

C. S. PALMER
BRIDGE.

No. 176,991.

Patented May 2, 1876.

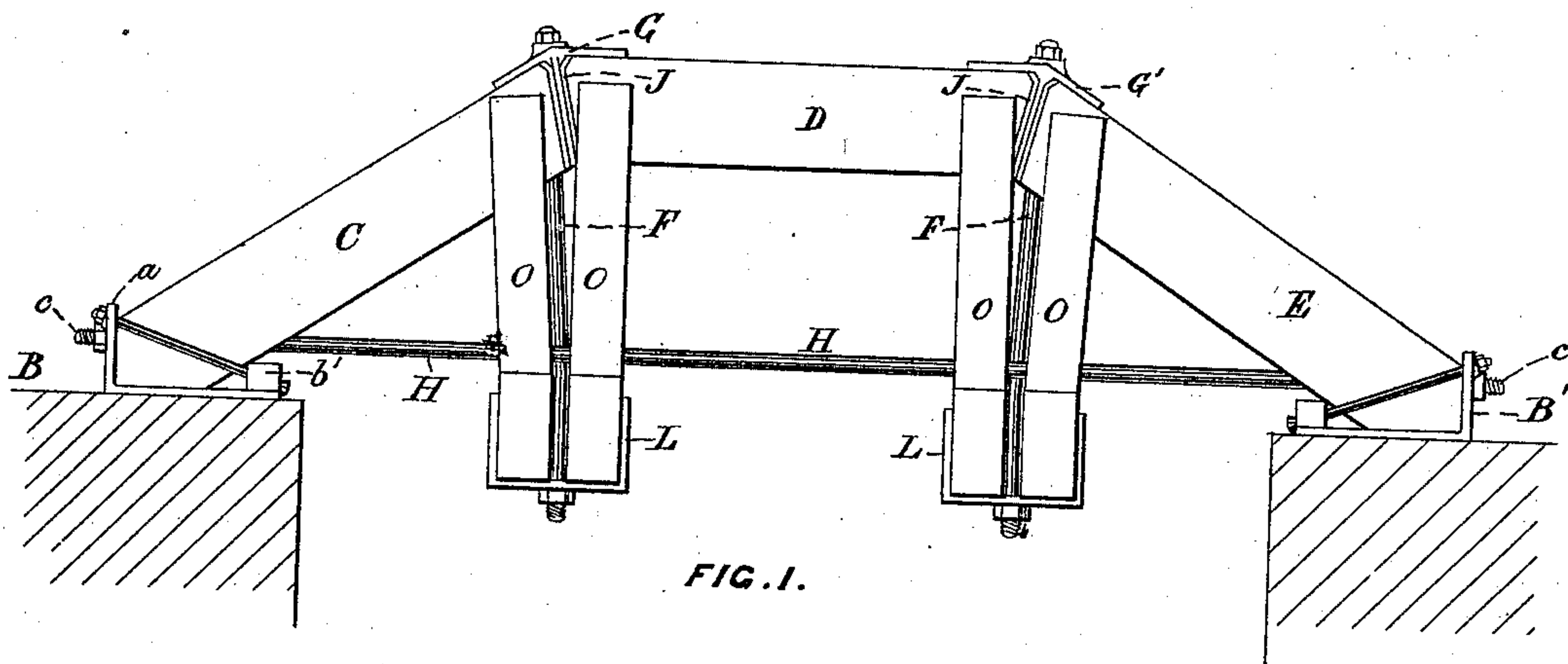


FIG. 1.

