corresponding change in the proportions.

The above described method of obtaining proportions does not take very much time, is not difficult and a little trouble taken in this way will often be productive of very important results over the guess method of deciding proportions so universally prevalent. I have repeatedly known concrete to be increased in strength fully 100% by simply changing the proportions of sand to stone as indicated by the above method and not changing the amount of cement used in the least.

A person interested in this method of proportioning will find on trial that other sands and stones available in the vicinity will give other depths in the pipe, and it is probable that by looking around and obtaining the best available materials the strength of the concrete obtainable will be very materially increased.

As a guide to obtaining the best concrete, the proportion of cement remaining the same, the following are the results of extensive tests:

(1) The stone should all be of one size or should be evenly graded from fine to coarse, as an excessive amount of the fine or middle sizes is very harmful to strength.

(2) All of the fine material smaller in diameter than one-tenth of the diameter of the largest stone should be screened out from the stone.

(3) The diameter of the largest grains of sand should not exceed one-tenth of the diameter of the largest stone.

(4) The coarser the stone used the coarser the sand must be, and the stronger, more dense and water-tight the properly proportioned work becomes.

(5) When small stones only are

used, the sand must be fine and a larger proportion of cement must be used to obtain equal strength.

REINFORCED CONCRETE BRIDGE FAILURES.

A case of the failure of a bridge, described in a recent number of an American technical "weekly," is not only of much importance to students of the qualities of reinforced concrete; it also gives an instance of the fulfilment of a prophecy such as but seldom occurs. On the 11th August last a correspondent wrote to the journal named giving particulars of a culvert of armoured concrete built under contract in Indiana, with calculations from which he concluded that the bridge in question would be subjected, under its specified loads, to an intensity of stress beyond safe limits. The County Commissioners were informed of this, but said that the design had been checked and had been shown to be safe.

After this letter had been put into type, but before it had appeared in the journal, a second communication was received from the same correspondent, stating that one of the bridges built to this design had actually given way on the 18th of the same month under a traction engine. This was confirmed, on reference, by the designers, who also sent in a detailed report, with calculations of the stresses in the steel. It is noticeable that they gave none for those in the concrete. These are supplied by the Editor, who finds it was made to bear a crushing stress of 900 lbs. to the square inch. This is higher, it seems, than is usually allowed in specifications, but is not a dangerous load for the best concrete. It is stated, however, that the material in the culvert fell far short of the highest standard of excellence. In the Editor's calculations the loads are not those due to the actual weights, but to equivalent uniform loads.

In view of the increasing use of this material, and as the study of failure is the surest way to success, we propose to give a few details of the structure and of the accident which wrecked it.

The clear span of the culvert was 15 feet; the road was carried on a slab of armoured concrete 16 feet wide. The thickness of this slab was 7 inches; this was increased at the edges by 13 inches, so as to make two girders 20 inches deep in all by 12 inches wide. The reinforcement in the slab and in the girders was distinct—in the former it consists of 17 bars, 11/16 in diameter, spaced 10 inches apart, and placed parallel to the abutments, 1 inch above the bottom of the concrete. Across these, i.e., from one abutment to the other, run four 1/2 inch bars, evenly spaced. The girders are each reinforced by two

* Abstract of paper read before the third annual convention of the National Association of Cement Users.

bars running from end to end near the lower surface. These have connected to them, on each side of the centre, four bars sloping upwards, and away from the centre at an angle of 45 degrees, which run nearly to the top of the girder to take shear. A further provision against shear is made by a bent bar, the central part a little above the two just mentioned, the ends sloping up to the ends of the girder. This bar also has four sloping shear rods on each side of the centre. The three principal rods together gave an area of 3.40 square inches.

The engine which caused the accident weighed 7.36 tons with full boiler, of which 4 tons were carried on the rear wheels. The exact spacing of the wheels is not given. The driver stated that when the bridge gave way the leading wheel had nearly reached the further abutment, and the travelling wheels were about the middle of the span, which would make the distance centre to centre 7 feet 6 inches. When in this position the centre of the bridge collapsed, letting the engine through into the stream. The driver was shut in

between the footboard and the cab, but fortunately escaped injury and was got out unhurt. From the photograph of the wreck it would seem that the whole structure fell, including the side girders.

Examination of the wreckage showed that none of the steel had been broken; as for the concrete, the writer of the letter says it was good, as pieces would ring if struck with a hammer; but the designers

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say that "gross carelessness was shown in construction;" that the concrete was poor and had nowhere adhered to the steel. They also point out several minor faults. The failure happened three days after the forms had been removed; these had remained in place for three weeks after the completion of the concrete. The cost of the bridge at the contract rates was only 300 dollars.

