(No Model.) 2 Sheets—Sheet 1.

D. E. FISHER.

BRIDGE.

No. 591,832. Patented Oct. 19, 1897.

Fig. 1.

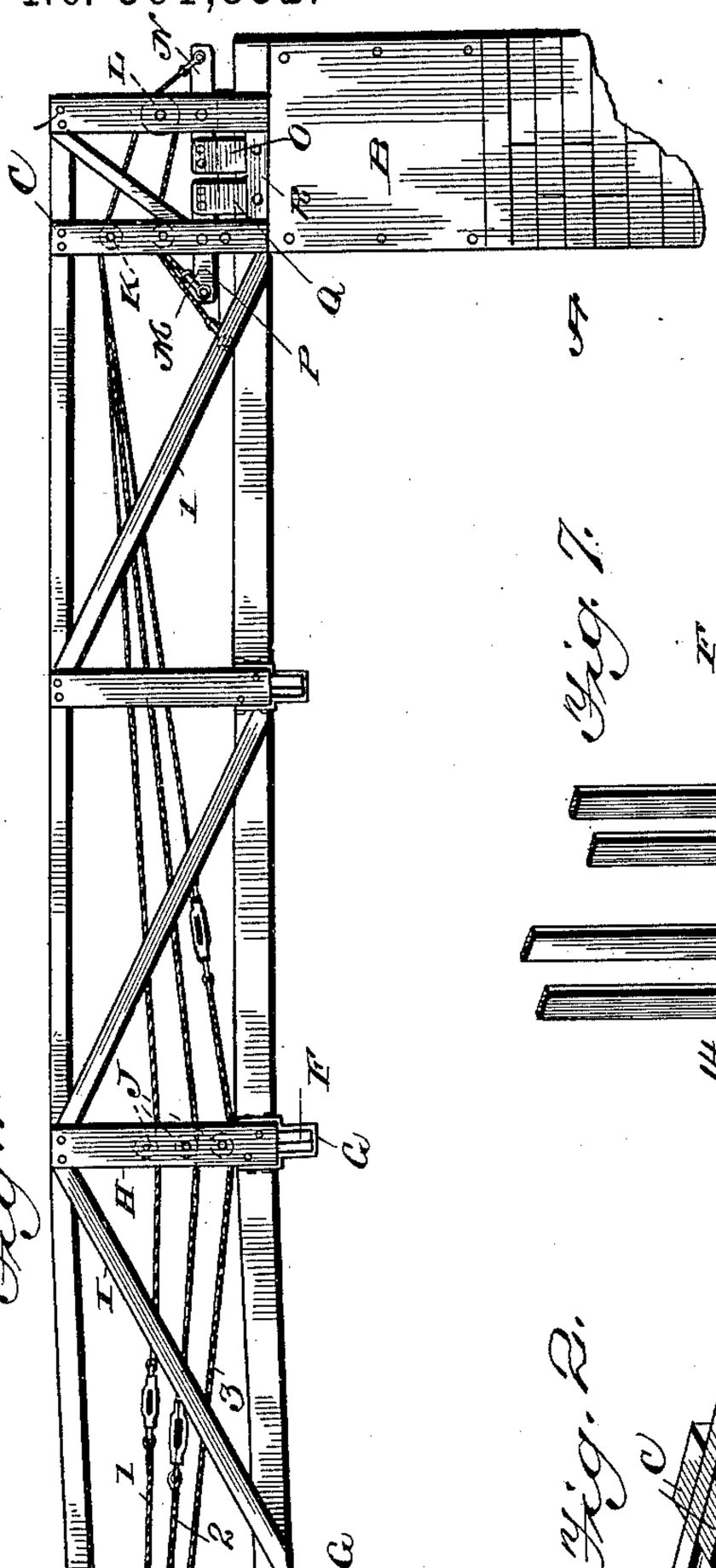


Fig. 3.

