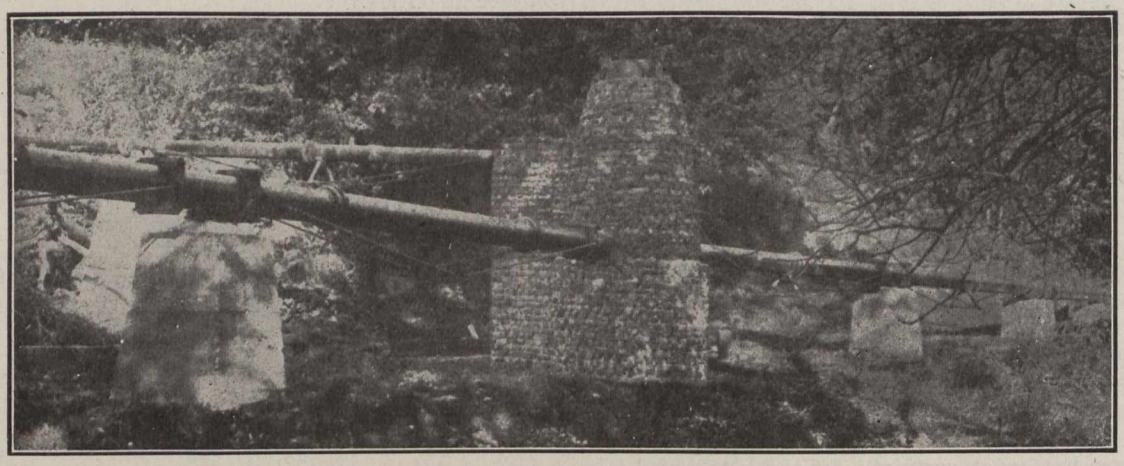
of the plate and rollers in such a manner as to secure the rollers from falling out, but at the same time to permit them to roll on the plate with the expansion and contraction of the pipe, a saddle to fit the outside diameter of the pipe.

While the expansion in an iron pipe with a flow of sewage would be very small, owing to the almost constant temperature of the sewage, and might be taken care of by the "giving" of the lead in the joints, at the same time the

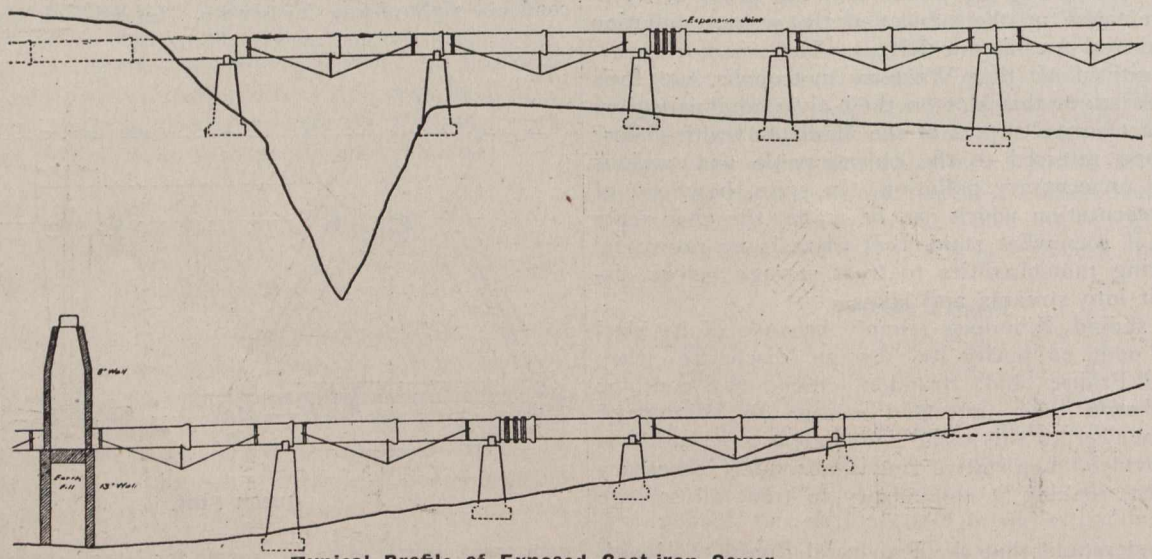


Exposed Sewer and Drop Manhole, Leavenworth, Kansas.

To avoid placing piers in creek channels where they would obstruct the flow, it was necessary to get a wider panel than 12 feet, and a truss was designed to support the intermediate joint. The truss consists of clamp bands to fit the circumference of the pipe and hold the truss rods in

loosening of the lead from expansion and contraction would cause leaks that would require attention later on, and it was considered necessary to install expansion joints.

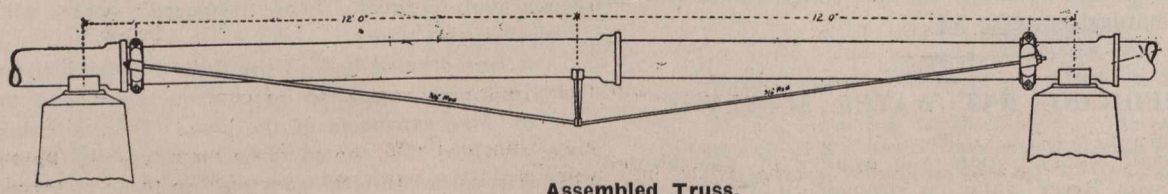
In designing the special castings required for this work, every effort was made to have them simple, yet strong. To



Typical Profile of Exposed Cast-iron Sewer.

place, a queen post and a set of rods, as shown on the details. In estimating the cost of the work, it was found that the complete truss was less expensive than the pier with its necessary castings, so it was decided to make the panels 24 feet instead of 12 feet, and to use a truss between each set

provide for different sizes of pipe, bushings were used where possible, or one casting only of a set was altered. This reduced the number of patterns required for the castings and kept the castings standard as far as possible. The castings required for the work were made by local foundries.



Assembled Truss.

of piers. To provide further for expansion, it was decided in cases where there was more than 75 feet of exposed pipe in a span to place an expansion joint. The regular type of iron body, brass sleeve expansion joint was specified.

The unit contract prices for this class of work were as follows:

10-inch light weight cast-iron pipe, in place..	$ 1.50 per ft.
8-inch " " " " " " ..	1.00 "