shall be provided with a bell-shape extension and foot valve; proper means shall also be provided to charge the pumps. These shall have cast-iron impellers fitted on bronze shafts which shall be flange connected to the motor shaft. The discharge pipes shall be supported on bracket fastened to the walls of the pump house and carried to the main emptying culvert of the dock. A sluice valve shall be provided in the discharge pipe for closing same.

These pumps are intended to work against a head of approximately 40 ft. and shall show an efficiency of 70% when working against that head.

Caisson Gates and Entrance Walls.—The entrance walls mentioned above, and shown in Fig. 7, consist of timber cribs supporting on the top a mass concrete gravity wall 18 ft. in height. They will be 600 ft. in length and funnel-shaped in plan, giving an outer entrance width of 300 ft. The walls are to be each 75 ft. in width. The type of construction consists of a stone foundation to be laid on the earth bottom for a depth of 4 ft., this to be covered by smaller stones to a depth of 1 ft. On top of this the timber is to be laid to an elevation of 6 ft. above low-water. The timber formation is to be filled with stone and to be floored at the top to carry the concrete structure. The space between the concrete walls is to receive earth filling.

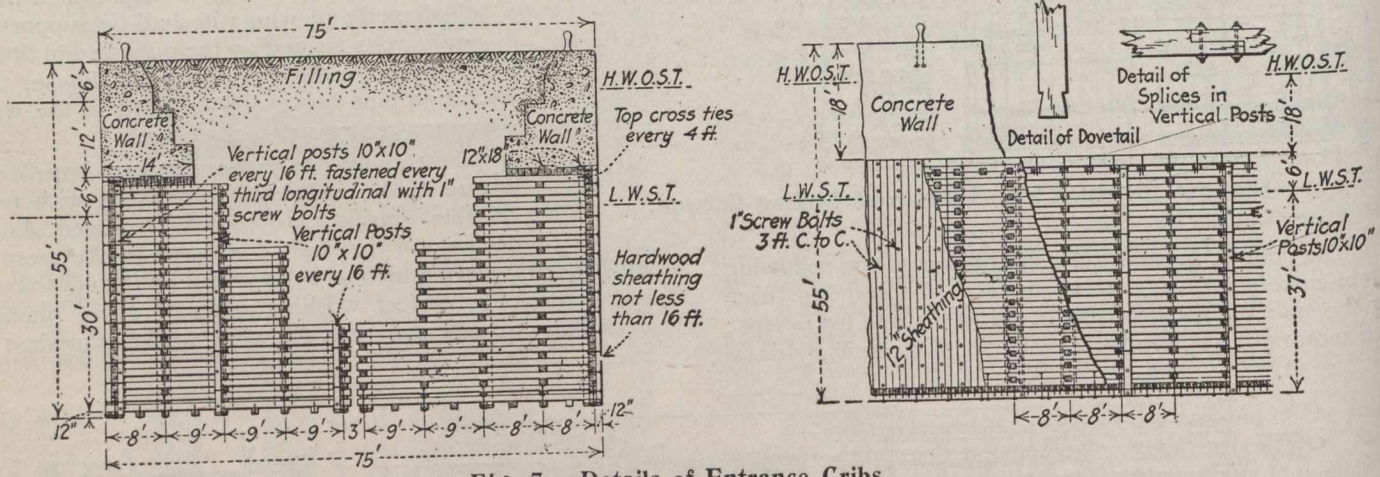

Fig. 7.—Details of Entrance Cribs.

The entrance walls approach each other until at the outer entrance of the lock the width conforms approximately to the width of the dry dock. The steel rolling caisson, shown in plan and sectional elevation in Fig. 5, will vary in length from 120 ft. on one side to 123 ft. on the other. It will be 19 ft. 10 ins. in width and is to take the form of a hollow steel frame box properly ballasted to adjust itself in a floating position when in the water. A concrete chamber, shown in Fig. 3, is provided for housing the caisson when not in use. The caisson will be provided with a steel water-tight deck 22 ft. in height. On this the rising tide will be allowed to enter through openings permitting flooding at the rate of 4 ft. in height per hour. This will prevent the caisson from floating in times of flood tide. The caisson will be provided with filling and emptying culverts, as shown in Fig. 2. There will be six of them, each approximately 10 ft. square and constructed of steel and water-tight. When the caisson is to be pulled out of its chamber and across the dock to form the closure its weight will be transferred on rollers by rails shown in the cross-section of Fig. 5. These rails are to be 6 x 9 ins. in section and to be of medium hard steel. The large sectional area is to prevent deflection at times when the caisson is undergoing repairs and there is no hydrostatic pressure underneath. The rollers are to be 2 ft. in diameter and placed 8 ft. centre to centre. The caisson chamber is to be covered with white pine 4 ins. thick resting on steel I-beams placed 30-ins. centre to centre, set in the concrete wall.

Fig. 6 gives details of the floating caisson which is to be used to close the inner entrance under ordinary conditions or the whole dock in cases of emergency. It will be constructed of mild steel and will have water-tight ballast, air and tide chambers, etc., such as are common to floating gates to provide for easy handling when afloat. It will also have 6 filling culverts similar to those already described. It will be equipped with two centrifugal pumps, having a total capacity of 10,000 gal. per minute against a head of 40 ft. These are to be used to remove water ballast when necessary. The caisson is to be provided with timber sills and sides, designed to butt against the sills and vertical walls built into the concrete side walls at the junction of the two main sections of the dock. When the full length of the dock is to be used this floating caisson is to be towed outside of the dock altogether.

The method of filling and emptying the dry dock is as follows: The culverts are arranged so that each part of the dry dock may be filled or emptied independently. Water is admitted through the filling culverts, shown in Fig. 2, and led into the front part of the chamber around the rolling caisson. The rear chamber is filled through a culvert curving around the floating caisson, as shown by the dotted line. When it is stated that one chamber may be filled or emptied independently of the other it is to be noted that the rear chamber cannot be filled unless the front chamber is full of water. In emptying, the water is conveyed through the sumps beneath the side walls, as shown in the illustration.

When the dock is in use the vessel will be supported by blocks, shown in Fig. 4. The cast-iron keel blocks are to be in three pieces, as shown. Altogether they attain a normal height of 4½ ft. They will be capped with timbers 13 ins. square. The bilge blocks will be of pitch pine provided with sliding irons and oak slide blocks. The bilge block slides will be of white oak and will be situated along the entire length of the dock at 16 ft. centre to centre.

The contract, as stated, was awarded to Messrs. M. P. and J. T. Davis, of Quebec, who are at present engaged upon the work. We are indebted to "Engineering News" for the drawings illustrating this article.