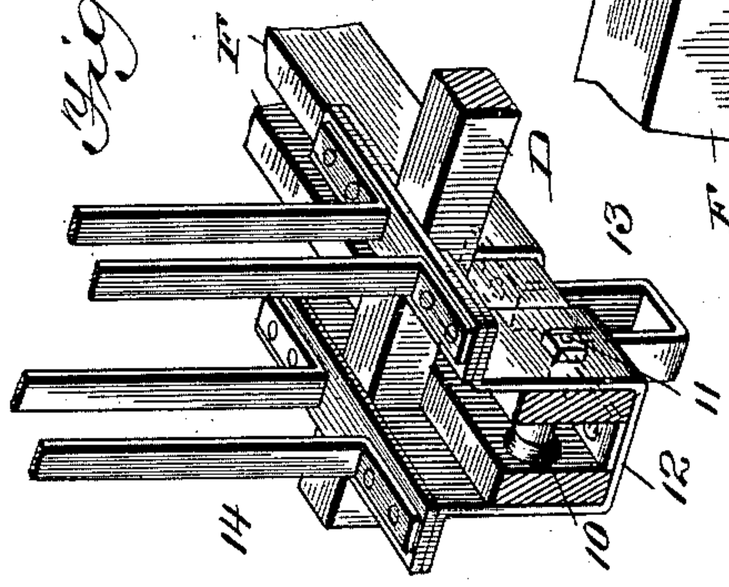


Fig. 4.

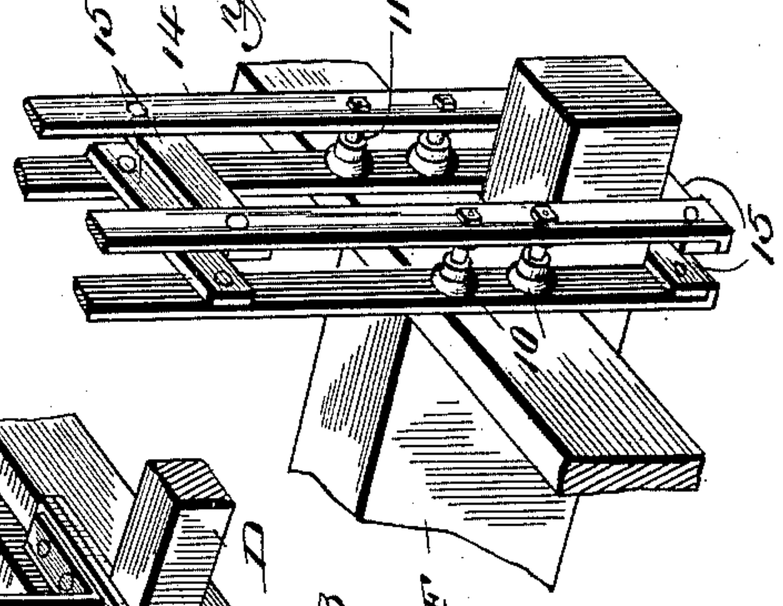
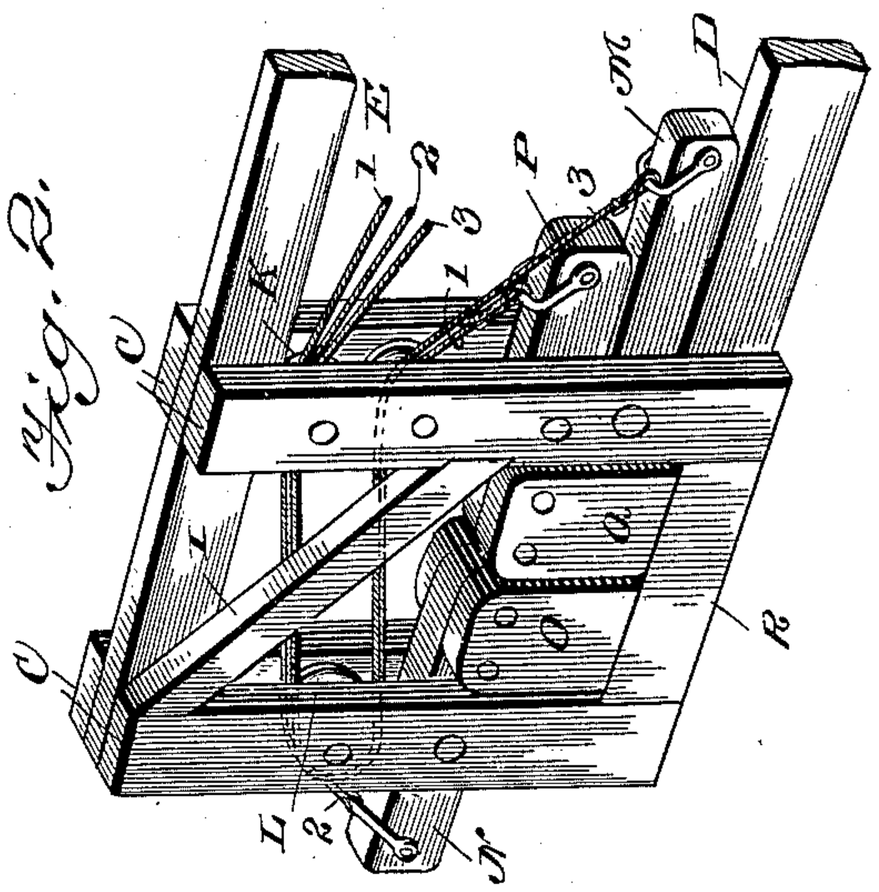


Fig. 2.



