

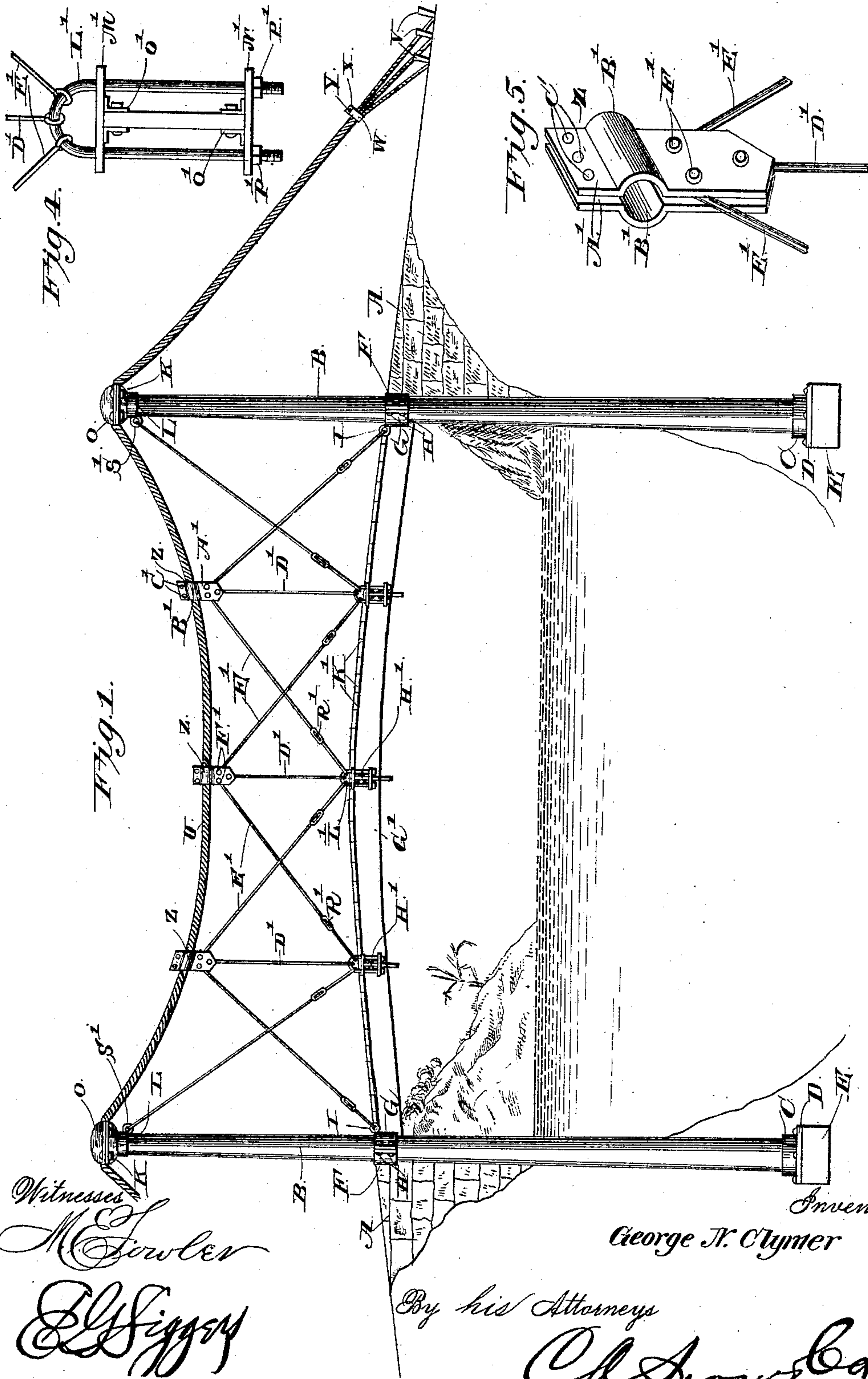
(No Model.)

2 Sheets—Sheet 1.

G. N. CLYMER.  
SUSPENSION BRIDGE.

No. 413,172.