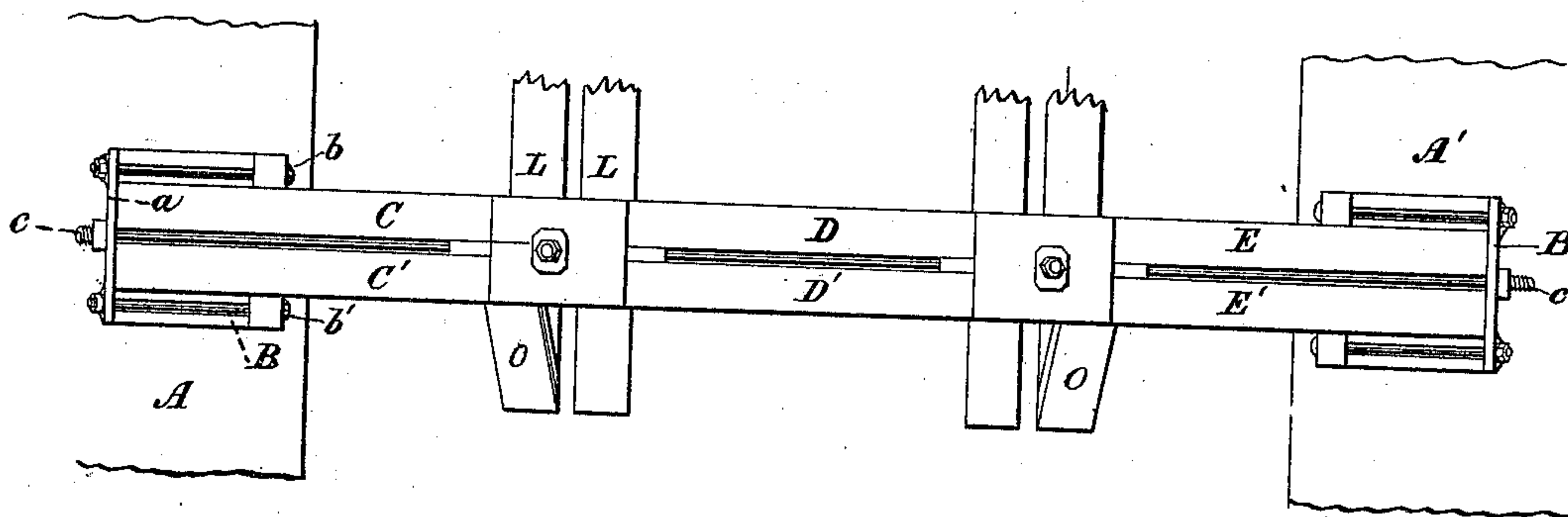


FIG. 2.

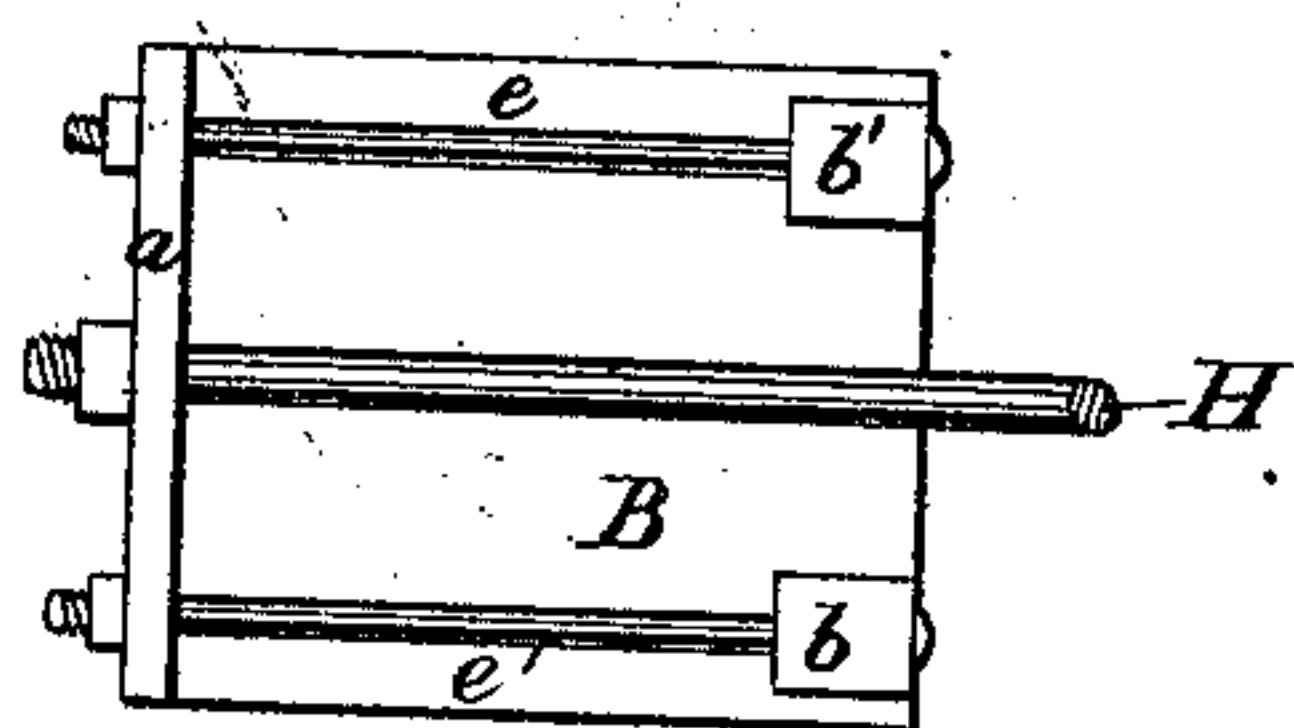


FIG. 3.

