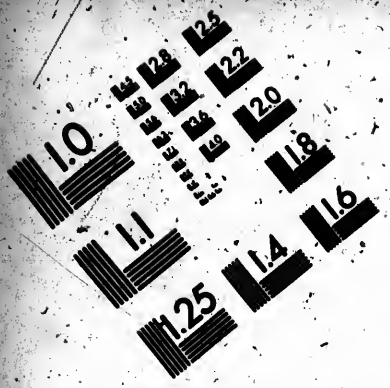


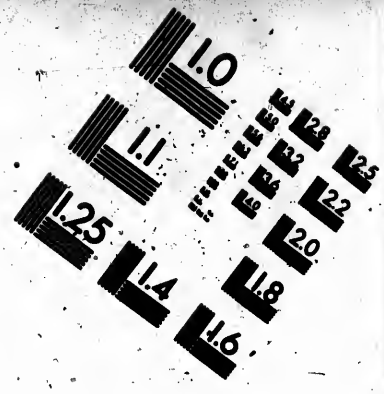


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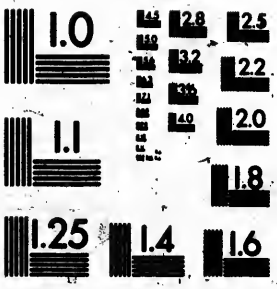


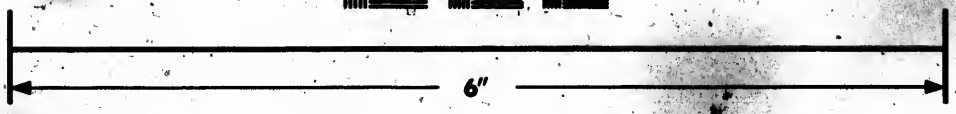



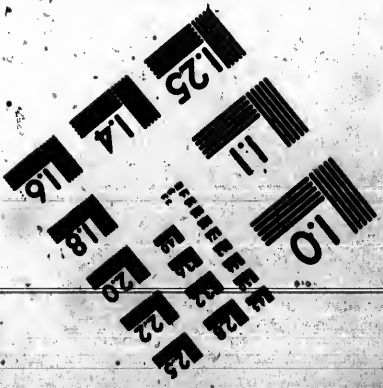


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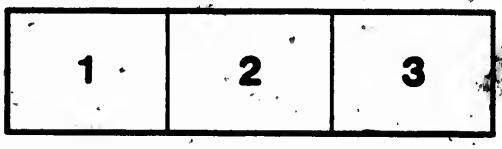


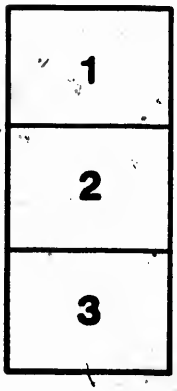


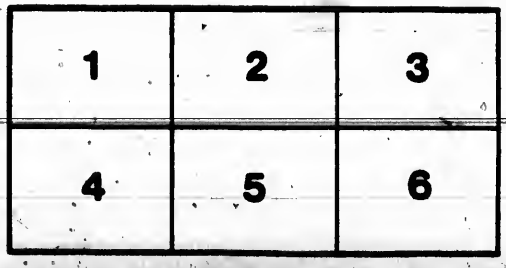

# SPECIFICATION

FOR THE

## BUILDING AND ERECTING OF TWO STEAM BOILERS FOR THE MONTREAL WATER WORKS ACCORDING TO DRAWING.

The Boilers will be two (2) in number and of the kind known as the Lancashire double furnace single flue, with 24 Galoway tubes in each boiler, and according to the drawing furnished with this specification of which there are four (4) views, viz, Plans, Longitudinal, sections, Front and Rear views. Description.

The Boilers to be 7,' 3" diam, outside of shell and 26,' 0" extreme length. Dimensions.

The Shell to be made 7/16 iron Buckley or Wyandotte boiler plate charcoal hammered, stamped 50,000; all longitudinal seams to be double riveted throughout with the best quality ⅞ inch rivets, 2 inch from centre to centre, to be chipped and caulked leaving ¼" in width outside of rivets and made perfectly steam and water tight. Shell.

The Furnaces will be two (2) in number in each boiler, and will be three (3) feet internal diam., made of 7/16" Buckley or Wyandotte fire box plate stamped 50,000. The Furnaces as will be seen by the drawing are 7,' 6" in length, perfectly cylindrical, and at that distance from the junction with one flue running to the back end of the boiler, this flue is flat in top and bottom with semi-circular sides: this flue to be made of 7/16" iron Buckley or Wyandotte boiler plate, charcoal hammered stamped 50,000 and to be stayed throughout its length with 24 Galloway tubes as shown in drawing.

