

CANADIAN Contract Record

*A Weekly Journal of 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, Purchasers of Municipal Debentures and Leading Contractors in All Lines Throughout Canada

VOL. 17.

TORONTO, MONTREAL — SEPTEMBER 26, 1906 — WINNIPEG, VANCOUVER

No. 30

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.

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in advance.

CONFEDERATION LIFE BUILDING, TORONTO
Telephone Main 2362.

Branch Offices:
Room 334, Board of Trade Building, Montreal.
Telephone Main 2995.

750-751 Union Bank Building, Winnipeg.

Telephone 1774.
Davis Chambers, 615 Hastings St., Vancouver,
B.C. Telephone 2245

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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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POSITION WANTED

In Contractor's office, Advertiser has had a number
of years' experience, more particularly on
the commercial side of the building business.
C. F. MYERS, 935 Bathurst Street, Toronto.

FOR SALE

We offer for immediate shipment from
stock, and subject to prior sale: 10,000 ft. 8
& 9 Cast Iron Pipe "MacLarens," 8" x 45 x
12' 0". Proved to 300 and coated.

I. H. GAUDRY & CO.,
Quebec

Proposals For Concrete Bridge Piers

Sealed proposals addressed to Alderman J. G.
Latimer, Chairman, Committee on Works, for
erection of Concrete Piers and abutments for
the support of a steel bridge over the Red River
at the foot of Redwood avenue, Winnipeg, will
be received at the office of the undersigned up
to 2.30 p. m.

TUESDAY, OCTOBER 16, 1906.

Plans, specifications and forms of proposal
may be obtained at the office of H. N. Ruttan,
City Engineer, Winnipeg, Canada.

Each bid must be accompanied by an accepted
cheque or draft payable to the order of the City
Treasurer, or cash deposit for a sum equal to 5
per cent. of the total amount of the bid, which
will be subject to forfeiture in case of failure on
the part of the contractor to enter into a written
contract with approved sureties if called upon
to do so.

The City reserves the right to reject any or all
tenders or to accept any bid which appears ad-
vantageous to the City of Winnipeg.

C. J. BROWN,
City Clerk.

City Clerk's Office, Winnipeg, September 12th,
1906.

Town North Toronto

Sealed tenders will be received by the under-
signed marked "Tenders for Sidewalks" up
to 6 o'clock p. m. on WEDNESDAY, 3RD OC-
TOBER, 1906, for building a Concrete Sidewalk
3 feet in width, on the east side of Yonge street
from about the north side of Eglington avenue
southerly to the south limit of the town, except
a part to the south of Glenwood avenue, where
the present plank walk is on trestles. Also for
a concrete Sidewalk on both sides of Brskine
avenue 4 feet in width part way. Also for a
Vitrified Brick Sidewalk 4 feet in width on
Glenview avenue from Yonge street westerly
to the west side of lot 126, between the south
row of double pines.

Plans and specifications can be examined at
the Town Hall and specially from 4 to 6 o'clock
p. m. on Thursday, 27th September, 1906, when
the town engineer will be present to give ex-
planations as to same.

Tenders to be at a rate per lineal foot of 3 feet
or 4 feet in width for the concrete walk and at
a rate per lineal foot for vitrified brick walk 4
feet in width, in all cases to include lares,
private entrances, road crossings, etc., as per
plans and specifications.

A marked cheque for \$25 to accompany each
tender, to be payable to the undersigned, which
to be returned when the successful tenderer
enters into contract with the town.

The lowest or any tender not necessarily
accepted.

W. J. DOUGLAS, Clerk and Treasurer,
Town of North Toronto,
Eglinton P. O., 17th September, 1906.



TEMISKAMING and NORTHERN ONTARIO RAILWAY COMMISSION.

TENDERS FOR GRADING

Sealed tenders, addressed to the undersigned
and marked, respectively "Tender for Kerr
Lake Branch," "Tender for Charlton Branch,"
and "Tender for Haileybury Spur," will be re-
ceived up to 12 o'clock noon, on TUESDAY,
OCTOBER 2ND, 1906, for all the work except
tracklaying and ballasting connected with the
building of the following branch lines, viz.:

1. From the main line near Cobalt to the Kerr
Lake region, a distance of approximately four
miles.

2. From the main line to a point at or near
Haileybury Wharf, a distance of about one and
three-quarter miles.

3. From the main line near Rugehart to the
Village of Charlton, a distance of about eight
miles.

Plans and specifications may be seen at the
office of the Commission, 25 Toronto Street,
Toronto, and at the Chief Engineer, North Bay,
Ontario.

Marked cheques payable to the order of the
Chairman and Secretary-Treasurer of the Com-
mission must accompany tenders as follows:
Kerr Lake Branch \$2,000.00; Haileybury Spur,
\$500.00; and Charlton Branch, \$2,000.00.

Tenders must be made out on the printed
form supplied by the Commission.

The commission will not be bound to accept
the lowest or any tender.

H. W. PEARSON,
Secretary-Treasurer,
25 Toronto St., Toronto.

Dated at Toronto, September 10th, 1906.

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

TOWN OF DALHOUSIE

Province of New Brunswick

TENDERS FOR WATERWORKS

Sealed tenders addressed to the Town Clerk
of the Town of Dalhousie, New Brunswick, will
be received until 7.30 p. m.,

Wednesday, October 3rd, 1906,

for laying about 17,000 feet of conduit pipe,
part 12-inch, part 10-inch, and part 8-inch
diameter, and for furnishing all materials there-
for.

Plans and specifications will be ready for in-
spection, and may be seen at the office of the
Chief Engineer, 103 Bay Street, Toronto, or at
the office of the Town Clerk, Dalhousie, N. B.,
on and after September 24th.

No tender necessarily accepted.

Tenders for other sections of the work will be
called for at a later date.

WM. S. MONTGOMERY, Esq.,
Mayor, Dalhousie, N. B.
ALEX. J. LE BLANC, Esq.,
Town Clerk, Dalhousie, N. B.
W. E. DOUGLAS,
Resident Engineer, Dalhousie, N. B.
WILLIAMS CHIPMAN,
Chief Engineer, 103 Bay St., Toronto.

THE BOARD OF EDUCATION TENDERS WANTED

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

MONDAY NOON, OCTOBER 1ST, 1906

for the several trades necessary in the erection
of a

High School Building in Riverdale

also for the enlargement of

Rosedale Public School

and for fitting up

Building on Pembroke Street

for Manual Training Class.

Specifications may be seen and all informa-
tion 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.
H. SIMPSON,
Chairman of Committee.

[FOR ADDITIONAL ADVERTISEMENTS FOR TENDERS SEE NEXT PAGE.]

TOWN OF DUNNVILLE
PROVINCE OF ONTARIOWATER WORKS
EXTENSIONS

Sealed tenders will be received by the town clerk until 8 p.m.

TUESDAY, OCTOBER 2ND, 1906

for laying about 7,000 lineal feet of water mains also for furnishing all materials therefor.

Plans, specifications, etc., may be seen at the office of the Chief Engineer, 103 Bay Street, Toronto, and at the Town Clerk's office, Dunville, on and after September 20th. No tender necessarily accepted.

WILLIS CHIPMAN, Chief Engineer,
103 Bay Street, Toronto, Ont.
J. W. HOLMES, Esq., Town Clerk,
Dunville, Ont.

Proposals For Bridge
Superstructure

Sealed proposals addressed to Alderman J. G. Latimer, Chairman, Committee on Works, for erection of steel superstructure for Highway Bridge over the Red River at Redwood Avenue, Winnipeg, will be received at the office of the undersigned up to 2.30 p. m. on

TUESDAY, NOVEMBER 20, 1906.

Plans, specifications and forms of proposal may be obtained at the office of Col. H. N. Rutan, City Engineer, Winnipeg, Canada.

Each bid must be accompanied by an accepted cheque or draft payable to the order of the City Treasurer, or cash deposit for a sum equal to 5 per cent. of the total amount of the bid, which will be subject to forfeiture in case of failure on the part of the contractor to enter into a written contract with approved sureties if called upon to do so.

The City reserves the right to reject any or all tenders or to accept any bid which appears advantageous to the City of Winnipeg.

C. J. BROWN,
City Clerk.

City Clerk's Office, Winnipeg, September 12th, 1906.

SALE OF
Contractors' Plant
By Tender

Sealed Tenders, addressed to the undersigned, will be received until Tuesday, the 2ND DAY OF OCTOBER, 1906, at noon, for the purchase of the plant of Barry and McMordie, contractors, Niagara Falls, Ontario. The said plant consists of the following:—

- 1 Hoisting Engine (Beatty) 16 horsepower.
 - 1 Travelling Derrick.
 - 7 Dump Cars 3-yard capacity, standard gauge.
 - 2 Diving Outfits.
 - 1 Upright Beatty Boiler, 18 horsepower.
 - 1 Upright Beatty Boiler, 21 horsepower.
 - 1 Upright Beatty Boiler, 24 horsepower.
 - 5 Steam Drills.
 - 1 Rand Air Compressor, 12 x 14.
 - 1 Rand Air Compressor, 8 x 8.
 - 3 Wood Boring Air Augers.
 - 3 Sift-leg Derricks.
 - 1 Northey Pump, 3-in. suction.
 - 3 Small Dump Cars, 30-in. gauge.
- Picks, Shovels, Bars, Water Pipe, Steel, Ropes, Etc.