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(No Model.)

2 Sheets—Sheet 2.

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BRIDGE.

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Fig. 3.

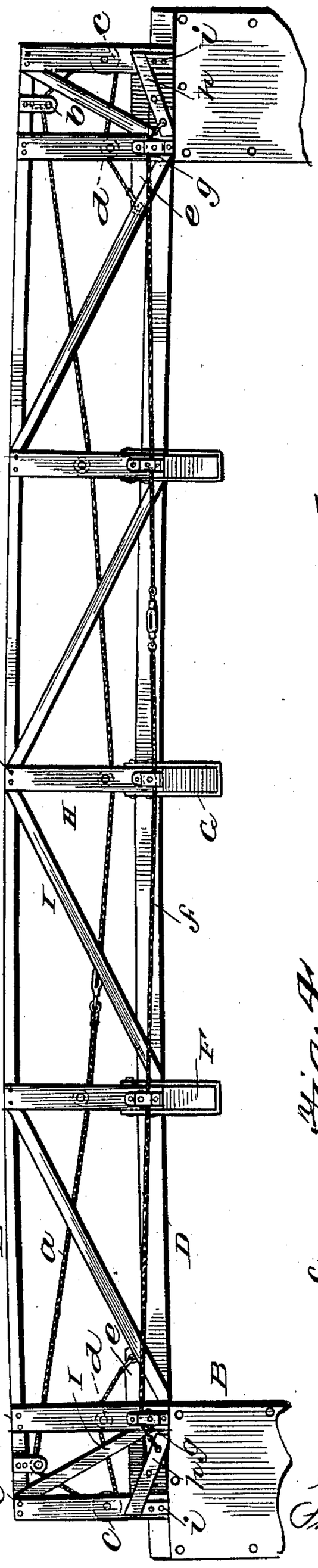


Fig. 6.

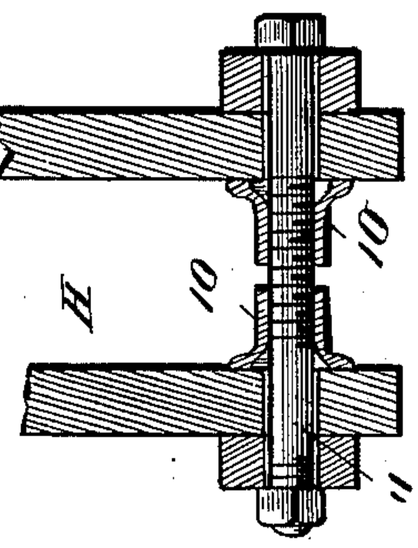


Fig. 5.