The fault, in our opinion, is to be found as much in the design as in the construction. The idea seems to have been to transmit the load through the girders to the abutments, and not directly from floor to abutment. Now, it is most difficult to say how wide a strip of floor is really taking the weight of any concentrated load: the value of calculations depends entirely on this unknown factor, as the resulting stresses will vary inversely with the width of the strip chosen, and this width must depend on the discretion and judgment of the calculator. In such a case every part of the structure should be so placed as to take the loads as directly as possible, and dependence on unknown factors should be avoided. To effect this, the girders should have been placed not at sides, but nearer centre, so as to come directly beneath the loaded portion of the platform. As built, with the girders at the edges of the platform, it was quite possible for the latter to fall before the former had taken their proper share of the stresses; their acting together would depend on the unknown distribution of stress in this wide thin plate. The edges might have been strengthened by raising the longitudinal ballast walls and reinforcing them in a similar manner to that adopted for the girders, adding considerably to the strength and not greatly to the expense.

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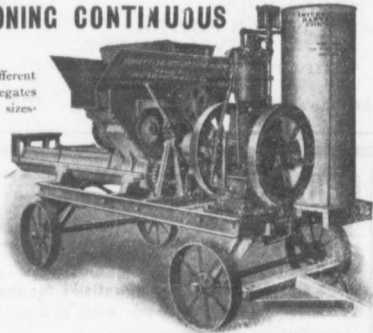
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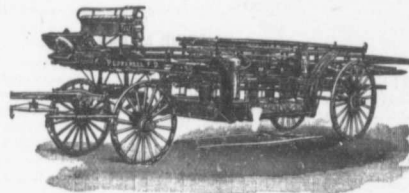
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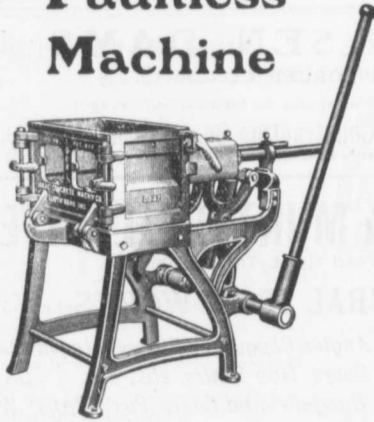
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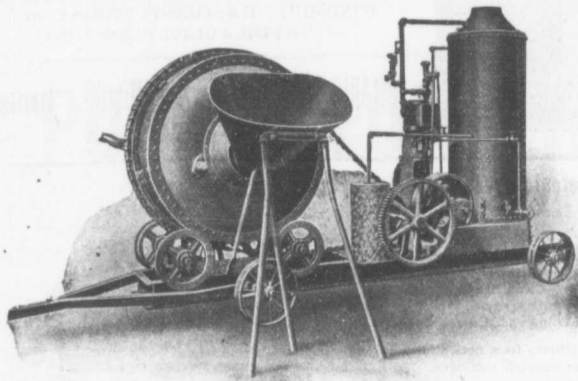
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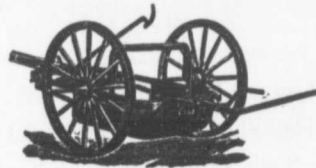
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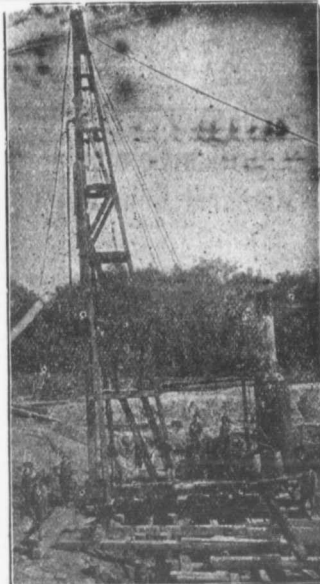
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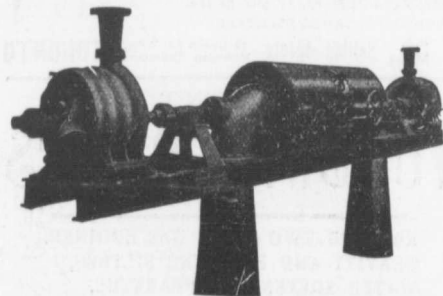


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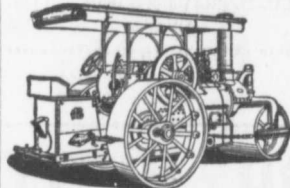
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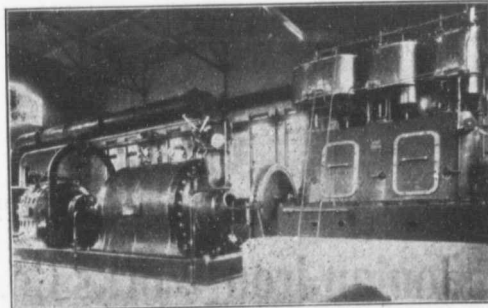