The said plant may be inspected at the yards of Barry and McMordie, Niagara Falls, Ontario. Each tender must be accompanied by a marked cheque for 10 per cent. of the amount of the tender. The remainder of the purchase money will be payable in cash within fifteen days after acceptance of tender, or, if desired, payment of 50 per cent. of the purchase money may be deferred for six months on approved security being given.

The highest or any tender will not necessarily be accepted.

BICKNELL AND BAIN,
2 Leader Lane, Toronto.
Vendors' Solicitors

TENDERS FOR
FIRE ALARM

Sealed tenders, addressed "F. Adams, Esq., Chairman Fire, Water and Light Committee," and endorsed "Tenders for Fire Alarm," will be received at this office up to 4 o'clock in the afternoon on THURSDAY, THE 19TH DAY OF OCTOBER, 1906, for a Fire Alarm Telegraph for the City of Peterborough.

1. For supplying all the material required, and erecting, equipping and putting it in operation.

2. For supplying all the material required and delivering it at Peterborough.

3. For maintenance and repairs of the system after it is erected for periods of five or ten years. Tenders to give full particulars and complete specifications of the system proposed and all the material.

A list of boxes, gongs, etc., required will be furnished on application to the undersigned. The lowest or any tender not necessarily accepted.

S. R. ARMSTRONG,
City Clerk.

City Clerk's Office, Peterborough, September 21st, 1906.

CONTRACTS OPEN.

NORTH SYDNEY, N. S.—A new bait freezer will be erected here cost \$7,000.

WIARTON, ONT.—A. P. Ebert is considering the rebuilding of his factory recently burned.

LETHBRIDGE, ALTA.—J. H. Hanson of Butte, Montana, proposes erecting a large sawmill here.

WEST SELKIRK, MAN.—The by-law has been carried to establish a system of waterworks here.

INNISFREE, ALTA.—H. Johnson, of Wetaskiwin, intends erecting a large store building this season.

WOLSELEY, SASK.—R. E. Hall will receive tenders up to September 27th for heating the new town hall.

PARRY SOUND, ONT.—The by-law has been carried to raise \$10,000 for extension of the waterworks mains.

HAGERSVILLE, ONT.—J. H. Scott, Town Clerk, has taken tenders for the purchase of \$10,000 debentures.

MEDICINE HAT, ALTA.—J. E. Howson has purchased the American hotel and purposes having it remodelled.

RAPID CITY, MAN.—Architect Elliott, Brandon, has prepared plans for a large Oddfellows' hall building, 50 by 80 feet.

YALE, B. C.—Plans have been prepared for a two story boat house, on Mill river, cost between \$50,000 and \$75,000.

INGERSOLL, ONT.—T. R. Mayberry has taken tenders for construction of a cement arch bridge in West Oxford township.

GRAND FORKS, B. C.—The Boundary Iron Works have purchased a site and are arranging for rebuilding their works here.

SHAWVILLE, QUE.—The Methodist Congregation are planning to rebuild their church recently burned, estimated cost \$7,000.

ESTEVAN, MAN.—The Calgary Brewing Co. and the Imperial Oil Co. propose erecting two large warehouses here this fall.

RIDGETOWN, ONT.—The installation of a general system of waterworks for the town, is being discussed by business men.

SASKATOON, SASK.—Subscriptions are being received for the proposed general hospital building to be erected at a cost of \$30,000.

PONOKA, ALTA.—A by-law will be voted on October 9th to raise \$7,200 to build a fire hall and provide appliances for fire protection.

MONCTON, N. B.—The City Council will seek legislation to authorize a grant of \$10,000 for the erection of permanent exhibition buildings.

FREDERICTON, N. B.—C. A. Sampson, Victoria Public Hospital, has taken tenders for remodelling the heating plant of that building.

SOURIS, MAN.—It has been decided to adopt the plan of Architect Shillinglaw of Brandon for the new Methodist church building, cost \$20,000.

MIMICO, ONT.—The building of the railway branch of the Y.M.C.A. is being moved to the roundhouse where a two-story addition will be built.

WOODSTOCK, ONT.—The by-law which was voted on to loan \$25,000 to the Canada Bearings Co., Hamilton, to establish a factory here, did not carry.

TILLSONBURG, ONT.—A. R. Raynes, Town Clerk will receive tenders up to October 8th for the purchase of \$5,000 4 1/2 per cent. waterworks debentures.

HESPELER, ONT.—W. A. Hudson, architect, Preston, is planning for the remodelling of the building occupied by S. L. Hahn, into offices for the Merchants' Bank.

ST. JOHN N. B.—Tenders are taken this week for sewer and plumbing work for manual training and domestic science school building, Waterloo street. H. H. Mott, architect.

AMHERST, N. S.—C. W. Holmes has authorized the Secretary of the Board of Trade to offer a free site for a factory to the promoters of the new industry being organized.

NELSON, B. C.—The Canadian Bank of Commerce has purchased a site on West Baker street on which they will at once proceed to build a stone and brick office building.

NEW WESTMINSTER, B. C.—The B. C. Telephone Company are considering the erection of a fine office building in the city, also the installation of the latest type of switchboard.

MOUNT FOREST, ONT.—The Provincial Railway and Municipal Board have granted the application of the town to issue \$5,000 debentures for extending their waterworks system.

PORT ELGIN, ONT.—R. Munro, Town Clerk, will receive tenders up to October 1st for purchase of \$30,000 waterworks debentures and \$2,500 debentures, interest 4 1/2 per cent.

BRANDON, MAN.—The plans for the Collegiate Institute building prepared by Architect Elliott have been passed by the School Board. Building to be of St. Louis red pressed brick, cost \$50,000.

CALGARY, ALTA.—A four story addition to the Alberta Hotel will be erected this season.—The Calgary Hotel Co. have recently been incorporated and propose to construct a new hotel building.

CARTIERVILLE, QUE.—Plans and specifications for the waterworks of the village are being prepared by Charles Brandeis, Consulting Engineer, Montreal. About 3 1/2 miles of streets will be provided.

SYDNEY, N. S.—The directors of the Y. M. C. A. are considering the erection of a new building.—The Cape Breton Foundry Co. will soon begin the erection of its new buildings in south end of the city.

EBURNE, B. C.—B. W. Garreth will receive tenders up to September 28th for the construction of a dyke and ditch, flood boxes, etc. Plans at office of Thomas Watts, Engineer for the Commissioners at Steveston, B. C.

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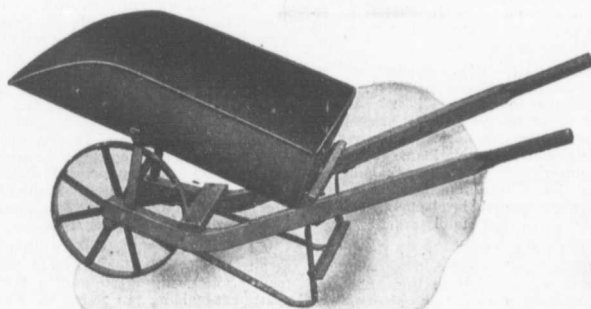
Furnished with either heavy steel drop balls or chains

“CYCLOPEAN” CONCRETE BUCKETS

STRONGEST AND BEST
DUMP CLEAR IN A MOMENT

All Sizes and Styles for Prompt Shipment

“STERLING” ROLLER BEARING WHEELBARROWS



10 Styles. Send for Catalogue

W.H.C. MUSSEN & CO.

Railway, Mining and Contractors' Supplies
MONTREAL

Tupper street have been prepared and work of construction will soon begin.—The Detachable Boiler Flue Co. will erect a factory here, 100 by 75 feet.

MARYSVILLE, N. B.—C. H. LaBillois, Department of Public Works, Fredericton, will receive tenders up to October 8th for repairing McConnell bridge. Plans at the Department and at the Alex. Gibson Manufacturing Co.'s store here.

CORNWALL, ONT.—L. K. Jones, Department of Railways and Canals, Ottawa, will receive tenders up to September 28 for the work of rebuilding the retaining wall in the back ditch of the Gal'op's Canal. Plans at the office of the Superintendent of the St. Lawrence Canals.

VICTORIA, B.C.—Hooper & Watkins, architects, have taken tenders for the erection of a brick addition to the Williams building on Broad street for David Spencer.—C. A. Harrison, proprietor of the Driad Hotel, has purchased a site on Haywood avenue for a new residence.