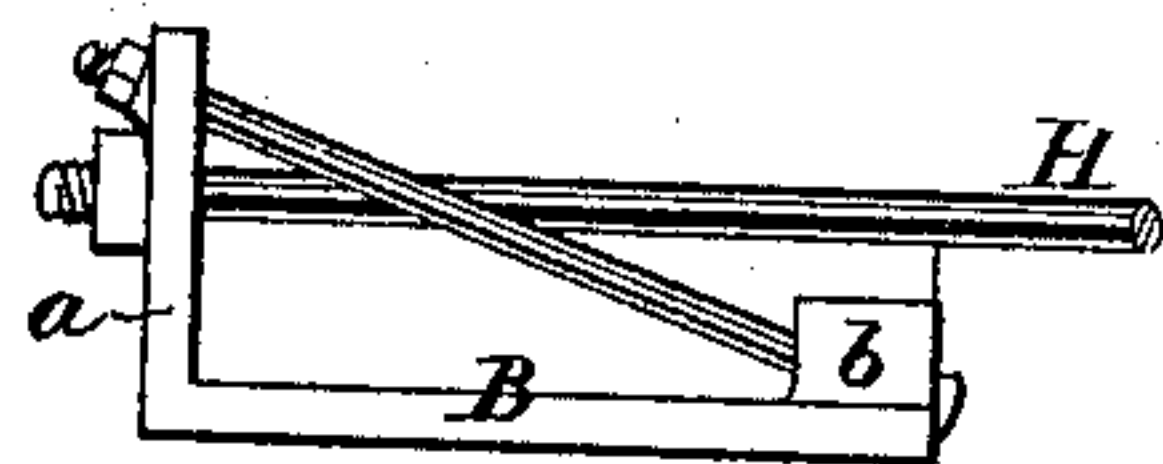


FIG. 4.

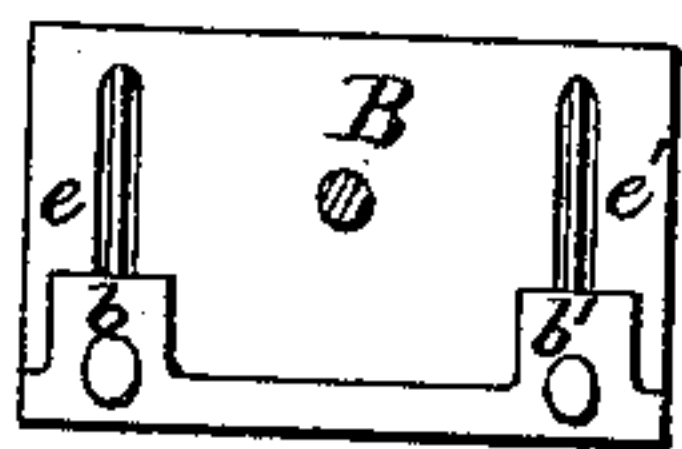


FIG. 5.

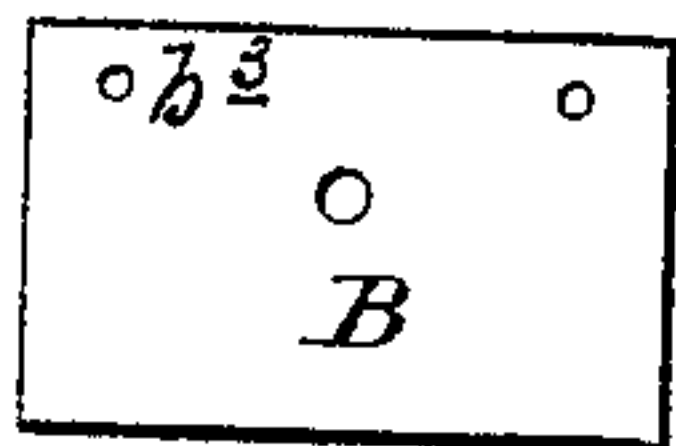


FIG. 6.