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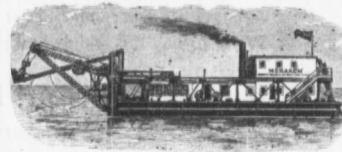
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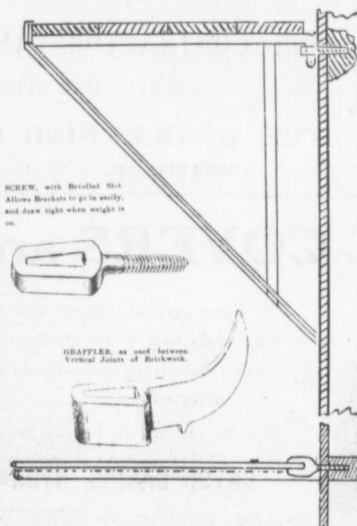
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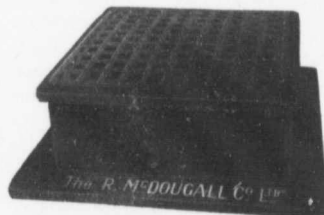
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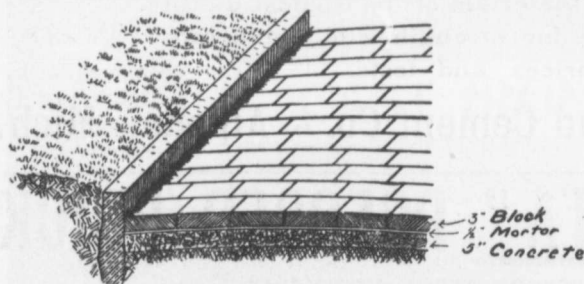
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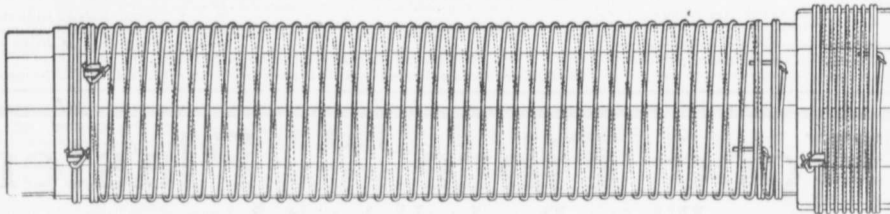
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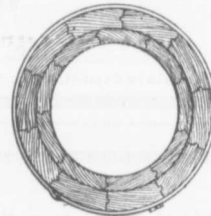
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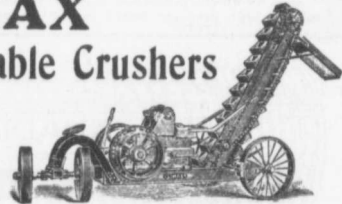
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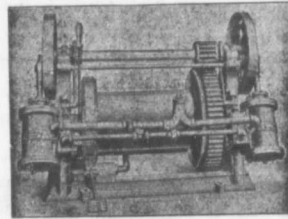
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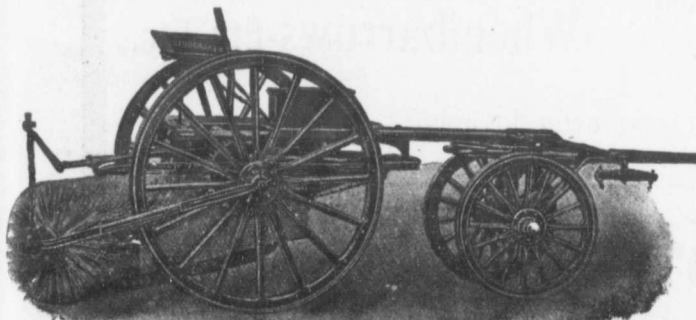
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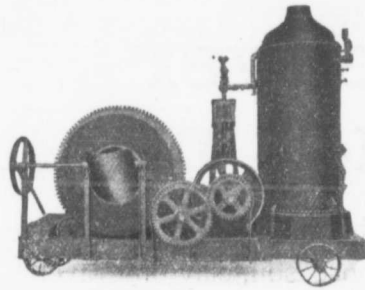
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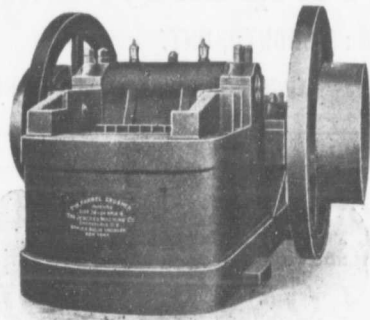
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