QUEBEC, QUE.—The construction of the Quebec & Saguenay Electric Railroad from St. Joachim to Malbaie, a distance of 58 miles, will be commenced shortly.—Mrs. Pelletier will build a residence on St. Cecile street, cost \$2,500.—It is rumored that the Grand Trunk Railway management have decided to erect a new palace hotel here in the near future.

PORT ARTHUR, ONT.—F. Gelinas, Department of Public Works, Ottawa, will receive tenders up to October 12th for construction of a breakwater. Plans with E. B. Temple, resident engineer, this town; J. G. Sing, Confederation Life Building, Toronto, and at the Department, Ottawa.—The Meisel Manufacturing Co. intend erecting a factory in the north end of the town.

LONDON, ONT.—Tenders will be received by H. Needham, reeve, up to September 29th, for steel joists, painting and other repairs to iron bridges in London township, over Thames river, on Adelaide street road. Plans at County Engineer's office, County Buildings.—The Grand Jury consider that a new court house should be erected for the city and the county of Middlesex.

OTTAWA, ONT.—N. J. Kerr, City Engineer, will receive tenders up to September 26th for construction of asphalt pavement on Dalhousie street, from St. Patrick to St. Andrew.—The G.T.R. propose to build a line between this city and Kingston.—The National Transcontinental Railway Commission will shortly invite tenders for the construction of 200 miles of road running east and west from Lake Abitibi.

REGINA, SASK.—The plans of John Woodman, architect, Winnipeg, for the proposed Union Station have been submitted to the Board of Trade and City Council.—The School Board are considering the erection of a new school in the north side of the city.—A site has been purchased corner Cornwall street and Victoria avenue for the new Land Titles office for which plans are being prepared by the Provincial architect.—It is stated that the Malcolm Canneries are seeking incorporation and purpose erecting large packing houses here.

MONTREAL, QUE.—Taylor, Hogle & Davis, architects, have prepared plans for additions to the Nurses' Home of the General Hospital.—The C. N. R. are considering the erection of repair shops here for the eastern lines.—The Allis-Chalmers-Bullock, Limited, intend enlarging their buildings.—Building permits have been issued to the Canadian

Express Company for a ten-story office building, corner Youville square and St. Paul street, cost \$250,000, also, to C. P. R. for a new paint shop, adjoining the Angus shops, cost \$70,000.

EDMONTON, ALTA.—H. A. Magoon, architect, has prepared plans for a new theatre to be erected corner Jasper avenue and Third street, the building to be two-story and 48 x 110 feet.—The congregation of Queens avenue church have decided to erect a manse on the lot adjoining the church, cost about \$3,000.—Tenders are being taken for steam heating of the new addition to the Bulletin building.—Building permits have been issued as follows: W. L. Lessing, residence, Fraser avenue, cost \$2,000; Philip Hager, residence, Namayo avenue cost \$1,300; H. Lloyd-Young, dwelling, cost \$1,700.

HAMILTON, ONT.—The Provisional Committee appointed in connection with the new proposed Y.M.C.A. building in the East End recommend the erection of a building to cost \$30,000.—Fraser & Randall, real estate brokers, have been commissioned to secure a site for a silk manufacturing company of New Jersey, wishing to locate here.—Building permits have been issued as follows: E. H. Bawtzheimer, brick dwelling, Madison avenue, cost \$1,500; T. H. & B. Railway, car repair shop, Garth street, cost \$4,000, also oil house \$1,500; W. Swales, two residences, Gibson avenue, cost \$2,500.

VANCOUVER, B. C.—The Sons of England are considering the erection of a new hall.—The Board of Trade, Trades and Labor Council and Hundred-Thousand Club are considering the proposal to unite to erect a building for their use.—Dalton & Eveleigh, architects, are preparing plans for rebuilding the Grand View Hotel, Cordova street.—Ald. G. H. Halse has purchased a site on Beach avenue on which he proposes the erection of a fine hotel.—Building permits have been granted as follows: Robert McKay, house Third avenue, \$1,200; W. H. Marcus, house, Triumph street, \$1,400; J. E. Wright, house, Ninth avenue, \$1,500; J. Laidlaw, house, Tenth avenue, \$1,500.—A five story hotel is to be erected on Grouse mountain to cost \$100,000.—Dr. McGuigan is interested.—A site has been purchased for a new fire hall, corner Salsbury drive and Charles street.

WINNIPEG, MAN.—H. B. Rugh, architect, will receive tenders up to September 29th for the erection of a brick apartment building 43 x 70 feet on Rose street, Fort Rouge.—The City Engineer has reported on new bridge over the Red river at the foot of McDermot avenue, cost \$240,000.—The Committee of Works at this week receiving tenders for granolithic walk on Maryland and James streets also for sewers and macadam pavements.—The City Council gives notice of its intention to construct asphalt pavements on Salter, Monkman, Rorie and Maple streets and Sargeant and Sutherland avenues, also a number of granolithic walks and sewers.—Plans for a large brewery on Beaconsfield street are being prepared.—The Cockshutt Plow Co. are preparing to make a three story addition to their warehouse on Princess street.—A. C. N. R. official states that the general terminal, locomotive and car repair shops for the western system will be located at Fort Rouge.—Two new fire halls are to be built, one in ward three, the other in either ward four or five.—The Works Committee have recommended the construction of the following sewers: In Mountin ave., cost \$23,700; in Notre Dame avenue, cost \$3,270; in Anderson avenue, cost \$3,800 and several other works.—The Water Supply Commission will have a survey made of the country between the city and

East Shoal lake to see if water can be brought from there by gravity.

TORONTO, ONT.—Plans for the new Knox church building have been adopted by the Committee and work will soon begin, cost about \$100,000.—A new mission church is to be erected by the Davenport and Davenport roads, Kingsmill, Hellmuth, Saunders and Torrence have purchased property on Sorauven avenue which it is understood is for an American firm of manufacturers to build on.—The Board of Control have decided to call for tenders immediately for the substructure for the proposed Lansdowne subway.—Tenders are wanted at 878 Palmerston avenue for plumbing, tin-smithing and plastering three houses.—Tenders are wanted for excavation and mason work. Plans at 398 Spadina avenue.—The Building Committee of the Kenilworth avenue Baptist church are soliciting subscriptions for the erection of a large church on Waverley road.—The Board of Education have instructed the Property Committee to report on building a large school on the Manning avenue site.—The plans for the new Island Bath House have been approved by the Island Committee.—F. W. Stair, proprietor of the Star theatre, has announced that he intends beginning the erect. of a burlesque theatre, corner Queen and Bond streets cost \$150,000.—Tenders are wanted at 388 Spadina avenue for masonry, bricklaying, carpentry, etc., on dwelling.—Tenders are wanted for plastering and plumbing a pair of houses, Plans at 78 Charles street.—The City Engineer has been authorized to report on the removal of the South Parkdale station to Sunny-side.—Several sets of plans have been prepared for the new Union station and have been submitted to the C. P. R. authorities.—The new building of St. Anne's Episcopal church, corner Gladstone avenue and St. Anne's road will begin early in the spring, cost about \$35,000.—Building Permits have been issued as follows: George Watson, 2-story brick dwelling, Curzon street, near Queen, cost \$1,200; Mr. Marshall, 2-story rough-cast dwelling, Hallam street, near Shaw, cost \$1,800; Methodist Book Room, 6-story brick addition to factory, Temperance street, cost \$30,000; K. J. Allison, 2½-story brick dwelling, Isabella street, near Yonge, cost \$4,500; J. Armstrong, pair 2-story and attic brick dwellings, 159-161 University avenue, cost \$6,000; Rose E. Holland, pair 2-story roughcast dwellings, Clinton street, cost \$1,800, A. Wilkins & Co., 2-story brick dwelling, Avenue road, near Roxborough avenue, cost \$2,700; Thomas Johnstone, 2-story frame dwelling, 88 Doel avenue, cost \$1,000; Thomas Butler, pair 2½-story brick dwellings, Markham street, near Lennox, cost \$6,000; James Beck, 2-story roughcast dwelling, Thorne street, near Shaw, cost \$1,000, Chas. Snow, 3-story brick store and dwelling, corner College and Delaware avenue, cost \$6,000; J. Small, 2-story brick dwelling, St. Clarens avenue, near Bloor street, cost \$3,000; George Alexander, 2½-story brick dwelling, Lynd avenue, near Dundas street, cost \$2,000; H. F. Squires, 4 pair 2-story and attic brick dwellings, corner Lennox and Bathurst streets, cost \$18,000; Herbert Galbraith, pair 2½-story brick dwellings, 268 271 Beatrice street, cost \$4,400; W. H. Ellis, pair 2-story and attic brick dwellings, 618 620 Huron street, cost \$6,500; J. C. Maxwell, 2-story roughcast dwelling, brick front, Lappin avenue, near Dufferin street, cost \$1,700; William Vanhorne, 2-story roughcast dwelling, brick front, Dagmar avenue, near Jones, cost \$1,200; W. E. Dool, pair 2-story and attic brick dwellings, 28-30 Beatrice street, cost \$5,500.

