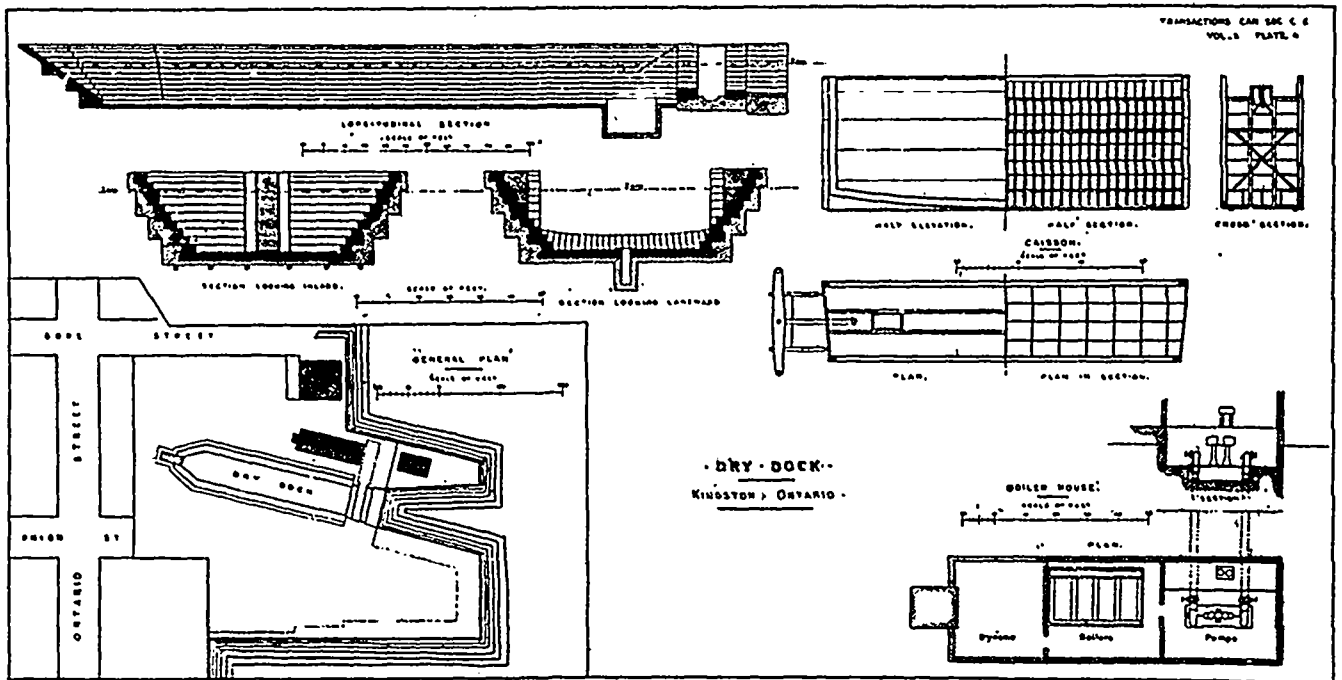


fire pump, the steam cylinder being 15 inches, and the water cylinder 10 inches in diameter, both having a stroke of 21 inches. This pump can be used in the event of the auxiliary pump being disabled. A delivery pipe is carried to the outside of the building, having a proper cap for attaching *four* lines of 2½-inch fire hose. A "Knowles" patent duplex boiler feed pump, with steam cylinder 6 inches, and water cylinder 4 inches, and stroke 7 inches, is placed in the boiler-room. The boilers—four in number—are of the cylindrical, multi-tubular type, set in brick work, with all the fittings and appliances for their successful working. They are 14 feet long and 5½ feet in diameter, each containing 84, No. 9, W. G., lap-welded, charcoal iron tubes, 3½ inches external diameter, and furnished with domes 3 feet high and 2½ feet diameter. The shells and ends are of three-eighths steel, the longitudinal seams being lapped and double riveted, the circumferential seams lapped and single riveted. Before acceptance they were subjected to a cold water test of 180 pounds per square inch, the working pressure being set at 100 pounds. Two of these boilers supply steam enough for the main engines. The smoke flue runs along the front end of the boilers, where connection is made with the uptakes, and is carried to and through the party wall of

the curved bars, which project somewhat beyond the sides of the keels, are for the purpose of preserving the parallelism of the caisson while being moved. The lower 3 feet is of cellular construction for strength and stiffness, and composed of ½-inch plates and 3 × 3 × ⅝ inch angles. All angles for the sides and ends are 3 × 3 × ⅝ inch, and for the reverse bars 3 × 3 × ⅝ inch. The cross-beams up to the lower dock are 4 × 4 × ½ inch angles, and above 3½ × 3½ × ½ inch. Under the lower and upper floors, Z beams 5 × 3½ × 2½ × ½ inch, were used. The upright posts are 6 × 3 × ⅝ inch channels, and the diagonal braces 4 × 3 × ½ inch angles. The plates in the bottom and first row on the sides and ends are ½ inch in thickness, and those above diminish to ¼ inch in the top plate, which is finished with a 9 × ⅝ inch bulb. The floor plates are ½ inch in thickness. All outside plates were planed on their edges, and lapped 2½ inches in the work and were single riveted. Where required, filling pieces were placed between the plates and the frames, to make up for the difference in the thickness of the plates, and voids between the plates and the frames. For the movement of the caisson a hauling bar 13 feet 4 inches in length is connected by means of a 4-inch pin, the outer end projecting 7 feet 9 inches, and carrying a yoke 17 feet



the dynamo-room, when it is led downwards and under the floor to the chimney. A boiler of the drop flue type, 9 feet high and 4 feet in diameter, with 250 1½-inch by 18-inch flues, with circulating tubes, is placed in a corner of the boiler-room, and supplies steam to the auxiliary engines, which can also take steam from the main boilers. A travelling crane to lift three tons has been placed in the engine-room, and with it any part of the engines or pumps can be handled for repairs.

The dock is closed by a caisson, built of steel, which may be described as an irregular rectangular box with parallel sides and inclined ends, measuring 57 feet in length on the inner face, and 59 feet on the outer; 11 feet 10 inches in width, and 21 feet 6 inches in height. Two keels, 4 by 8 inches dimensions, run the whole length of the bottom, on the outer edges of which are inserted at regular intervals 4 by 4½ inches shear steel bars, properly bent, their places in the keels being truly planed to the required curvature. The keels rest on the rollers in the caisson berth and chamber, and

8 inches in length, attached by a 4-inch pin, the outer ends being supported by two hinged brackets coupled with parallel motion bars. For ballasting purposes *two* 6-inch sluice valves are placed in the outer face above the line of the upper floor, to which are attached 6-inch cast iron pipes leading to within 4½ feet of the bottom. At the bottom of the inside face a 4-inch valve is placed to drain the caisson when the dock is empty; and the caisson can also be emptied by a No. 5 pulsometer. The cellular bottom is filled with concrete, and the further permanent ballast is supplied by the requisite amount of stone. On the outer faces are riveted 6 × 6 × ½ inch angles, which carry the white oak meeting faces, which are secured in place by ¾-inch bolts. The caisson weighs 255,000 lbs., and when the lake is at zero its displacement is 358 net tons. It is moved into and out of place by wire ropes, which pass over traversing grooved wheels secured to the masonry at the dock end of the chamber, and over spirally grooved drums keyed on a horizontal shaft at the head, which is actuated by the auxiliary engines.