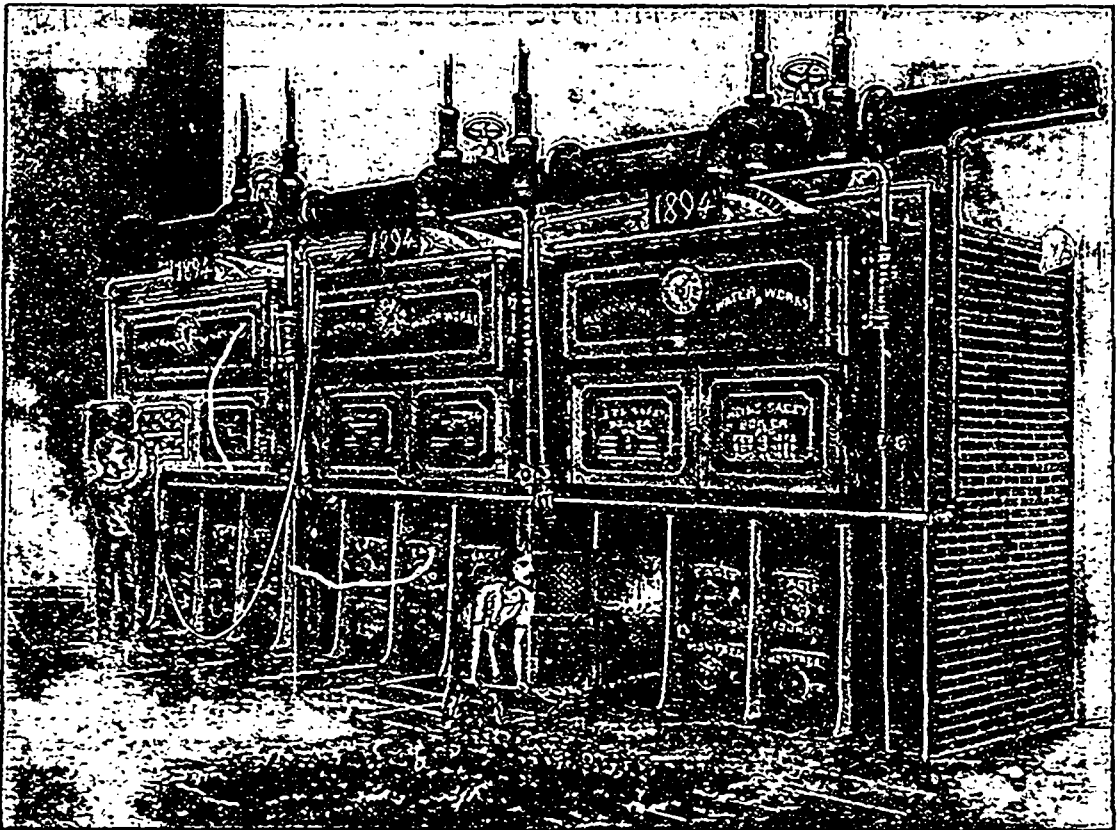


herewith, are of the standard size, E16, having each a drum 48 in. x 19 ft. 6 in. long, of steel plate double rivetted, with heads dished to a spherical form. The driver is rivetted to two water legs, one at either end, composed of a head plate and a tube sheet flanged all around of the best steel plate, and joined at bottom and sides by a steel butt strap. The legs measure 7 ft. 4 in. wide and 10 in. deep, affording an ample water space for circulation, with no obstruction whatever save the small amount of area taken up by the hollow stays. There are hydraulic tubes screwed and rivetted in the outside sheet and the tube sheet, and being plugged with wood and perfectly exposed at both ends of boiler, are availed of as a perfect mode of cleaning the tubes from soot by means of a nozzle and hose specially provided for the purpose.

The boilers thus constructed rest at their front end on a set of strong cast iron columns, bolted and braced together by the door frames, deck plates, &c., forming

The feed pipe enters it through a loose joint in front, and the blow-off pipe screwed tightly into the rear end, passes by a steam-tight joint through the rear head of the shell. The tubes are expanded into the tube sheets forming the inner side of the legs of the boiler with roller expander, and opposite each tube in the outer side of the leg is a hand hole, fitted with a plate cover and jacket, and yoke with bolt and nut. By removing any of these the tube can be easily and quickly examined or removed.

The brick setting of these boilers is provided with air spaces, through the side walls, and underneath the combustion chamber to the bridge wall. When the heated air mingles with the gases of combustion as they emerge from the furnaces, a suitable arrangement of fire brick, made especially for the purpose, and disposed in the lower and upper tier of tubes, so distributes the flame and guides it among the tubes that the entire tube-heating surface is made available



"NEW HEINE BOILER, MONTREAL WATER WORKS."

the fire front; and at the back end on plates and rollers laid on a solid brick wall, thus admitting of free expansion.

The boilers are placed on an incline descending to the rear at the rate of about 1 in 12, and thus a most active circulation is secured through the tubes from rear to front, and through the drum from front to rear. This circulation is so active as to prevent the deposit of scale in the tubes, and to keep them quite clean even if there were not means of purifying the feed water. A defective plate is provided so that the ebullition of steam and water from the front leg of boiler does not affect the dry box, over which the steam nozzle is placed, at the front of the shell or drum, and the entrainment or mixing of water with the steam is practically nil. The purification of the feed water is accomplished by means of a large mud drum placed within the shell of the boiler and well below the water line, when it is completely immersed in the hottest water of the boiler.

without any obstruction. Ample space makes leisurely progress for the flames, which meet in turn all the tubes, lap round them, and finally reach the second uptake at the forward end of the top tier of tubes at a temperature of less than 900° Fah., showing a loss of temperature between that point and the rear end of the lower tier of tubes of over 1800° Fah., which proves the utility and efficiency and perfect arrangement of the tube surface.

These boilers have been tested to 200 lbs. hydrostatic pressure per square inch, and are capable of sustaining a much greater pressure without risk or danger. Their capacity for steam production is only limited by the grate area and the ability to consume coal, as the design of the boilers, the number and disposition of the tubes, and the freedom of circulation, enable these boilers to be forced so as to yield in some cases, by actual test, more than 70 per cent. above their actual rating.