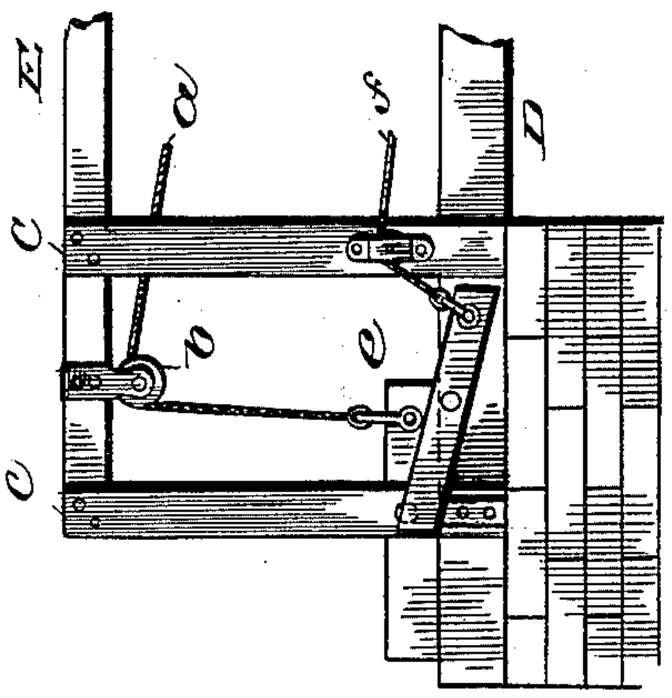
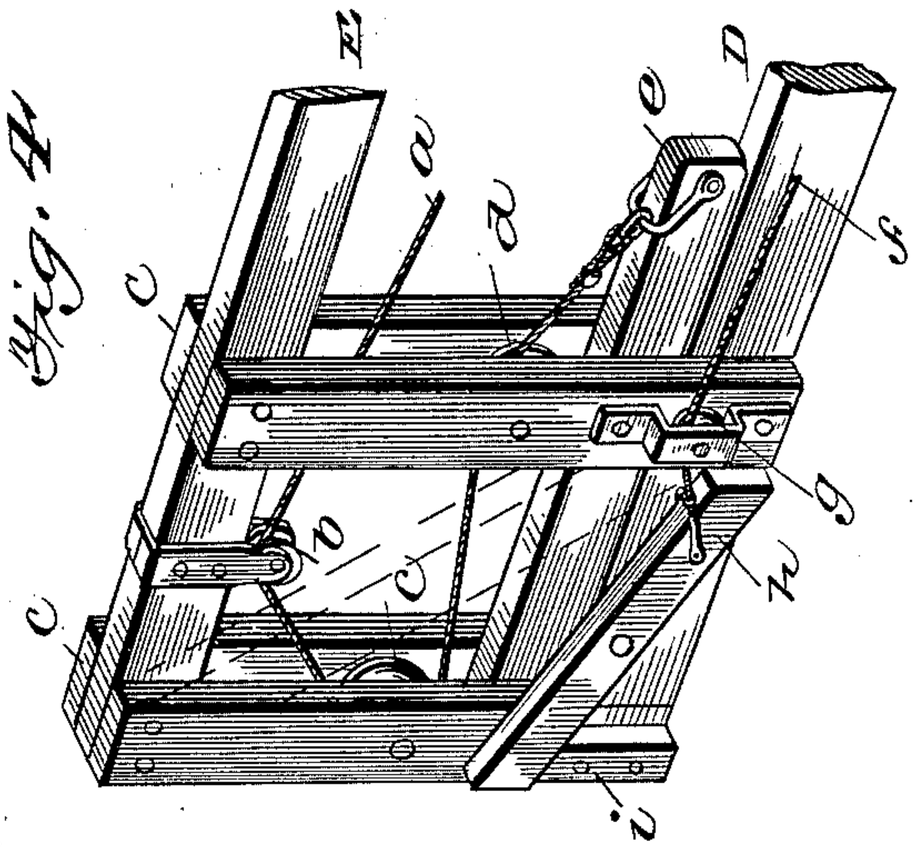


Fig. 4.



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UNITED STATES PATENT OFFICE.

DAVID E. FISHER, OF KENTON, OHIO.

BRIDGE.

SPECIFICATION forming part of Letters Patent No. 591,832, dated October 19, 1897.

Application filed March 24, 1896. Serial No. 584,703. (No model.)

To all whom it may concern:

Be it known that I, DAVID E. FISHER, a citizen of the United States, residing at Kenton, in the county of Hardin and State of Ohio, have invented certain new and useful Improvements in Bridges; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in bridges, and has special reference to suspension-bridges.

It consists in certain novel features of construction and arrangement hereinafter described and claimed.

In the annexed drawings, which fully illustrate my invention, Figure 1 is a side elevation of a bridge embodying my improvements. Fig. 2 is a detail perspective view of a portion of the same. Fig. 3 is a side elevation of a modification adapted to bridges of a lighter form than that shown in Fig. 1. Fig. 4 is a detail perspective view of a portion of the bridge shown in Fig. 3. Fig. 5 is a side elevation showing another modification. Fig. 6 is a detail sectional view, and Figs. 7 and 8 are detail views showing peculiarities of construction employed in iron bridges.

In carrying out my invention I make use of the usual piers or abutments A, upon which I build boxes B, which are filled with rocks, waste iron, &c., to make a heavy anchor and hold the bridge and prevent its being carried away by freshets. Anchored in these boxes and rising therefrom are the posts or columns C, which are constructed of two parallel vertical timbers bolted together. These posts or columns, it will be understood, are erected on both sides of the stream, and chords D are secured to and extend between the same on a level with the roadway, while their upper ends are connected by slightly-arched chords E. The floor-supporting beams F are passed beneath the lower chords D and are shouldered to fit snugly against the same, as shown most clearly in Fig. 8. The projecting ends of the joists are secured in clevises or brackets G, to and in which are also secured the lower ends of intermediate posts or columns H. Suitable braces I are arranged between all the posts. The posts or columns H are similar in construction to the end posts or columns C, and series of pulleys J are journaled in and between the members of all the posts. In the form of bridge shown in Fig. 1 each of the intermediate posts is provided with three pulleys or rollers, two pulleys or rollers are provided in each of the inner posts C, and a single roller or pulley L in the outer posts C near the bottom of the same.