FIRES.

G. N. R. station, freight shed and water tank at Garneau, Que., completely destroyed.—Apple evaporator building at Watford, Ont., owned by R. J. Graham, Brockville, completely destroyed.—Melrose Abbey cheese factory, near Havlock, Ont., completely destroyed.—The fire brick factory of Jones Bros., Christie street, Toronto, loss \$6,000.—Stritsel's general store and Guillard's livery barn at Watson, Sask., loss about \$20,000.—Globe Hotel and stables at Ceylon, Ont., loss \$3,000.—Fruit warehouse of Titterington Bros., Balfour street, St. Catharines, Ont., loss \$2,000.—Public school building, Stoughton, Sask., loss \$5,000.—Gilmour Hotel, Bank street, Ottawa, loss \$75,000.—Wood-working factory of C. W. Gibbs, 514 Dufferin avenue, Winnipeg, loss \$10,000.—The Presbyterian manse, and a large quantity of lumber of Ritchie Bros. at Aymer, Que., loss \$88,000.—Buildings of P. Drolet, St. Augustin, Que., loss above \$2,000.—The cheese factory of P. Allord, at Kendall, Ont., completely burned.—Machine shop of Ontario Sugar Company's factory, at Berlin, Ont., loss \$6,000.—Stock barn of Hon. W. C. Edwards, at Rockland Ont., loss \$5,000.—Wm. Oke's earns with contents, Whitby, Ont., loss \$3,000.

CONTRACTS AWARDED.

WOLSELEY, SASK.—\$30,000 debentures: Confederation Life Association, Toronto, purchasers.
 STETLER, ALTA.—\$6,000 school debentures: Nay, Anderson & Co., Regina.
 YORKTON, SASK.—\$5,000 school debentures: Nay, Anderson & Co., Regina.
 QU'APPELLE, SASK.—\$5,000 debentures: Nay, Anderson & Co., Regina.
 STRATHCONA, ALTA.—\$15,000 school debentures: National Trust Co.
 VEGREVILLE, ALTA.—\$15,000 school debentures: Nay, Anderson & Co., Regina.
 LAVEY, ALTA.—Erection of business block for Mrs. Hetu, of Edmonton: A. J. Atkins, Strathcona, contractor.
 YARKER, ONT.—Kelsey system of heating in Methodist church: James Smart Manufacturing Co., Brockville, contractors.
 RED DEER, ALTA.—Erection of new fire hall: McKee & Cruickshanks, contractors.
 CHIGNECTO, N. S.—Masonry of new power house for Maritime Coal, Railway & Power Co.: J. N. Page, Amherst, contractors.
 VANCOUVER, B.C.—Erection of business block on Hastings street for Mayor

Buscombe: Smith & Sherbourne, contractors.

WELLAND, ONT.—New buildings for the Iroquois Motor Car Co.: Provincial Construction Co. of Toronto, contractors.

PINCHER CREEK, ALTA.—Erection of mill and elevator for the Pincher Creek and Elevator Co.: Scott Bros., contractors.

ST. THOMAS, ONT.—Erection of brick residence corner Southwick and Erie streets for A. S. Smith: F. G. Hill, contractor.

PICTON, ONT.—The work of building the new Carnegie library will be done by day labor under the superintendence of John Burns & Son.

COOKSTOWN, ONT.—Erection of Union Bank building: William Robinson, contractor, cost about \$5,000. Bond & Smith, architects, Toronto.

HAMPTON, N. B.—Erection of new school building: George Langstroth and J. W. Smith, contractors, cost \$13,000. J. E. Fairweather, architect

STRATHCONA, ALTA.—Erection of residence for priest in connection with St. Anthony's church: Thomas Page, Edmontion, contractor, cost \$4,000.

FRELIGHSBURG, QUE.—Installation of Kelsey system of warming and ventilation in R. C. church: James Smart Manufacturing Co., Brockville, Ont., contractors.

ST. GEORGE DE HENRYVILLE, QUE.—The James Smart Manufacturing Co., Brockville, Ont., have secured the contract for installing the Kelsey system of heating in the R. C. church.

MONTREAL, QUE.—Construction work on No. 5 station. Iron work, H. R. Ives & Co., \$8,888; roofing, W. F. Powell & Co., \$885; painting and glazing, Charles Fortier, \$1,114; electric wiring, W. J. O'Leary, \$425.

OTTAWA, ONT.—Remodelling and enlarging Bell Telephone building: Stone work and masonry, Thoms & Bouthillier; carpentry, Charles Hopewell; painting, A. J. Carson; roofing, MacFarlane & Douglas; plastering, John Sutherland.

WINNIPEG, MAN.—Works at St. Andrew's rapids: Quinlan & Robertson, Montreal, contractors.—The Fire, Water & Light Committee have recommended the acceptance of the following tenders: Erection of transformer house, warehouse and repair shop for electrical department, John Saul, at \$13,750; supply of 2,000 half-inch Empire meters, National meter Co. at \$12.50 each; water pipe and specials, William Jacks & Co., at \$4,020.82; valves, T. McAvity & Sons, at \$4,581; hydrants, Canadian Fairbanks Co., \$9,375.

TORONTO, ONT.—One of the tenders for work on schools, John McLeod,

having made an error in his estimate for stone work on Phoebe street, Dewson street and Kew Beach schools, omitting to reckon the cut stone, the property committee allowed him to withdraw his tenders, and accepted the next lowest tender. Mr. McLeod was awarded the contract for carpentering for \$29,450, being the lowest. The masonry contracts accepted were: Phoebe street, A. Webb, \$48,920; Dewson street, Lucas & Son, \$6,880; Kew Beach, Lucas & Son, \$6,636.

CORRECTION.

By mistake, the address in the advertisement of the Ideal Concrete Machinery Company in our last issue, was given as South Bend, Ind., instead of London, Canada, where the company have recently established a factory.

The firm of Proulx & Paquin, plumbers, Montreal, will be succeeded in business by E. Proulx.

S. L. Lynott and R. Keating, of Red Beach, Me., have leased the larrigan factory at St. Andrews, N. B., and intend entering upon the stone business. It is their intention to put in a "Jenny Lind" polishing machine and begin work at once.

Geo. H. Bradbury, manager of the Manitoba Pressed Brick Company, states that a company has been organized for the purpose of installing a sand-lime brick plant at Regina. Mr. Bradbury says the Berg system has proven a great success, there being over 100 plants operating under this system in the different states to the south. In Canada the Ottawa, Toronto, Port Arthur plants are all doing excellent work and producing a very fine brick. The Regina plant will be up-to-date.

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 WRITE FOR PRICES
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 LIMITED
 TORONTO, CANADA.
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"BULL DOG" SHOVELS

forged from one piece of High Carbon Bar Steel without weld or rivet, solid neck and blade, tempered in oil, straight chucked handle can be replaced when broken.

CANADIAN SHOVEL & TOOL CO.
 HAMILTON, CANADA

WRITE FOR CATALOGUE



Sectional View of finished One-piece Shovel, showing gauge or thickness of steel at different points

Note Solid Shank

AN ECONOMICAL CONCRETE ABUTMENT.

By C. R. Yongg.*

A concrete abutment of economical design was recently constructed at the Etobicoke River, about seven miles west of Toronto, on the Mimico Division of the Toronto & York Radial Ry. The railway, which is an electric one, carrying a heavy suburban traffic, crosses the

This reinforcement was for the purpose of tying the "towers" rigidly together and to ensure the arch carrying without danger the ends of the stringers from the temporary trestle across the river, which were supported on a cradle resting on the arch.

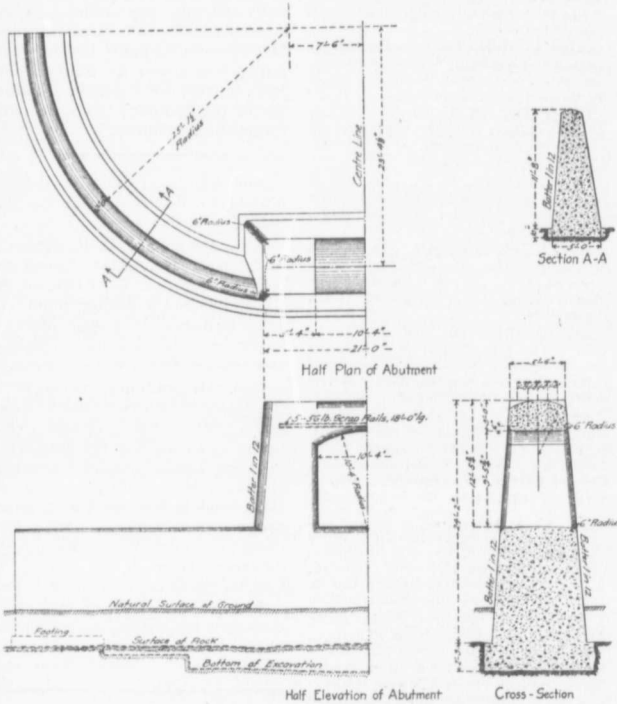
The design was that of Mr. James McDougall, Assoc. M. Inst. C. E., Chief Engineer of the railway. The

on their journey westward and arrived in Vancouver, B. C., on Saturday morning. A number of prominent local members of the civil engineering profession met the visitors on the arrival of their train. Among those who extended welcome were Mr. H. J. Cambie, consulting engineer of the C.P.R.; Mr. James Forde Garden, M.L.A.; Mr. George H. Webster, president of the British Columbia Contract Company; Col. Tracy and Mr. W. A. Clement, City Engineer.

