

the perforated bottom and into the lime tanks below. This milk of lime is stored in three vertical cylindrical iron tanks, 12 ft. in diameter and 18 ft. high, with conical bottoms. One charge of lime consists of from 2,000 to 6,000 lb., and the tank holds about 10,000 gal. of water, giving a $2\frac{1}{2}$ to 7% solution. In these tanks the milk of lime is kept agitated by compressed air admitted at the bottom through a small perforated pipe.

The flow of both the alum and lime solutions is regulated by standardized orifices operating under fixed heads. The milk of lime is pumped into the supply pipe or settling tanks by a centrifugal pump. As a general rule, the lime is added to the water as it enters the first settling tank, and the alum as the water enters the second settling tank.

Consumption.—The maximum consumption of water during the summer is about 6,000,000 gal. per day, for which at times, 1,600 lb. of alum and 5,600 lb. of lime

in series with the new reservoir; and the bottom was placed sufficiently low to pass below the fill of cinders and rubbish, and rest on the river silt.

Estimates were made of the comparative cost of a steel tank and a reinforced concrete reservoir. Exclusive of the foundations, pipes, gate-house, and accessories common to both designs, the steel tank was estimated to cost \$32,000, and the reinforced concrete reservoir, \$30,800. The reinforced concrete reservoir was supposed to have some advantage, being a more permanent form of construction and not requiring painting, and perhaps a desire to follow the latest fashion had a minor influence; at all events it was decided to use reinforced concrete.

The reservoir has vertical sides and is 153 ft. 6 in. in diameter at the top and 35 ft. deep at the centre. The side-wall extends 25 ft. 6 in. above the ground. The capacity is approximately 4,250,000 gal. There is a central partition, consisting of a 4-in. reinforced concrete

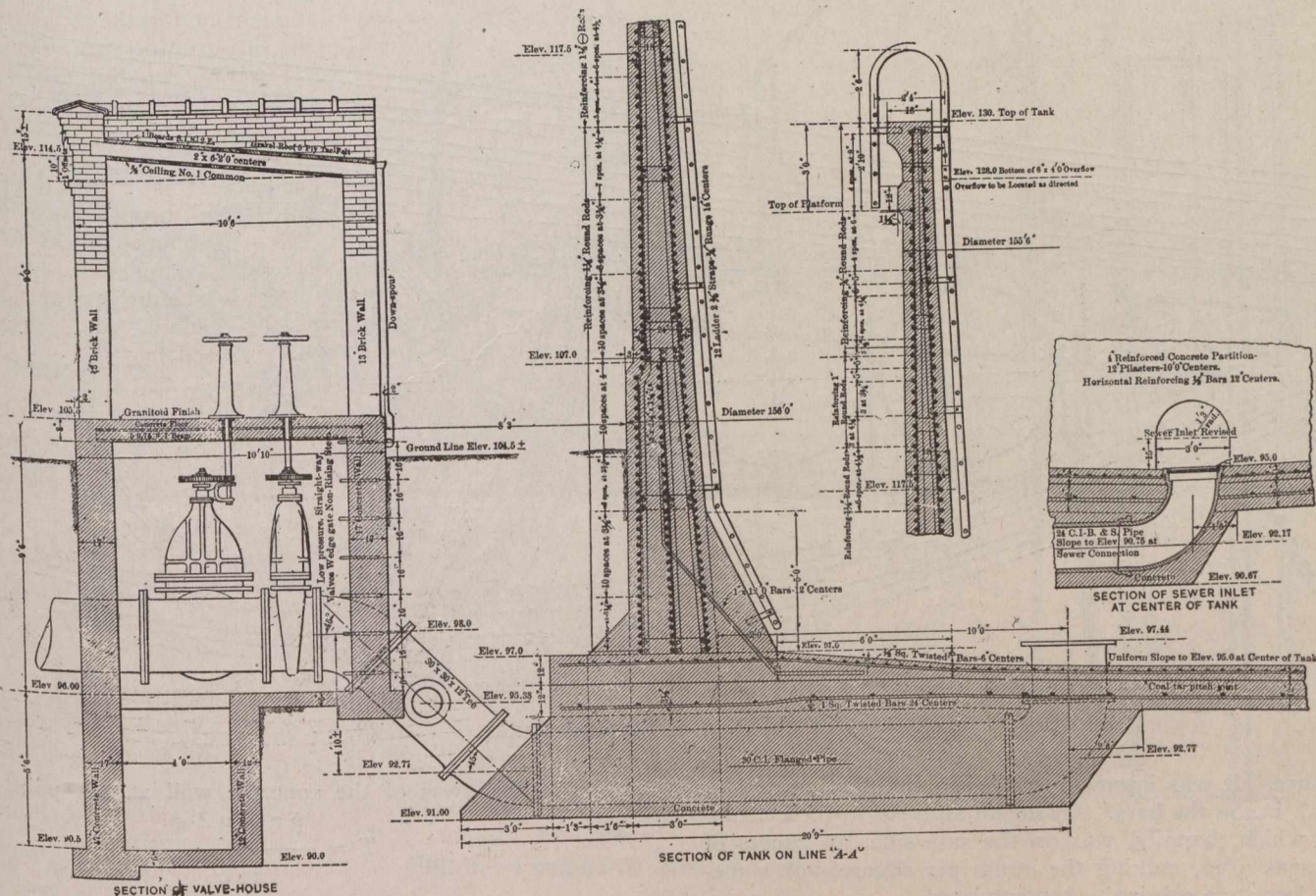


Fig. 1.—Section Details of Settling Tank.

are required, or about 2 grains of alum and 7 grains of lime per gallon of water.

The water is used for boiler purposes, for condensing and cooling in connection with the ice machine, as well as for washing barrels, bottles, etc. It is not used in brewing beer, partly because of the natural prejudice against water taken from the river below the outlet of the large city sewers.

Reinforced Concrete Reservoir.—Reverting now to the reinforced concrete reservoir completed: After due consideration of the various possibilities as to the shape and location of the reservoir, a circular shape was decided on, and the diameter was made as large as the available space permitted. The elevation of the top was fixed by that of the water in the old settling tanks, which operate

wall, with buttresses, which starts at one side of the reservoir and passes diametrically across to within 14 ft. of the other side. The object of this partition is to make the entering water circulate around the reservoir before reaching the outlet. The diameter of the intake and outlet pipes is 30 in., and that of the waste pipe 24 in. The outlet pipe has a float and a hinged joint, so that water is always taken from near the surface. The valves controlling the flow are in a gate-chamber outside the reservoir.

Foundation.—The foundation is a 12-in. layer of concrete resting directly on the river silt and reinforced, in two directions at right angles, with 1 in. square bars, 2 ft. from centre to centre, making $\frac{1}{2}\%$ reinforcement each way.