The Furnace will be in three lengths, and flanged and riveted together, with a wrought iron ring 1½' inch by 4"

inches between each length, and riveted to head sheets, as shown on drawings, in the best possible manner ; the joints chipped and well caulked. the entire circumference of furnace is to be formed with one sheet with seam at bottom

At a distance of 1'-9" from the junction of the furnace with the ~~flue~~ flue, there will be a contraction of that flue as shown in the plan of boiler, this flue is, 3'-3" wide and will be contracted at this place to 2'-3" for a width of 12" in. as shown. The flue is of oval section & where the sides are parallel for is 6'-9" wide by 3'-6" high

The Galloway tubes to be same as shown in drawing viz 10" diam. at top and 6½" diam. at bottom and flanged top and bottom, and made of ⅜" Buckley or Wyandotte extra flange plate, stamped 50,000, each tube to be tested to 200 lbs per square inch before riveted in place. How are these to be tested?

Head Sheets. The front head sheets will be 7' 9" diam. of ½" Buckley or Wyandotte extra flange plate, stamped 50,000, and will be ~~joined to shell by an angle iron as shown~~ flanged and riveted to shell.

The back head will be ½" plate, same iron as in front head, and flanged and riveted to shell and flue in usual manner.

Staying. The head sheets, front, and back, will be stayed to the shell of boiler, by ~~five~~ (5) gussets stays at each end, the gussets to run well back in to the ~~second sheet of the~~ boiler, and fastened with double angle iron to head sheets and shell, as shown. There will also be ~~two~~ (2) bolts 2" ins. diam. run through the entire length of boiler, and fastened to head sheets with nuts and washers inside and outside as shown. 4 of these at the front end 1½" washers to be 5" dia x 11/16 thick

Steam Drums The Steam drums to be 36" diam. and 4' 0" hight and made of 7/16" iron, same brand as that of the shell. the bottom of drum to be fastened of one plate

The top of drum to be convex say 6," to 8" ins. and stayed to shell of drum by six (6) gusset stays and to ~~shell of boiler or to~~ the bridges by four (4) stays of not less than 1¼" round iron, the drum to be double riveted to shell, and the shell inside of drum to be perforated with a series of small holes, or if one large hole, it is not to

exceed 5/8" diam., and to be strenghtened by two wrought iron bridges properly riveted to shell of boiler on each side of the hole. as shewn in drawings

Man Holes.

On the top of each boiler will be riveted a cast iron manhole, on the top of which will be a cast iron cover, faced, ground and made steam tight; each cover to be bolted with about sixteen (16) one (1) inch bolts, and to be provided with two brass valves and seats; to be 5 inches inside diameter, and to be provided with the necessary joints, levers and weights, to resist a pressure of 75 lbs to the square inch; and the other a lock up safety Valve. Another man hole will also be provided in front head sheet of each boiler as shown. (Richardson's) this to be shewn stayed by a wrought iron ring

Safety Valves

In addition to the above, one 6 inch brass safety valve must be provided and connected to the steam pipe, in such place as the Engineer may direct. This valve to be made complete in every respect.

Grate Bars and Bearers.

Each boiler to be provided and have fixed therein one sett of grate bars and bearers, on the Ashcroft principle.

Try cocks and Glass Guages.

Each boiler to be provided with 3 best brass try cocks, one glass water guage, and one steam pressure guage of the Bourdon's patent.

Stop Valves.

Each steam drum is to be provided with a brass stop valve, the same as those on the old boilers, and connected to the steam pipe in such way that any of the boilers may be shut off. A collapsing brass valve of 2 inch diam. shall also be connected on the top of each drum.

Feed Pipes and Valves.

The feed valves and feed pipes are to be the same as those on the old boilers and connected to the present feed pipe leading from the Engine room.

Blow off Valves and Pipes.

Each boiler to be provided at the front with one blow off valve and pipe, not less than 2½ inches diam., the pipe to lead to the outside of the boiler house, as the engineer may direct.

In addition, each boiler is to have a surface blow off of the same diameter as above. All valves to be of brass.

mud doors and hand holes to be placed on such ever portion of the boiler the Engineer may direct

**Boiler Fronts** The boiler fronts to be of the same patern and design as those now in front of the cornish boilers; to be of cast iron and not less than ⅜ of an inch thick; the out line to be of the precise form of the brickwork, and to cover the whole of the brick and boiler fronts, and thereby protect them from all moisture. They shall also be provided with all the strengthening ribs and flanges required to bolt them together, and fastened to the boilers in the most mechanical and substantial manner. These fronts to have as little space as possible between them and the boilers, and such space to be filled in with fire clay. These fronts must also be provided with brick faces

**Doors and Dampers.** Each boiler to be provided with two (2) doors and two (2) dampers of the principal called the Ascroft Patent balanced furnace doors. Doors for entrance in side of boiler

**Flue Dampers.** In addition to the above dampers each boiler to be provided at the back flue with a sliding damper, with balance weights, chains and pullies. necessary to lead the chains to some convenient place in front of the boilers.