In the afternoon the visiting engineers left at 2 o'clock on the steamer Joan for the works of the Vancouver Power Company on the North Arm of the Inlet. After an inspection of the hydro-electric plant at that point the party returned to the city. During the morning, the tourists in small parties visited the sawmills and other points of interest about the city.

On Sunday evening they left for Victoria and spent Monday there, being taken about the city in tallyhos, while a large party went by launch to visit the dry dock and the marine railway at Esquimalt in charge of Mr. Devereux. In the afternoon under the guidance of Mr. Mohun the parliament buildings, including the museum, were visited.

In the evening a number of the visitors attended the reception to Their Excellencies, Lord and Lady Grey, in the parliament buildings and left by the steamer Charmer about midnight for Vancouver. On Tuesday morning at 10 o'clock their special train left and the trip eastward began. They proceeded by the Crow's Nest Pass route visiting Rossland, Grand Forks, Phoenix, Greenwood, Nelson, Kootenay, Moyle and Coleman. From there the party proceeded to Fort William thence to Montreal.



CONCRETE ABUTMENT, TORONTO AND YORK RAILWAY.

river valley by 600 ft. of wooden trestle, a 140-ft. through truss steel span and 800 ft. of fill, averaging 18 ft. deep, commencing immediately to the west of the 140-ft. span, thus necessitating an abutment at this point.

Saving in concrete was effected in two ways. First, the fill was stopped 30 ft. from the center of the abutment and allowed to slope down all around on a slope of 1½ to 1 to the circular wing walls, the tops of which are slightly above high water mark. A short wooden trestle, put in before filling commenced, carries the traffic from the bridge on to the fill. Second, a saving of some 24 cu. yds. of concrete was effected by leaving an arched opening in the center of the abutment where the material is ineffective.

Details of the structure are shown by the accompanying illustration. The arch between the truss-seats was reinforced by five 56-lb. scrap rails, placed 1 ft. apart as shown.

*Assistant Engineer, Toronto & York Radial Railway, Toronto, Ont.

concrete work was done by Mr. O. Hicks, Humber Bay, Ont.

CIVIL ENGINEERS' EXCURSION.

The party of Civil Engineers touring through western Canada, arrived at the Mountain View Hotel, Shepard, Alta., Wednesday morning, where they disembarked and were met by Mr. J. S. Dennis, superintendent of irrigation, and the local irrigation officials and engineers, who escorted them to the scene of inspection. Lunch was served in a tent at the engineers' camp. Afterward they proceeded

Riddell & Thomas, builders, Dauphin, Man., have dissolved partnership.

Sidney A. McDonald, contractor, Montreal, has registered his business under the firm name of W. McDonald & Co.

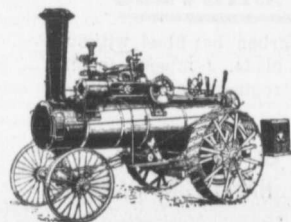
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Mem. Soc. C. E. West Penn. '87
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TRACTION and PORTABLE ENGINES
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All Powers Quality the Best
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BLUE PRINTS
POSITIVE BLUE PRINTS
BLACK PRINTS
MULTI-COLOR PRINTS
Best Finished Work on the Market at
the Lowest Prices.

WHY PURCHASE STRUCTURAL STEEL
We offer 300 tons second hand
TEE AND GIRDER RAILS, for
bridges, &c., cut in lengths to
suit purchasers.

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Some Recent Contracts:—
Toronto 31,441 sq. yds. Chatham 15,633 sq. yds.
Halifax 30,000 sq. yds. Amherst 8,000 sq. yds.
Regina 21,315 sq. yds. St. Catharines 4,500 sq. yds.
St. Boniface 18,272 sq. yds. Total . . . 129,161 sq. yds.
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WARREN BITUMINOUS PAVING COMPANY, LIMITED
Head Office: 164 Bay Street, TORONTO
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HIGH GRADE GERMAN BRANDS FOR GRANOLITHIC
AND ARTIFICIAL STONE SIDEWALKS.

Sewer Pipes, Best English Cements. Best Belgian Cements
Culvert Pipes, &c. W. McNALLY & CO., Montreal

JOSSON CEMENT
Is the Highest Grade Artificial Portland Cement and the Best for High
Class Work. Has been used largely for Government and Municipal Works.
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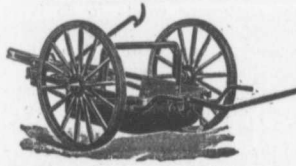
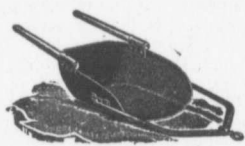
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Works at SHALLOW LAKE, ONT. Write us for prices.

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FOR
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With or without Cone Top Filler. These
Moulds are standard both in sizes and thick-
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Wheel Scrapers (pressed or square bowls)
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Robt. MacIaren & Co., Glasgow.

NEW COMPANIES.

Peterborough Steel Rolling Mills Company, Limited, Peterborough, Ont., incorporated, capital \$200,000. Directors W. Ferguson, W. Rudkins, R. J. Munro, A. Dunn, R. H. Fortye, D. O'Connell and A. Elliott.

Southampton Furniture Company, Limited, Southampton, Ont., incorporated, capital \$200,000. Directors, J. H. Spence, F. H. Phelan, F. W. Carey, and others, all of Toronto.

Ontario Oil & Refining Company, Limited, Chatham, Ont., incorporated, capital \$100,000. Directors, C. T. Hobart, G. W. Harrison, T. K. Holmes, J. M. Pike and J. Symon.

Interprovincial Mining Company, Limited, Haileybury, Ont., incorporated, capital \$1,500,000. Directors, W. A. Weir, and J. A. Ewing, Montreal, A. Lay and T. H. Steele, Haileybury, and L. J. Labrosse, Hawkesbury East.

Huronian Cobalt Silver Mining Company, Limited, Cobalt, Ont., incorporated, capital \$500,000. Directors, J. R. Gamble, W. A. J. Bell, T. Langton, and others.

J. Vansickler & Company, Limited, Toronto, incorporated, capital \$40,000 to carry on the business of builders, contractors and roofers. Directors, G. H. Kemmis, G. Grant, and others.

British-American Silver Company, Limited, Toronto, incorporated, capital \$50,000. Directors, J. E. Elliott, W. H. Wallbridge, and J. E. Davies.

Wright Silver Mining Company, Limited, Toronto, incorporated, capital \$200,000. Directors, T. Harder, F. C. Elks, E. B. Ryckman, and others.

Keewatin Lumber Company, Limited, Keewatin, Ont., incorporated, capital \$250,000. Directors, E. W. Backus, W. F. Brooks, A. E. Horr, and W. H. Flanagan, all of Minneapolis, and D. McLeod, Keewatin.

Toronto Furniture Company, Limited, Toronto, incorporated, capital \$40,000. Directors, D. K. Ridout, D. C. Ridout, T. P. Johnstone, and others.

Twin Lake Mining Company, Limited, New Liskeard, Ont., incorporated, capital \$500,000. Directors, J. Ruby, H. Dorrow, New Liskeard; and T. Passmore, North Bay.

Exeter Canning & Preserving Company, Limited, Exeter, Ont., incorporated, capital \$40,000. Directors, J. Snell, J. G. Jones, C. Sanders, T. Harvey, S. Martin, A. Marchand, W. Sanders, and J. Hunter.

Canada Mines Limited, Toronto, Ont., incorporated, capital \$100,000. Directors, H. C. Barber, J. A. Gormaly, R. T. Shiell, H. L. Dunn, and others.

Williams Copper Mining Com-

pany, Limited, Toronto, incorporated, capital \$100,000. Directors, J. F. Lennox, D. A. Rose, and M. W. Mayor.

Fort Francis Lumber Company, Limited, Fort Francis, Ont., incorporated, capital \$60,000. Directors, W. A. Preston, Fort Francis; W. Blackwood, Winnipeg; W. J. Elliott, Toronto; and H. J. Tharle, Fort William.