A series of cables 1 2 3 pass over the pulleys K L and under the pulleys J and are provided with the usual turnbuckles, so that they may be drawn taut, so as to receive the strain of the bridge and support the same. The end of the cable 3 is secured to the inner end of a locking or bracing lever M, which is pivoted within the inner post C, directly above the chord D, and is adapted to lie on said chord. The end of the cable 2 is secured to the end of a lever N, pivoted within the outer column C and having arms O secured to its inner end and adapted to come into contact with the blocks or stops R, secured to the sides of the chords D. The end of the cable 1 is secured to the lever P, pivoted within the column C and having arms Q at its inner end adapted to strike against the stops R. It will thus be readily seen that after the cables have been brought to the proper tension any strain on the central intermediate portion of the bridge will tend to depress the central portions of the cables, and the levers will then be immediately caused to turn so as throw their locking ends and arms against the lower chords and the stops thereon and consequently brace the bridge, so as to prevent any sagging thereof.

Actual experience has shown that in bridges constructed without the locking-levers employed by me some part of the tensile strength of the cables is not utilized and that the interposition of the levers utilizes the entire tensile strength of the cables.

In Figs. 3 and 4 I have shown a bridge adapted to shorter spans and smaller streams than that shown in Fig. 1. In this form of bridge but two cables are used, and of course only two locking-levers are employed. The upper

cable *a* passes over a pulley or roller *b*, hung on the upper chord of the bridge between the columns C, thence to and around a roller *c*, mounted in the outer column C, and thence over a roller *d* in the inner column C, whence it passes to a lever *e* and is secured, said lever *e* being arranged and operating in the same manner as the lever M. (Shown in Figs. 1 and 2.) The lower cable *f* passes over a roller *g* on the side of the inner column C and has its end secured to a lever *h*, pivoted at a point between the columns C and having its free end adapted to rest on a stop-block *i*, secured on the side of the outer column C.

In Fig. 5 I have shown still another form in which the lever *e* is shifted over to the outer column C and the roller *c* is dispensed with, the cable *a* passing directly from the roller *b* to the lever *e*. The arrangements shown in Figs. 3, 4, and 5 operate precisely as those shown in Figs. 1 and 2, but are simpler and consequently better adapted for use over small streams, where a cheaper and shorter bridge is desirable.

In order to maintain the members of the posts at the proper distance apart, I employ the construction illustrated in Fig. 6. Stops 10 10 are adjustably mounted on the securing-bolt 11 and turned up against the members of the post, as shown. The stops can be adjusted to hold the members of the post at any desired distance apart, as will be readily understood, and after the fastening-nuts have been turned home the structure will be rigid.

In Fig. 7 I have shown a metal column which may be used instead of the wooden column shown in the other figures. In this case the columns are composed of vertical straps or stays 14, which are bolted to and rise from the clevises 12, bolted to the floor-supporting beams F on opposite sides of the chord D. The lowermost cable in this form of bridge will pass below the floor-beams and run under pulleys or rollers mounted in hangers 13, secured to and depending from the clevises 12, and it will be obvious that the said hangers will vary in length, the hangers on the central column being lower or longer than the end hangers, so as to give the proper curve or bow to the cable.

In Fig. 8 the stays 14 are continued below the beam F and are connected at various points by straps 15, the lowermost pair of said straps serving to hold the pulley. These straps 15, it will be readily understood, are used on the columns illustrated in Fig. 7 to provide bearings for the upper rollers.

It will be readily seen from the foregoing description, taken in connection with the accompanying drawings, that I have provided a bridge of a simple and efficient construction, and which can be easily, rapidly, and cheaply built. The strain is entirely on the cables and no increase in the size of any part except the cable is necessary to adapt the construction to larger bridges or bridges subjected to greater strain.

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

1. In a bridge, the combination with the frame, of supporting-cables mounted thereon, and locking-levers mounted on the frame and attached to the cables.

2. The combination with the frame, of locking-levers pivoted thereto and adapted to bear thereon, and supporting-cables attached to said levers and supporting the frame.

3. The combination with the frame, of pulleys mounted on the frame, locking-levers pivoted thereto and adapted to impinge on stops on the side of the frame, and cables passing over the pulleys and attached to the locking-levers.

4. The combination with the chord and the floor-beams, of clevises secured to said beams on opposite sides of the chord, a hanger secured to and depending from said clevises, a roller mounted in said hanger to guide the suspension-cable, and columns rising from the clevises.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID E. FISHER.

Witnesses:
R. W. BISHOP,
JOHN IMIRIE, Jr.