

On March 21st, 1916, riveting of the 48-inch pipe was commenced. The sections were all 30 feet long, and on March 26th, 1916, pulling of the pipe towards the east shore was commenced. The first section pulled was 120 feet long. To the end was riveted a torpedo-shaped head 6 feet 7 inches long, with heavy lugs, to which the 1 1/8-inch plow-steel iron-centre pulling cable was attached. There were also two lugs on the inside of the torpedo to which a 1 1/8-inch plow-steel cable was attached. The



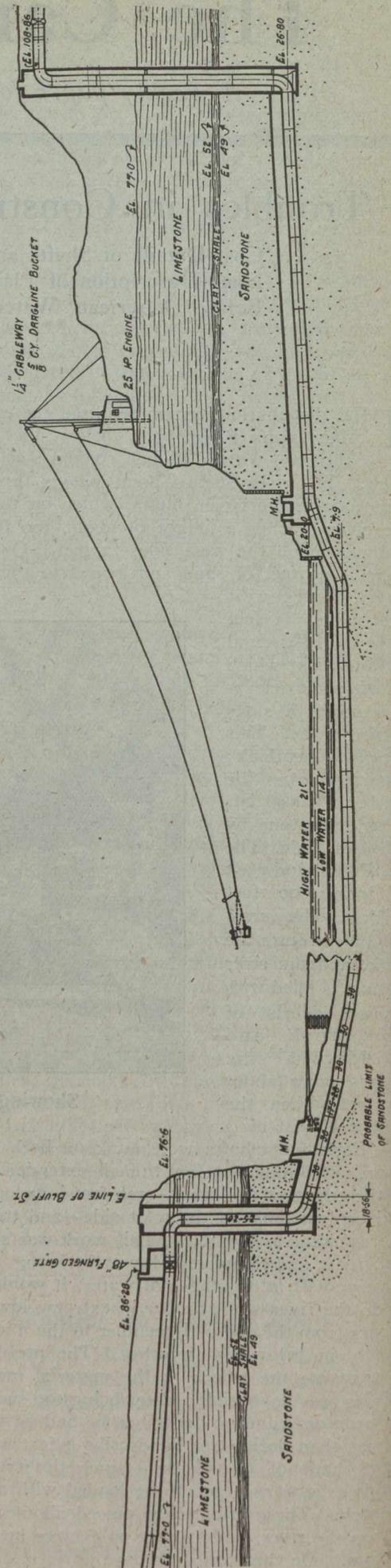
First Section Ready for Pulling.

pulling was done with a 25-h.p. Mundy engine, 125 pounds steam, and two triple sets of blocks. After this first section was pulled, 30-foot sections were added and pulled, and on March 30th, 486 feet of pipe had been pulled, and another day would have landed us on the east shore. This very day the ice broke in the upper river, about two weeks ahead of ordinary conditions, and a big ice gorge which had formed about 15 miles above the falls, broke and a tremendous flood of water came down; in fact, about 54,000 cubic feet per second, which is very nearly the maximum flood recorded on the upper Mississippi since 1860, when 60,000 to 65,000 cubic feet came down. We have a low-water record in December, 1910, for one day with 668 cubic feet per second. The flood simply picked up the pipe and laid it down stream on the flat west shore, only shearing part of the rivets in one joint about midways. The inside cable which was always anchored on the west shore saved the pipe. A few days afterwards, ten million feet of logs broke away at Anoka, 18 miles from Minneapolis, and came down over the falls and cleaned out the spoilbank, I-beams and all. The beams were picked up later.

Nothing further could be done until the river went down again. In July, the pipe was taken from where the flood had left it. It was straightened, joints repaired, and tested, and placed in position for handling again under low-water conditions. Meanwhile, the work of building shafts and tunnels went on, and was, as before stated, completed with lining May 27th, 1916. The shafts were lined with concrete, and the tunnels with 6-inch vitrified tiling.

The ditch was completely filled, of course, after the flood, with light material—sand and gravel, and smaller boulders—and it was decided that the surest and best way to excavate again would be with a drag-line excavating outfit, as follows: The track cable was started from a 14-in. x 14-in. x 48-ft. mast set up on the east shaft; elevation cable hitch about 116; the west end of cable being fastened to a bridle cable subject to pull up or down stream, with a set of 3/4-inch double blocks at an elevation of about 31. Total span about 980 feet. The track cable was 1 1/4-inch plow-steel; the load line was 5/8-inch plow-steel, and the tension line was 3/4-inch plow-steel. The engine was a Mundy 8 1/4 inches x 10 inches (25 h.p.) steam pressure 125 pounds. The bucket was a Sauerman 1/2-yard. A 20-h.p. engine was placed on the west side. We began setting up cable and engine on September 11th, 1916, and finished September 21st; and began drag-line excavation on the river proper October 16th, 1916, and finished January 20th, 1917.

The material was about as expected, but in the bottom of the trench we ran across large pieces of ledge that probably has been shifted into place during the early stages of the flood, and it became necessary to break these large debris by dynamite before the drag could handle them.



Profile Showing Elevations, Cableway Arrangement.

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