

carrying on two points. Careful measurements were made of the track, siding, curves, etc., and the site of delivery was similarly inspected to insure convenient unloading and storage.

For each shipment four 40-foot heavy capacity flat cars were used, and each length, which weighed approximately 47 tons, was loaded on cradles and swinging bunks. Fig. 8 illustrates the position of a pipe section when ready for transportation.

The Crib and Intake. — The crib which surrounds the intake is a structure 40 feet square and 25 feet in depth. It was built at the John Street wharf to a height of 10 feet, and completed after launching. It was towed out of the bay through the Western Gap, where it was loaded with about

divided into sections, as shown in Fig. 10. These were then filled with stone, which was successfully carried out by means of lowering the material in a cage directed by a tow cable to whatever section was being filled. The extremity of the cable was then transferred to another section by the diver. The centre section, surrounding the

tee with which the pipe line terminates, was filled with concrete to eliminate all danger of displacement of the intake. This operation, carried on at such a depth, necessitated a tremie pipe of small diameter, owing to the

excessive strain upon the upper portion of its length, when discharging the concrete.

The pipe line, as stated, ended in a tee, one flange connecting with the line, its mate provided with a bulkhead, and the third placed vertically and projecting out

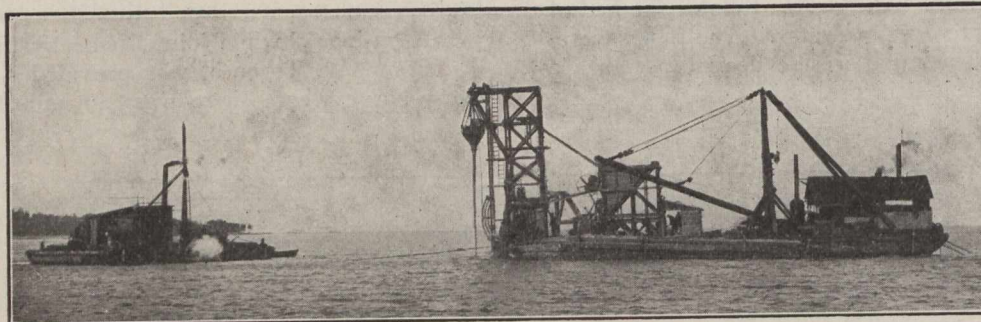


Fig. 5.—General View of Concreting Plant.

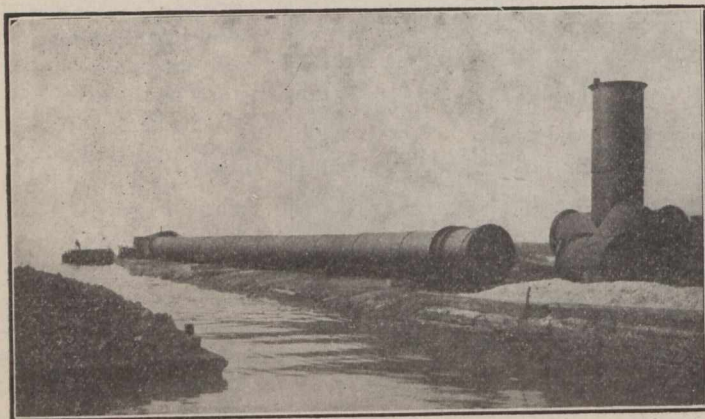


Fig. 6.—A Section of Pipe, With Expansion Joint.

25 tons of stone, held in suspension by three cables and a steel derrick, and then the whole outfit was towed by three tugs into the lake. Fig. 9 shows the crib on its way to the end of the pipe line.

When above its proper location, special precautions were taken to produce uniformity in the operation of lowering and to provide accurate knowledge for those at the surface, of its progress as it was being sunk. This formed one of the portions of the work where greatest care had to be exercised in order to place the crib as nearly as possible to its ideal position with respect to the pipe line, the last section of which was unplaced until the crib was finally seated. The difficulty will be understood when it is remembered that the pipe line was approximately 110 feet below the surface at that point, and there were no "bench marks" to define its relative position. The structure had been

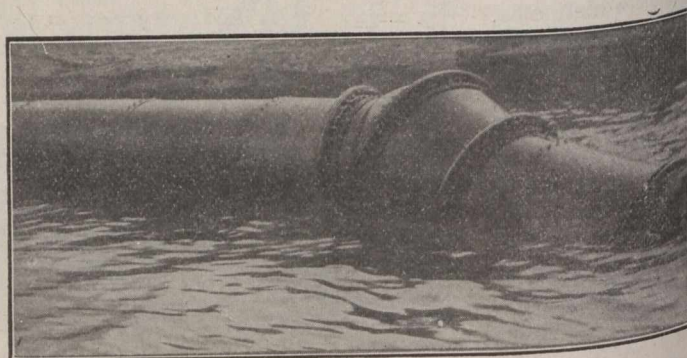


Fig. 7.—A 72-inch Flexible Joint Connected Up, and (at extreme right) An Expansion Joint.

of the crib to the intake proper, which is flared to it, and is 8 feet in diameter. It is cylindrical in form, standing vertically with closed top, while its sides are formed by a number of steel bars, as illustrated in Fig. 10, which prevent the intrusion of suspended matter of any considerable magnitude. Further, the inner part of the intake is provided with a steel plate, placed vertically to prevent the longitudinal entrance of sticks of wood, etc.

Piling.—Steel piles were used, it being felt that the work could not be satisfactorily done with the use of wooden piles, the depth of water, and of sand, the length of the line, etc.—conditions indicated that it would be almost impossible without tongue and grooving or some special manner of attaching one pile to its previously driven mates, to construct a permanent line. The steel piles were supplied by the United



Fig. 8.—A Pipe Section Ready for Transportation.