G. E. KING.
Tubular Bridges.

No. 196,154. Patented Oct. 16, 1877.

Fig. 1.

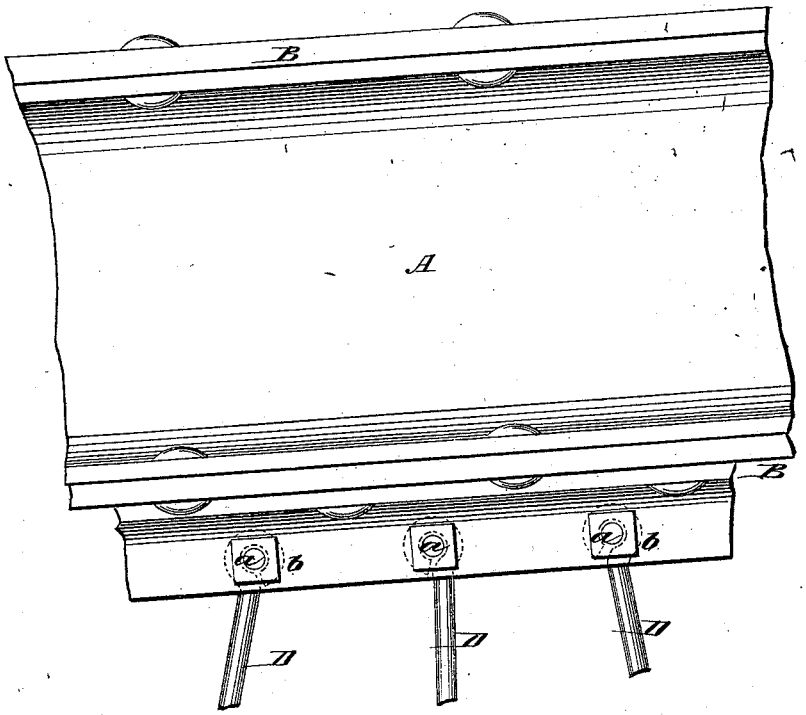
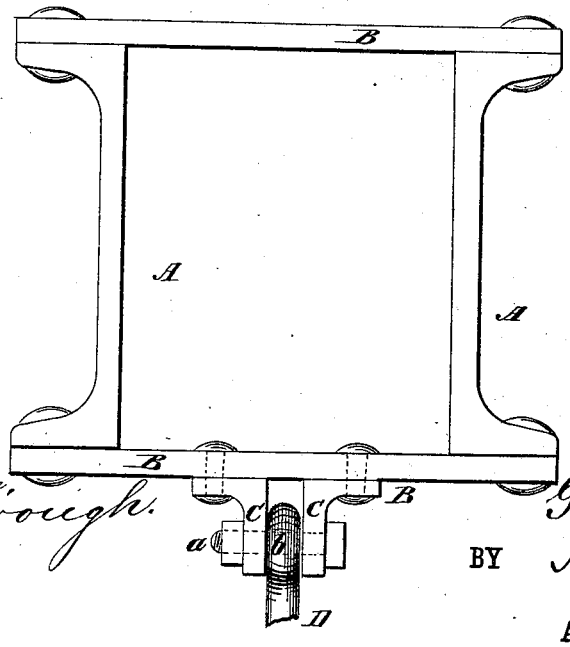


Fig. 2.



WITNESSES:
Francis McArdle.
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INVENTOR:
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UNITED STATES PATENT OFFICE.

GEORGE E. KING, OF DES MOINES, IOWA.

IMPROVEMENT IN TUBULAR BRIDGES.

Specification forming part of Letters Patent No. **196,154**, dated October 16, 1877; application filed August 3, 1877.

To all whom it may concern:

Be it known that I, GEORGE E. KING, of Des Moines, in the county of Polk and State of Iowa, have invented a new and useful Improvement in Tubular Bridges, of which the following is a specification:

This invention relates to bridges having tubular arches; and the nature of my invention and improvement consists in connecting the posts, counter-braces, and the lateral braces to a tubular arch by means of pins, bolts, or rivets passed through angle-irons rigidly secured to the arch, and also through eyes formed on the posts and braces, as will be hereinafter explained.

In the annexed drawing, Figure 1 is a side view of the section of a tubular arch. Fig. 2 is an end view.

Similar letters of reference indicate corresponding parts.

The tubular arch is composed of channeled iron plates A A and flat plates B B, rigidly and closely bolted or riveted together, so as to exclude moisture from the inside. To the bottom side of this tube I rigidly bolt or rivet angle-irons C C, having the form of the letter L. The vertical portions of these angle-irons form parallel flanges, between which the upper ends of the posts and brace-rods D are secured by means of pins, bolts, or rivets *a*, passed through eyes *b*.

Prior to my invention the posts and brace-rods were secured to the tubular arch by passing them through the tube, and using nuts and washers or shoulders. This weakened the tube, and involved safety devices for preventing the nuts from working loose. Furthermore, the tube was weakened by perforating it, and the perforations allowed water to enter therein, which soon rusted and weakened it.

By my invention the tube is not weakened, nor so perforated that moisture can enter between the joints of the plates.

The drawing shows the angle-iron C C secured to one of the flat plates B, forming the tubular arch; but when the arch is reversed, so that one of the channeled plates A is at the bottom, the angle-irons will be secured to these plates.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The angle-irons C C, riveted to the bottom plate of a tubular arch, and connected by bolt and eye *a b* with the posts and braces of said arch, as shown and described, so as to exclude moisture.

GEORGE ELIAS KING.

Witnesses:

ALBERT M. BLODGETT,

ALBERT H. PORTER.