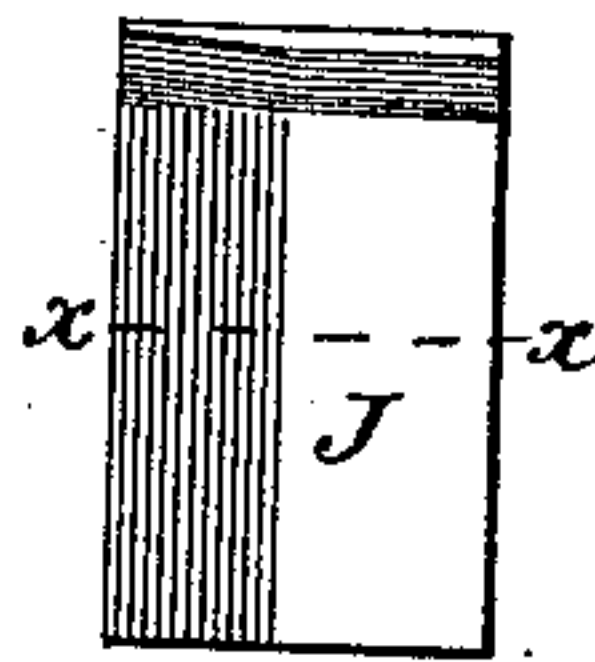


FIG. 9.

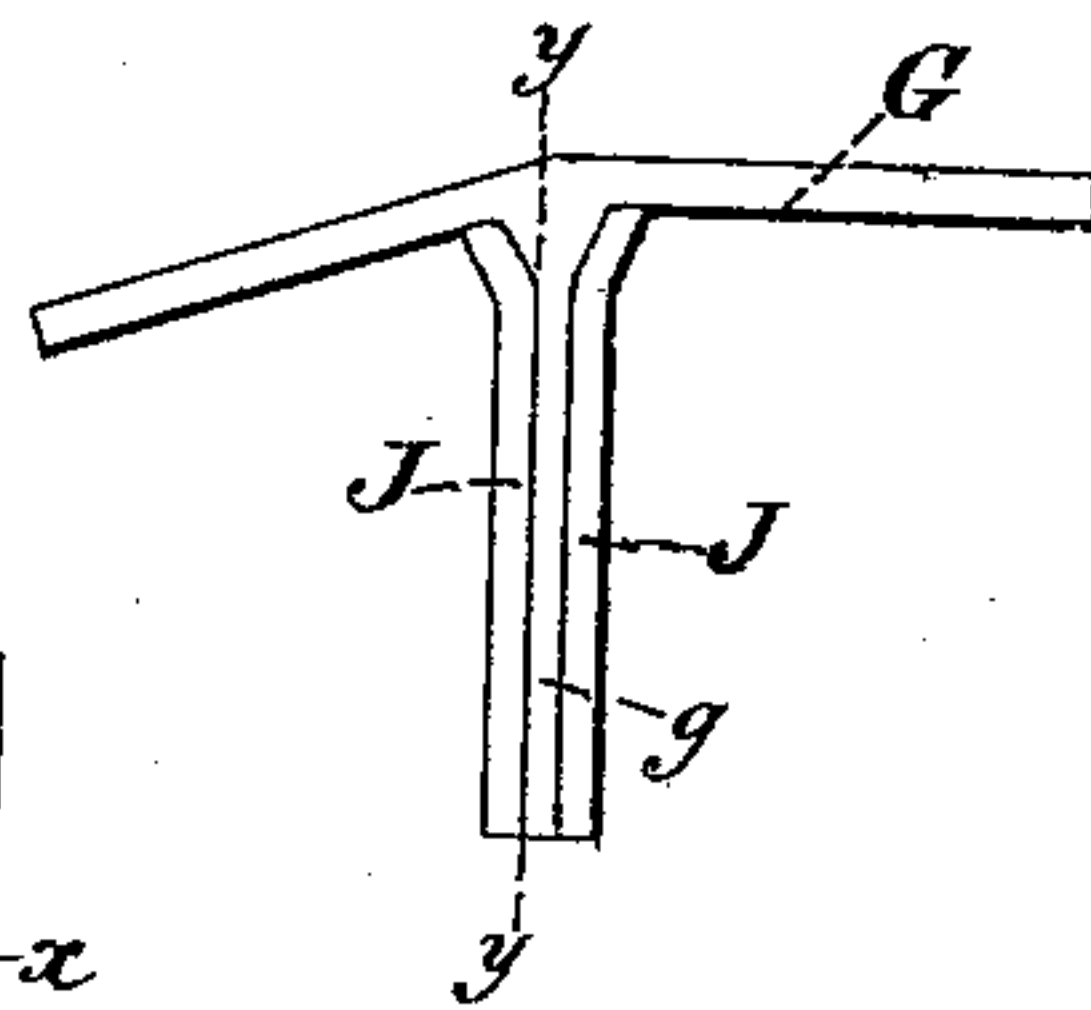


FIG. 8.