Toronto Waterloo Office Fixture Company, Limited, Waterloo, Ont., incorporated, capital \$75,000. Directors, G. Deisenroth, G. H. Haberstadt and J. H. Mitchell, all of Toronto; A. Bauer and John Letter, Waterloo.

Benjamin Moore & Company, Limited, Toronto, incorporated, capital \$50,000, to manufacture and deal in paints, wall finishes, oils, etc. Directors, H. B. Johnson, J. H. Whitehead, E. W. Wright, C. W. Thompson, and E. M. Gardiner.

Bailey Mining Company, Limited, Windsor, Ont., incorporated, capital \$500,000. Directors, E. A. Benson, Chicago; H. B. Wright, R. A. Bailey, L. S. Trowbridge, J. H. Harris, and J. P. Glendon, all of Detroit, and A. R. Bartlet, Windsor.

National Mining & Developing Company, Limited, New Liskeard, Ont., incorporated, capital \$40,000. Directors, K. Farrar, J. J. Grills, J. W. Bolger, and others.

Golden Reed Mining Company, Limited, Sault Ste Marie, Ont., incorporated, capital \$1,200,000. Directors, R. J. Miller, St. Thomas; G. Reed, Michipicoten River; M. Gates and A. E. Sharp, Sault Ste Marie, Michigan, and F. M. Dole, Sault Ste Marie, Ont.

COST OF DRIVING AND PULLING TEST PILES, HACKENSACK RIVER, N. J.

A pile was driven every 50 ft. across the Hackensack River, N.J., to test the nature of the bottom. Three 90-ft. piles were used, and were pulled after driving. The cost the work includes the cost of pulling as well as driving.

A scow driver was used, and the work was done at cost plus 10 per cent. for superintendence. The total number of feet penetrated by the piles was 634, or about 57 1/2 ft. as an average of 11 piles, 8 of which were driven to rock. The material penetrated was mud, sand and clay.

The work occupied 4 1/2 days, of which 1 1/4 days were spent in transporting the driver to the site of the work and removing it from the work after completion.

The cost was as follows:

Foreman, 4 1/2 days at \$4.....	\$18.00
Machine men, 45 days at \$3.....	135.00
Watchman, 4 nights at \$3.....	12.00

Total.....	\$165.00
Add 10 per cent. for profit.....	16.00

Total.....	\$181.50
------------	----------

This is at the rate of 30 cts. per linear foot of penetration for driving

and pulling, but it does not include the cost of coal. Coal was probably less than 1/2 ton per day, or say \$10 for the whole job, or less than 2 cts. per foot.

The cost of materials was as follows:

3 piles 90 ft. long, at \$25.....	\$75.00
2 spruce piles, 52 ft. long, for use as followers, at \$4.....	8.00
4 pile bands, at \$2.50.....	10.00

Total.....	\$93.00
Add 10 per cent. for profit.....	9.30

Total.....	\$102.30
------------	----------

This is equivalent to about 16 cts. per linear foot of pile penetration. The total cost was therefore:

	Per ft. Penetration.	Per Pile.
Labor.....	\$0.30	\$16.50
Coal.....	.02	0.90
Materials.....	.16	9.30
Total....	\$0.48	\$26.70

It will be noticed that there were 10 men and 1 foreman on the driver, which is an unusually large number; and it will also be noted that the wages paid the "machine men" were very liberal.

Since only 3 1/4 days were actually spent in driving, the average day's work was 3 piles driven and pulled. If an ordinary scow driver crew of 6 men at \$2, and 1 man at \$4, had been employed, the daily wages would have been \$16. To which add \$2 for coal and \$6 for rental of plant, making a total of \$24 per day for driving and pulling 3 test piles, or \$8 per pile. Even \$8 per pile would be a high cost for such work, when done by contract, if the cost of moving the driver to and from the site of the work is not included.

In view of the valuable information gained at small expense by driving test piles, it is surprising that engineers do not oftener test the bottom of rivers in this way before drawing plans and specifications for bridge foundations, trestles, etc. When a contract has been awarded for foundations, the first thing that the contractor wants to do is to order his piles. The engineer usually refuses to furnish a bill of materials until enough piles have been driven to determine the character of the bottom. This delays the whole work, and adds materially to the contractor's expense. Moreover, it usually results in a change of specified lengths of piles, and a corresponding change in the ultimate cost of the job. The time to drive test piles is before the award of a contract, not afterward.—Engineering—Contracting.

The building returns for Calgary, Alta., for the month of August was \$19,957 less than in the previous month. The actual number of permits issued was thirty-three for August of which the total value amounted to \$108,500 against \$128,457 for the previous month.

GERMAN ALSEN, at higher prices than competitors has again this year been awarded the most important contracts of the 1905-1906 season because practical tests by leading Engineers proved its merit and relative economy. Note the following:

MEXICO CITY X DAM (shipping instructions so far 60,000 bbls.) approximate amount	120,000 bbls.	U.S. PHILIPPINE GOVMT. ORDER	40,000 bbls.
XOCHIMILCO WATER WKS., MEX. approximate	175,000 bbls.	GOVMT. ORDER SOUTH AMERICA	150,000 bbls.
	200,000 bbls.	RIO DE JANEIRO, SANTO, ETC.	40,000 bbls.

Also enormous quantities for the **PACIFIC COAST, AUSTRALIA, ENGLAND, SOUTH AFRICA, &c.**

There is always a certain trade who will pay for the best. We also make American Alsen, the highest grade of domestic Portland cement.

CEMENT **45 BROADWAY, NEW YORK CITY** **CEMENT**
We protect our customers!

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Wire Screens for Road Making

Wrought Iron and Wire Guards and Enclosures for Jails, Asylums, Etc.

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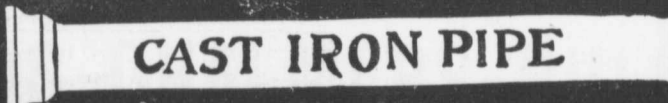
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THE WATERWORKS OF WINNIPEG, MAN.

There is no Canadian water-works system which presents more features of interest to the engineer than that of Winnipeg Man. The first work were constructed by a private company, but ten years ago the city authorities decided that municipal ownership offered the only way to obtain a satisfactory service for a place growing so rapidly as this. Two years were spent in obtaining the necessary legal powers for this purpose. The old works were then bought for \$237,000, and their extension and improvement were immediately undertaken. All this work has been under the charge of Col. H. N. Rutan, city engineer.

Two sources for a municipal supply were investigated, the Assiniboine and Red rivers and ground water. An examination of the river from Portage la Prairie to Winnipeg disclosed the fact that the Assiniboine was the main sewer of the country—offal was gotten rid of by throwing it into the river, enclosures for cattle and pigs were fenced with a corner in the river, and barnyards

were drained into it. It was felt that even the most perfect filtration would not remove the disagreeable impression, that after all, the water was nothing more or less than purified sewage, and that the only excuse for its adoption as a permanent supply for the city would be that it was the only one available. With the exception that the flow was larger, and water softer, the same objections applied to the Red River. It was found that in addition to its great cost, the Winnipeg River water would require to be filtered to remove the large quantities of the suspended organic matter which it contained.

One of the ground water sources investigated was at Poplar Springs, $17\frac{1}{2}$ miles from the city, where there is a large amount of water available. The cost of bringing it to the city will be large, however, and for this reason it is considered best to defer its use until later. There is a large amount of ground water within and near the city and investigations of its quality and quantity were made. Tests with

the air lift showed that the water in all the wells was under the same head, and it is considered likely that the artesian basin is supplied from a number of sources. After a full review and investigation of the situation by Mr. Rudolph Herring, consulting engineer, of New York, it was decided to sink a pump well. It was estimated that from this well and a line of conduit 5,000 ft. in length, connected to tube wells, a supply of 2,400,000 imp. gal per day could be obtained. After construction, it was found that the yield from this well alone, at a pumping depth of 38 ft. below ground level, was upwards of 2,400,000 gal. per day, and this being more than sufficient for the requirement of the city at the time, nothing was done towards the construction of the tube wells and conduit.

It shortly became evident that the city was going to grow very rapidly and that something should be done towards increasing the supply. The great quantity of water obtained from the first well completely changed the aspect of the develop-

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					Initial	Final	Neat.					3 (Sand) to 1 (Cement)				
							1 dy.	7 d.	28 d.	3 mos.	1 yr.	1 dy.	7 d.	28 d.	3 mos.	1 yr.
1903	20	O.K.	3.135	2.1	162	345	307	701	783	827	*	74	214	299	367	*
1904	44	O.K.	3.150	2.0	132	342	300	744	848	914	938	86	262	354	401	427

* Tests for 1 year were not completed when records closed. 1905 report not yet issued.

