

ins. of water. In the dam in question, the span was 8 ft. 7 ins. between the second and third shores. Between the first and second shores the clear span is 9 ft. 11 ins., and, although allowance was made for a high tide of 6 ft. 6 ins., it is seldom if ever reached. From the writer's experience, a clear span of 8 ft. 8 ins., subjected to a mean head of 16 ft. 8 ins., is quite satisfactory, the total load on a pile being 4.88 tons, and the maximum stress about 10 tons per sq. in.

Practical Construction Details.—First, it is of the utmost importance that the female end of the pile should always be driven over the male, and not the male in the female. If the latter is done, a column of spoil will be compressed under the male in the jaws of the female which will finally end in the bursting of the structure. To enable rapid progress two piles were split down the centre and a double male pile manufactured, riveting a 6 x 3 x 1/2-in. T-iron on the back for stiffness. By this means two piling machines were utilized; one was built on an outrigger, with one end supported on staging and the other end on a log on the ground, the piling frame, winch, boiler, etc., being self-contained and easily moved. The other machine was on a barge, and was also self-contained.

In passing, it may be mentioned that the piling winches were made by the Lidgerwood Manufacturing Company, and were capable of working a 2-ton "tup" or hammer. A 30-cwt. tup was found to be best in practice, and a good man can get 20 blows per minute, a 5-ft. drop being quite sufficient. From the plan it will be noticed that provisions were made for subdividing the dam every 100 ft. by using T-piles, a male and female T-pile being left opposite each other; this was done in accordance with the catalogue of the makers of the piling. When the time came to drive, however, difficulties arose, and as they could be overcome very easily by the manufacturers of the piles, the writer mentions them, hoping that he may thus assist others.

First.—By having a female T-pile, it would mean, in the ordinary course, driving a male pile in it; as previously mentioned, if this is done, it will end in disaster, unless the spoil in which it is driven is a fluid mud. To overcome this, a double female pile was made, and on one side a strip of iron, 1 in. wide and 1/2 in. thick, was tapped on the outside on one jaw in order to make a lock. The jaws were then interlocked, and the pile was driven, there being clearance for any displacement of spoil between the jaws.

Second.—Great care must be exercised in keeping the two T-piles parallel, otherwise obvious difficulties will arise in closing. The manufacturers could overcome this by making an expanding pile with slotted holes, so as to enable the closing pile to vary its width from the top to the bottom.

Third.—Even with parallel piles, it is extremely hard to marry in with the closing pile, and it is desirable to have a few piles of different width.

Fourth.—If a male T-pile is used at each side of the dam, as should be done, a double female pile is required with which to end, and such should be supplied by the manufacturers.

Fifth.—If a male T-pile is urgently required, it can easily be made, and at small cost, by riveting an ordinary 45-lb. rail to an ordinary pile.

Sixth.—In driving the piles, the moment one seems to be hardening up and has not reached the required depth, another should be driven ahead of it, and, if necessary, this should be repeated until there are signs of having reached soft ground again. It is then possible to exert more force, but even then abuse must not be resorted to, as there is grave danger of parting the piles, but if this does happen

by having driven ahead, that danger is limited in extent and is only local.

From the cross-section it will be noted that the piles toward the shore were driven on the side of a cliff, which had been left in a very irregular condition by the dredging, and added considerably to the difficulties of the piling gang; it also rather retarded the progress, as some piles had to be drawn. A fair month's work for the two machines, there being two 8-hour shifts on each machine, averaged 370 piles, representing 9,361 lin. ft. of driving.

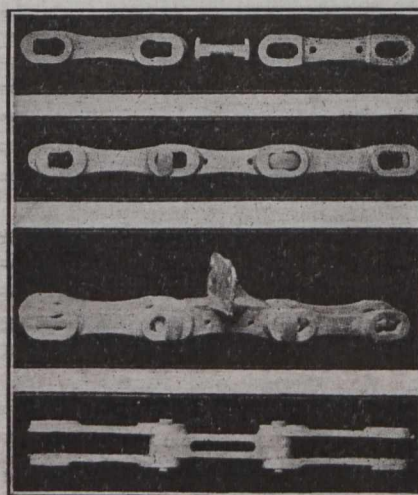
The first steel pile was driven on July 14, and pumping was started in Dam Section No. 1 on November 16, the entire dam being framed by the end of the year.

It is interesting to note that 1,872 steel piles were used, representing 47,385 lin. ft., or 9 miles of actual driving. In the first dam section there were 401 piles, which gives 24,060 lin. ft. of joint, representing very nearly 5 miles of joint.

A RIVETLESS CHAIN.

A chain was recently patented by Joseph L. Lee, general superintendent of the Cross Engineering Company, Carbon-dale, Pennsylvania, and manufacturing and selling arrangements have been entered into with the company, which is preparing to market the chain at an early date. The principle of this chain is entirely new, but simple, from which it derives its trade name of "Simplex." The accompanying illustrations of links, pins, attachments, and assembled parts are to a large extent self-explanatory, but the following claims are made for this new product by the inventor and manufacturers:—

This chain is interchangeable in all parts. Its parts are easily and quickly detachable, and each section can be so detached in less than a minute. The links can be released or removed by a horizontal movement of the diameter of the pin, or in the 9-in. pitch, 1 1/2-in. movement, doing away with the necessity of adjustment of take-up when links or pins require renewal, or to reverse the pins for further service. It will operate over either



a sprocket wheel or a traction wheel by reason of the concave shape of the links, and is also interchangeable with certain other types of rivetless chain. The chain has a wearing surface on both link and pin equivalent to standard riveted eye-bar chain, generally known as the 'Scranton' type of chain, the pins being reversible. so

that after becoming worn on one side they can be reversed 180°, so presenting the unworn side for 100% additional service, and at the same time nearly restoring the chain to its original pitch.

A special feature of this chain, as well as a distinct advantage over any other type of chain, is the "lip" shown on the outside links. When the chain is in working position, and whether in the position of passing over a sprocket or