**Test.** The Boilers to be constructed after the manner shown on the plans and described in this specification, and stayed in such a manner as to insure uniform strength throughout all parts, so that they will stand a pressure of 100 lbs. to the square inch, without deflection or the least deformity, which pressure will be indicated by a proved guage of the Bourdon's principle.

The boiler when completed are to be tested by the City or Government Inspector according to the Law regulating the inspection of steam boilers.

**Steam Pipes.** All the steam pipes are to be of cast Iron not less than ⅜ of an inch thick, and of 8 inches inside diam. to be perfectly steam tight and provided with all the necessary expansion joints and valves which shall be necessary to work all the boilers together, or each boiler separately, or either of the Engines. All the joints to be faced and bolted, and connected with the present pipes in such way as the Engineer may direct. Some and steam tubes to be covered with a non conducting material

Punching and Riveting.

All the sheets required in the construction of these boilers must bear the stamp and be of the thickness called for in this specification, and punched in such way that the holes will be opposite to each other and of the proper diameter for the rivets. In all cases where the holes may require enlarging for the admission of the rivets a half round rimer shall be used. instead of the drift. all rivets to be 3/4 and pitch not exceed 2"

All the rivets to be of the best quality as called for in this specification, in order that the Superintendent and Engineer may be satisfied that all the material and workmanship is in accordance with the specification; the Contractor binds himself to admit them to his shop or works during working hours, and give them any information they may require concerning the above works.

Delivery.

The boilers are to be delivered, fixed and completed in every respect to get up steam, in the boiler house of the Montreal Water Works on or before the first of July next 1876.

Excavation.

All excavation, filling and ramming round the foundations of the boilers and outside flue, shall be done in a proper and satisfactory manner; all surplus material shall be taken out of the building and deposited in such place as the Superintendent or Engineer may point out.

Foundations of Boilers and Brickwork.

The foundation beds for the boilers shall be composed of a layer of concrete one foot thick and laid perfectly level under all the boilers; this bed to be composed of broken stones mixed with hydraulic lime and river sand, in the proportion of 2 of broken stone, 1½ of sand and one of hydraulic lime: on the top of this bed there shall be a layer of fire bricks of four inches thick bound together with fire clay.

All the brick walls round the boilers to be made of sound hard burnt bricks, lined inside all the flues with fire bricks, four inches thick laid with fire clay for the back and side flues, and with morter and coarse salt for all other flues in the same shape and manner as those of the present Cornish boilers.

Inside Main Flues.

Outside the buildings at the back of the boilers, there shall be built a brick main flue, four by three feet, with walls in stone masonry outside the flue as shown on drawing.

The walls of the flues to be twelve inches thick, lined inside with four inch fire bricks laid in cement.

The outside bricks shall be laid with hydraulic lime, as will also the stone wall.

The foundation of this flue, to be laid on a bed of concrete one foot thick. The space left between the stone walls and the flue, to be also filled with concrete the same as specified for the foundations of boilers.

At the back of each boiler, the foundation wall of the building shall be opened to admit a small flue of two feet inside diameter to the main flue. These flues shall be built of fire bricks with cement, and jointed to the main flue in a workmanlike manner, with their proper openings for the dampers. The stone wall shall be four feet thick at the base, and will have at its top a frost batter of one half to one, and four feet deep.

Cold air Flue.

A cold air flue of two by four feet shall be built in front of the boilers, similar to the present flue in front of the old boilers to which it is to be connected. This flue to be covered with iron plates, similar to the present one.

Paving in front of the Boilers.

All the space in front of the boilers to be paved in brick 4 inches thick, properly laid on a bed of river sand three inches thick, with a slope of two inches to the front wall.

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## GENERAL CLAUSES.

It is to be understood that the contract for the boilers is to include and cover everything required in the construction of the steam boilers, foundations and equipment, and the erection of the same, ready for use in the present

coal house, in accordance with this specification and the drawings herein referred to. Also the connection between the new and the old boilers, with all the excavation and fillings necessary to accomplish these different objects. It is also to be understood that no extras whatever shall be allowed or sanctioned, except on the approval of the Water Committee endorsed by the Superintendent Engineer. The object being that the whole work, including all the pipes, valves or other things required to connect the new boilers and the flues to the present boilers, flues and chimney, shall be covered by one contract at one bulk sum.

The contractor is to maintain his work in repair during construction, and shall be liable for any damage done to the present works, or other property of the Corporation, through his carelessness or neglect.

An estimate of the work shall be made, from time to time, provided that no less than two thousand dollars worth of work be done between each estimate, and the same shall be paid to the contractor upon a certificate of the Superintendent of the Water Works and the sanction of the Water Committee, less twenty per cent, which will be kept back as a guarantee for the due fulfilment of the contract, and which shall be paid to the contractor after the work shall be completed to the satisfaction of the Superintendent and of the Water Committee whose final acceptance of the works shall be required to entitle the contractor to the final payment.

The whole of the work to be completed and put in working order on or before the first of July next. Completion.

LOUIS LESAGE,

*Superintendent of Water Works.*

Montreal, 24th January 1876.