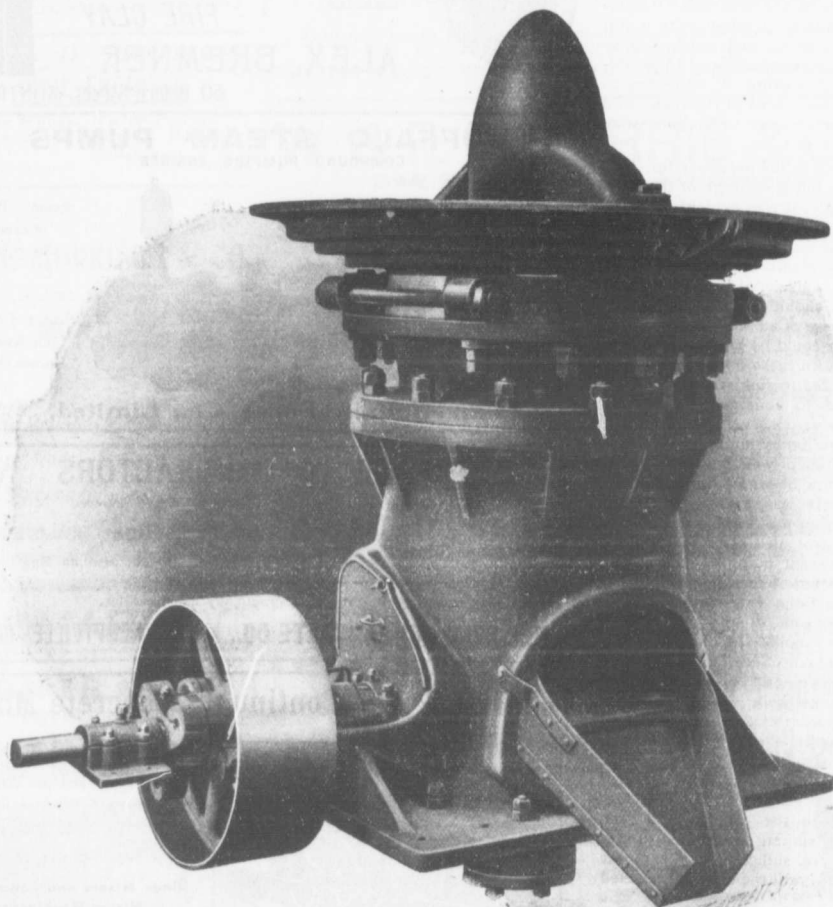
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ment, and led to the substitution of the large deep well system for the tube wells and conduit first proposed.

Owing to the large flow of water, great difficulties had been experienced in sinking the first well, the inrush of water carrying with it soil from outside the well curb, undermining the foundations of the buildings, and making it necessary to stop the well short of the rock and put in a strainer of broken stone and concrete.

Looking to the necessity for taking more full advantage of the artesian supply, it was evident that the next well should be sunk into the rock, and that the curb and pumps should be placed upon the rock. It was also considered that the principal wells should be in duplicate, so that in case of an accident to one, the other could be brought into service. With these objects in view it was decided to sink well 1 into the rock and to construct well 2 as a duplicate or reserve. The system of unwatering by pumps used in the construction of well 1 had, owing to a large flow of water, proved ineffective. It was necessary, if the construction was to be under complete control such as would enable the permanent pumping machinery to be erected at rock level, and the pump suction extended into the rock, that some other system of unwatering should be adopted. It was, after consideration, decided to use the pneumatic caisson system of sinking the well. A double steel shell caisson 18 ft. in diameter filled between the shells with concrete, was constructed at ground level, and sunk in the usual way. When water was reached, an air lock was attached to the caisson and the work of sinking continued under air pressure, sufficient to keep out the water, until the caisson reached the rock. The cutting edge was then sealed to the rock by concrete, 6-in. inlet pipes for the water being set in at rock level. A shaft 10 ft. in diameter was then sunk into the rock for a distance of 16 ft., and a gallery driven for a distance of about 40 ft. The pump suction extend into the shaft sunk in the solid rock. This system of sinking was found to be most efficient, the water being easily controlled, and all kinds of work, including setting up the machinery at the bottom of the well, were executed without difficulty.

Well 2 yielded 4,500,000 gal. when tested soon after completion, but has decreased on account of some obstruction in the inlet pipes by sand and gravel, which can be removed. Wells 3 and 4, under construction, will yield volumes, which are estimated by Col. Rutnan in connection with the discharge of Nos. 1 and 2 as follows: Nos. 2 and 3, 6,000,000 gal.; Nos. 2, 3 and 4, 8,000,000 gal. Well 1 will be completed like No. 2, and its yield in-

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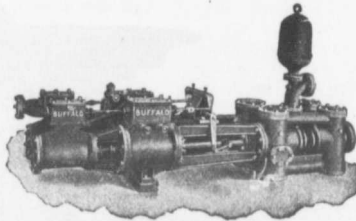
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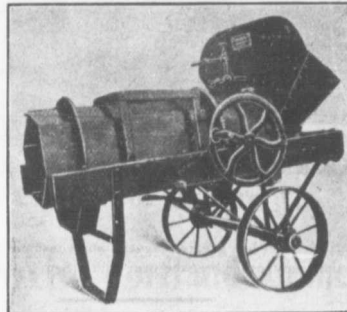
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Fig. S. P. 2

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In order to equalize the draft on the wells and furnish storage capacity on which to draw in times of heavy consumption, a 6,000,000 gal. reservoir has just been completed. The water is raised from the wells by pumps of 15,000,000 gal. capacity, and is delivered to the city by a 5,000,000-gal. triple-expansion pump and an electrically-driven centrifugal pump of the same capacity.

The water is very hard and is softened before it is distributed. The artesian well water supplied to Winnipeg contains, in its natural state, the following elements, in round numbers, in the amounts stated: Carbonate of lime, 16 grains per imp. gal.; carbonate of magnesium, 8.5 grains; sulphate of magnesium, 12 grains; sulphate of sodium, 5.5 grains; carbonate of sodium, 3.0 grains; chloride of sodium, 27.5 grains. Other compounds are present in minute amounts and are of no significance in this connection. The constituents mentioned have remained almost constant in kind and in quantity for over five years.

Of the constituents mentioned, only the first three cause the water to be hard. Of these three com-

pounds, the softening process removes only the first two, the carbonates of lime and magnesium. Sulphate of magnesium, while acting to some extent on soap, does not form any scale in boilers. In order to remove it from the water it would be necessary to add soda ash as well as lime. This would involve expense and other objections out of proportion to the benefit gained. The removal of the carbonates of lime and magnesium eliminates rather over two thirds of the hardening substances from the water.

The carbonates in the water are held in solution by carbonic acid gas which the water dissolved from the air or soil before it was able to dissolve the carbonates of lime or magnesium from the rock. Any means which will abstract this carbonic acid from the water will soften it, because the carbonates of lime and magnesium will at once separate from the water. Boiling softens the water for this reason, but it would be impracticable and undesirable to soften a public water supply in this manner. It is possible, however, to accomplish the same thing without the use of heat. If any substance having a strong affinity for carbonic acid is added to hard water, it combines with the

acid and sets free the carbonates of lime and magnesium, which thereupon separate and settle out as a white powder, leaving the water soft.

Such a substance is found in the builders' lime of the trade, the best grade being the cheapest to use. For convenience it is slaked and converted into lime water. When the lime water is mixed with hard water, flakes and crystalline matter are observed to separate at once. These consist of carbonate of lime, formed by the union of the lime, which was used with the carbonic acid in the water, also the carbonate of lime which was in the hard water, and lastly, hydrate of magnesium, produced by the action of the lime on the magnesium carbonate in the hard water. It is thus apparent that all of the lime which is used for softening is converted in the process into carbonate of lime, which separates immediately from the water, bringing with it the carbonates which were in the hard water.