FIG. 10.

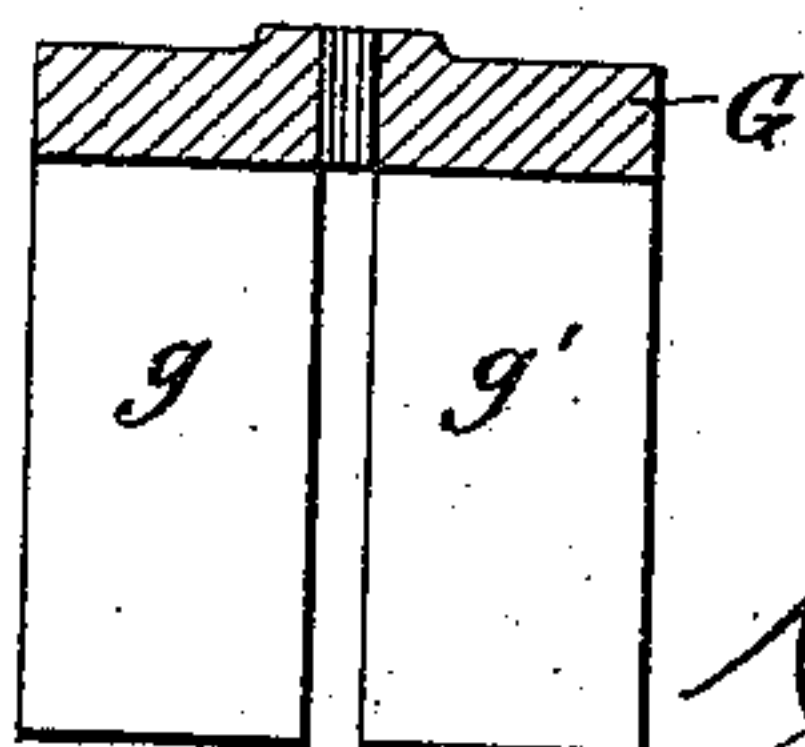


FIG. 7.

WITNESSES

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CHARLES S. PALMER, OF STROUDSBURG, PENNSYLVANIA.

IMPROVEMENT IN BRIDGES.

Specification forming part of Letters Patent No. 176,991, dated May 2, 1876; application filed February 10, 1876.

To all whom it may concern:

Be it known that I, CHARLES S. PALMER, of Stroudsburg, county of Monroe, State of Pennsylvania, have invented certain new and useful Improvements in Bridges, of which the following is a specification:

This invention relates to that class of bridges usually constructed from timber, and used for rivers, canals, roads, &c.; and it consists in the provision of certain metal shoes or seats, caps, and joints, so arranged and applied to the timbers forming the arches of the bridge that any one piece may be removed and new timbers inserted without interfering with the use of the bridge, or lessening its strength for the time being, the construction, application, and operation of all of which will be herein fully pointed out and described.

In the drawings, which form an essential part of this specification, Figure 1 represents a front elevation of one arch of the bridge. Fig. 2 is a plan view of the same. Fig. 3 is a detached plan view of the shoe or seat in which each end of the arch rests. Fig. 4 is a side elevation of the same. Fig. 5 is a front view, and Fig. 6 a rear view, of the same. Fig. 7 is a detached front elevation of the cap and joint. Fig. 8 is an end view of the same. Fig. 9 is a detached view of the wedge; and Fig. 10 is a cross-section of the same, taken on line *xx* in Fig. 9.

Similar letters of reference found in the various figures of the drawings will locate corresponding parts.

As at present constructed the wooden bridges found in general use throughout the country are not susceptible of proper repairs without stopping all travel during the same, and it is with great difficulty and expense that any sort of reconstruction is effected when needed. In the majority of cases they usually become so dilapidated through wear and tear, as well as natural decay, that the entire rebuilding of the structure is found to be a necessity, which entails great expense.

It is for the purpose of overcoming and obviating these difficulties, and to provide a bridge so arranged and constructed that any specified timber in the structure may be removed and replaced by another at will without disturbing the others or interfering with

the use of the bridge, that I have made my invention. In carrying out the details of the same I construct the arches double throughout, and set their bases in a peculiar metal shoe, which rests upon the usual masonry abutments, the entire arch being jointed at the center by means of a peculiar metal cap or joint, and tied at the bases by a suitable metal chord. Wooden bridges of this form have usually been tied by wooden chords, which are objectionable, owing to rapid decay, which occurs much faster where wood is joined to wood than in the use of wood and metal.

A A' are the usual masonry abutments, constructed in the ordinary manner, which support the entire superstructure. B is a shoe or seat, constructed from either cast or wrought iron, as may be preferred. Its rear *a* is turned upward at a right angle to its base, and at its front, on both sides, are provided two lugs, *b* and *b*¹. From these lugs to the top of the rear flange *a* of the shoe are passed two tie-rods, *e* and *e*¹, passing through openings *b*³, Fig. 5, and provided with suitable nuts for tightening them, for the purpose of strengthening the shoe, and to prevent the rear flange from giving way under strain. When in position these tie-rods serve to retain the base of the timbers of the arch from moving laterally. When new timbers are being inserted the tie-rod on that side may be temporarily withdrawn, to permit the base of the timber to enter the shoe, then replaced and tightened. This shoe or seat is made wide enough to receive the base of the double arch, and simply rests upon the top of the abutment without being anchored thereto. C C', D D', and E E' represent the timbers forming the arch of the bridge, and reaching from the abutment A to abutment A'. They are double in number, as shown, for the purposes as will presently be more fully described. The bases of the end timbers C and C', E and E', rest, respectively, in the shoes B and B' on the two abutments, the center timbers D D' being inserted between them, forming the top of the arch, in the usual manner. At the points of junction I insert a peculiar cap or point, G. (Shown plainly in Figs. 7 and 8.) This cap G is made of cast-iron, and usually about one inch in thickness, and with its top inclined at a slight angle, so as

to coincide with the angle of the arch. From its center depend two arms, $g g'$, as shown in Fig. 7, and which, when in place, are inserted between the lower and center timbers of the arch, as shown in Fig. 1. This cap prevents any moisture from entering the joint from above.

The arch at the bases is tied together by means of the metal chords H , which, passing through the rear flange a of the shoe or seat B , are made taut by means of the nuts $c c$ on the exterior of the flange of the shoe. This tie-cord H may be suitably constructed and arranged for the purposes of the ordinary expansion and contraction of the metal.

In order to take up all slack between the timbers, and to bring the arches to proper tension when new timbers are inserted, I insert between the caps and joints G and G' a metal wedge, J , of the shape as shown in Figs. 8, 9, and 10. These wedges are chamfered at one edge, so as to be easily inserted between the ends of the timbers and metal cap and joint, and then readily driven home with a mallet. The top of the wedge is turned at an angle, as shown in Fig. 8, and corresponding with the angle at the top of the depending arms $g g'$ of the cap, this for the purpose of preventing the wedge from becoming loosened and escaping from place by any jar or vibration of the bridge. A sustaining-rod, F , is inserted through each cap G , and its top held by a nut resting on the top of the cap. It passes down between the two timbers forming the arch; also, between the arms $g g'$ of the cap and joint to the timbers $L L$ below the level of the road-bed, and to which it is bolted for the purpose of supporting the cross-bars or timbers upon which the floor of the bridge

rests and is laid. These timbers and cross-bars may also be doubled for same purposes as in case of doubled arches. Suitable braces $O O$ are attached to the cross-supports of the bridge-floor, and at their top bolted to the arches of the bridge, for the purpose of preventing any lateral vibration. It will thus be seen that any one timber in the arches or floor-supports can be removed without endangering the balance of the structure, as the metal shoe-cap and joints sustain the rest of the timbers. In building new bridges the wedges are not absolutely necessary; but when new timbers are inserted they are instantly brought to a proper bearing by the insertion of the wedges.

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

1. In a bridge, in combination with the timbers forming the double arch thereof, and the metal chord H tying their base, the metal shoe or seat B , provided with lugs $b b'$ and tie-rods e and e' , cap and joint G , and wedge or key J , constructed, applied, and operating substantially as herein shown and set forth.

2. The metal shoe B , provided with lugs $b b'$ and tie-rods e and e' , substantially as herein shown and set forth.

3. The metal cap or joint G , provided with two depending arms, $g g'$, shaped and formed substantially as herein shown and set forth.

4. The wedge J , shaped as shown, its apex being turned at an angle, substantially as herein shown and set forth.

CHARLES S. PALMER.

In presence of—

A. L. MUNSON,
E. G. WARD.