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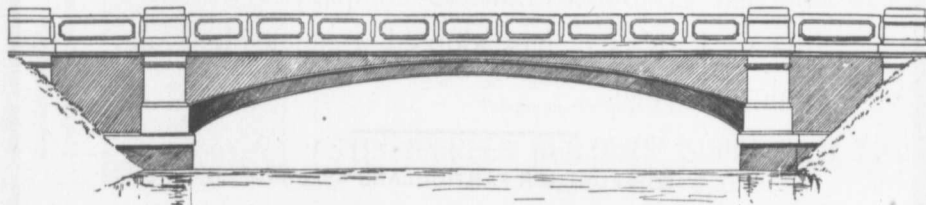
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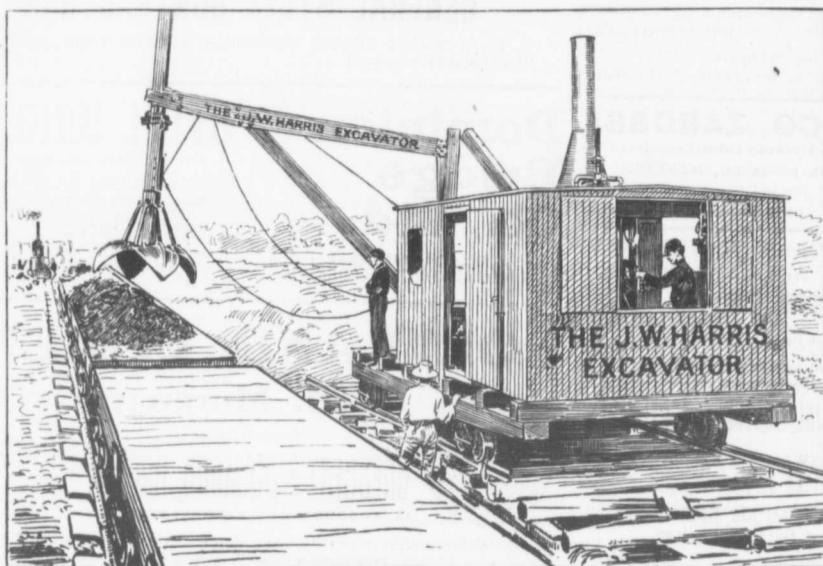
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A description of Winnipeg water supply would not be complete without a reference to the special fire service water works now being constructed in the business center of the city. This system is to take its supply from the Red River. It is to be capable of pumping 13,000,000 gal. of water per day at a pressure of 300 lb. per square inch. The water is to be distributed by about three miles of cast iron pipes, fitted with hydrants of special design, and with hose attachments for 4½ and 3½-in. hose. The pumps being made by Glenfield & Kennedy, of Kilmarnock, will be six in number, four 13½ x 18 in. and two 9½ x 18 in. triple double acting. These will be driven by six Crossley gas engines rated in the aggregate at 2,600 b.h.p. It is hoped that this system will be in operation early next year.

THE PRODUCTION OF CEMENT IN 1905.

The cement industry in the United States in 1905 is the subject of a bulletin recently published by the Division of Mineral Resources of the U. S. Geological Survey.

The number of kilns in use naturally shows an increase, though not, however, corresponding to that of the industry itself. For example, of rotary kilns in 1902, there were 456 active, 9 idle and 46 in process of building; in 1905 there were 722 active, 23 idle, and 42 building.

But along with the increase in the number of kilns, there has been a marked increase in the rate at which the plants were driven, and also in the size of the kilns. For 1902, it is stated, each active rotary kiln averaged a total output of 36,909 bbls.; for 1905 the average output was 48,118 bbls. This increase of about 30% is attributed partly to more steadily driving, and partly to the use of longer kilns. It is estimated that in 1906 an average of over 50,000 bbls. per kiln per year will be

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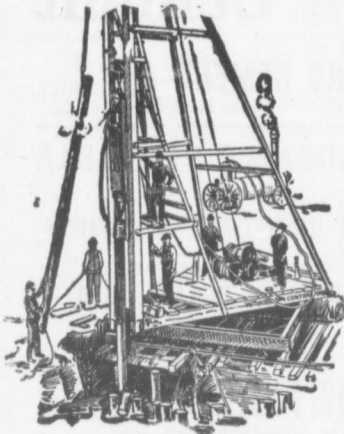
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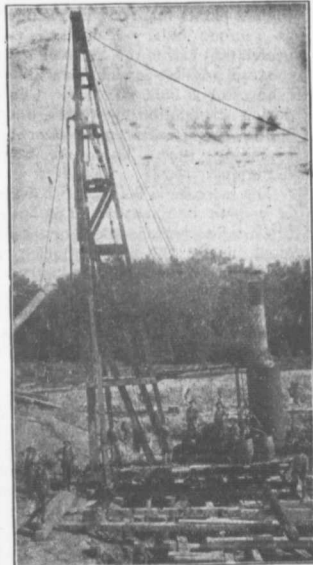
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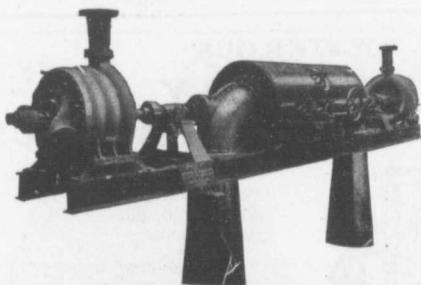
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attained. The increase in the use of rotary kilns shows a marked contrast when compared with the figures for vertical kilns. In 1902 456 vertical kilns were active, 9 idle and 46 building; in 1905, 395 were active 116 idle and none building. Only three factories in 1905 reported productions of Portland cement burned in vertical kilns.

The total capacity of American cement plants for 1905 is reckoned at 129,000 bbls. per day; it is expected that before the close of 1906 the total possible production will exceed 140,000 bbls. per day. Comparing production by years, 1905 shows the greatest gain over the preceding year. To quote from the report:

The increase is 8,427,051 barrels of cement in quantity and \$9,899,613 in value, which statement shows most clearly the great bettering of condition in the cement industry in this country in 1905. The total production of cement for 1905 was 40,102,308 barrels, having a value of \$35,931,533, as compared with a total production in 1904 of 31,675,257 barrels of cement, having a value of \$26,031,920. The production of Portland cement in 1905 was 35,246,812 barrels, valued at \$33,245,867.

The production of natural cement in 1905 was 4,473,049 barrels, valued at \$2,413,052. The production of puzzolan cement in 1905 was 382,447 barrels, valued at \$272,614.

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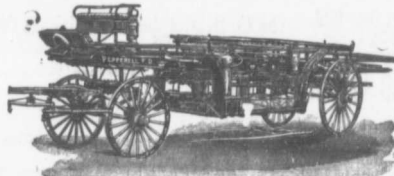
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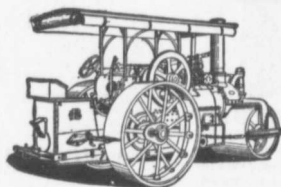
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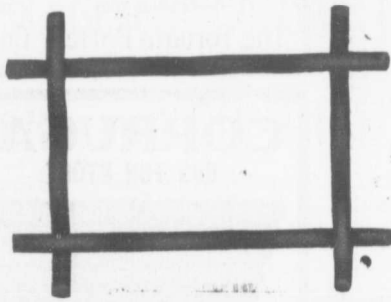
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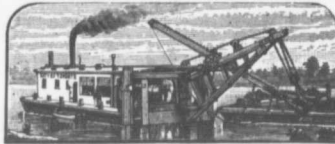
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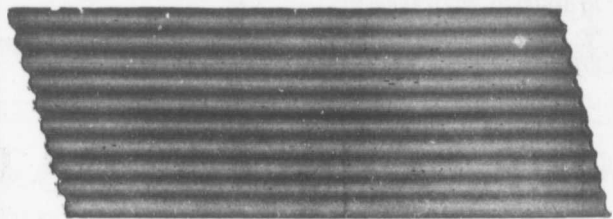
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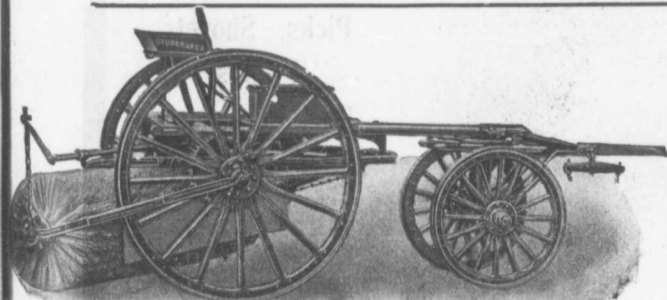
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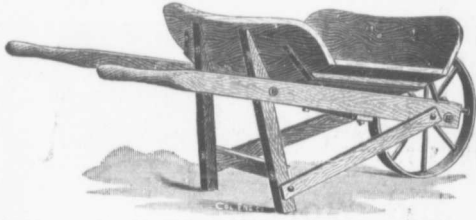
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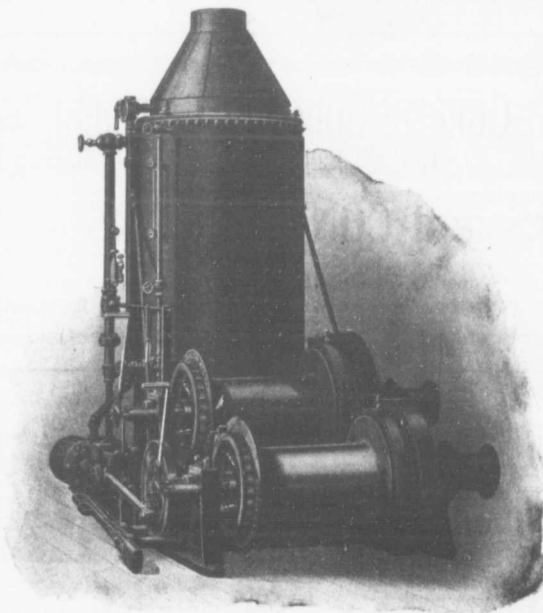
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