Patented Oct. 22, 1889.



Witnesses  
*M. Fowler*  
*E. L. Siggs*

Inventor  
*George N. Clymer*

By his Attorneys  
*C. L. Snow & Co.*

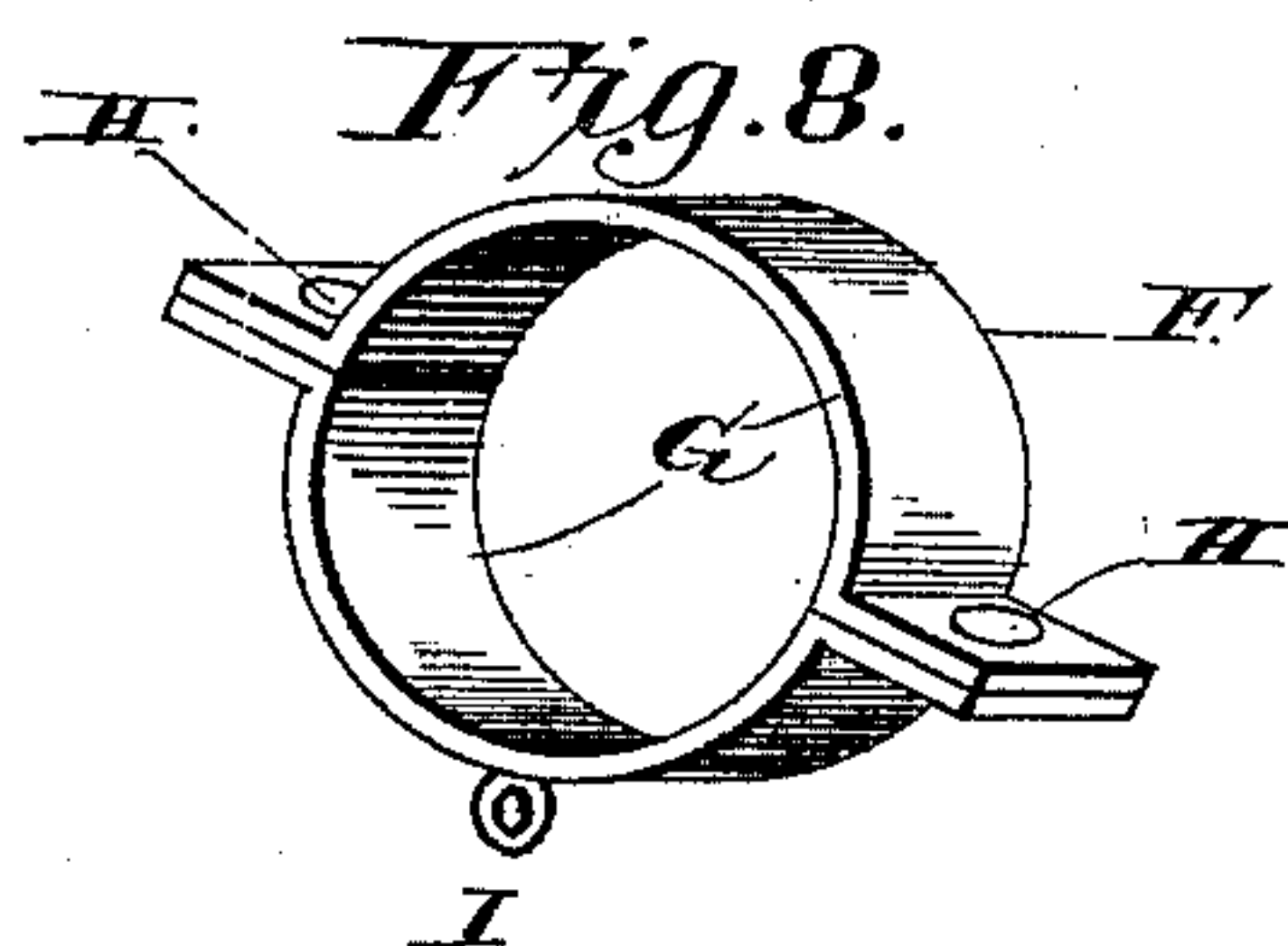
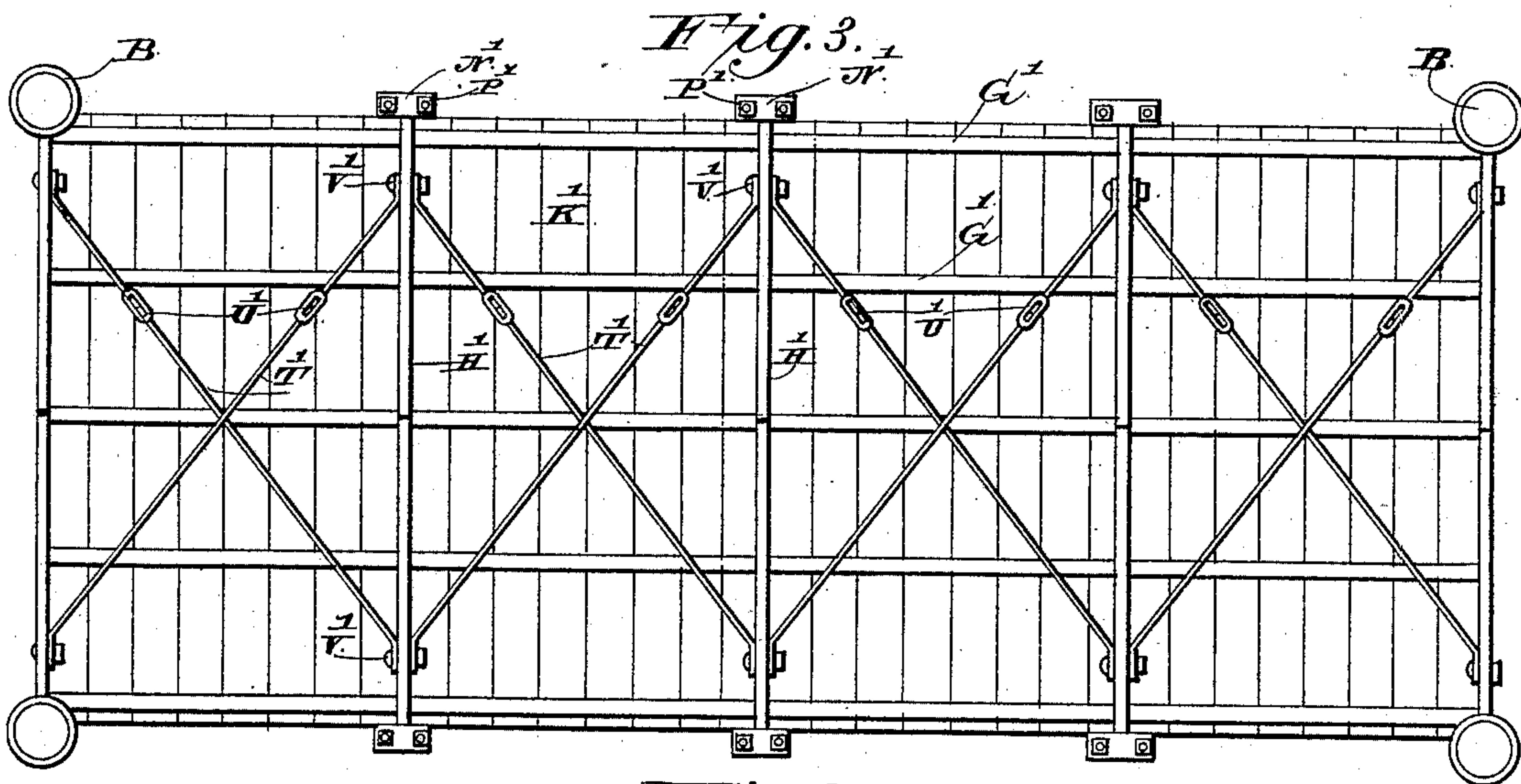
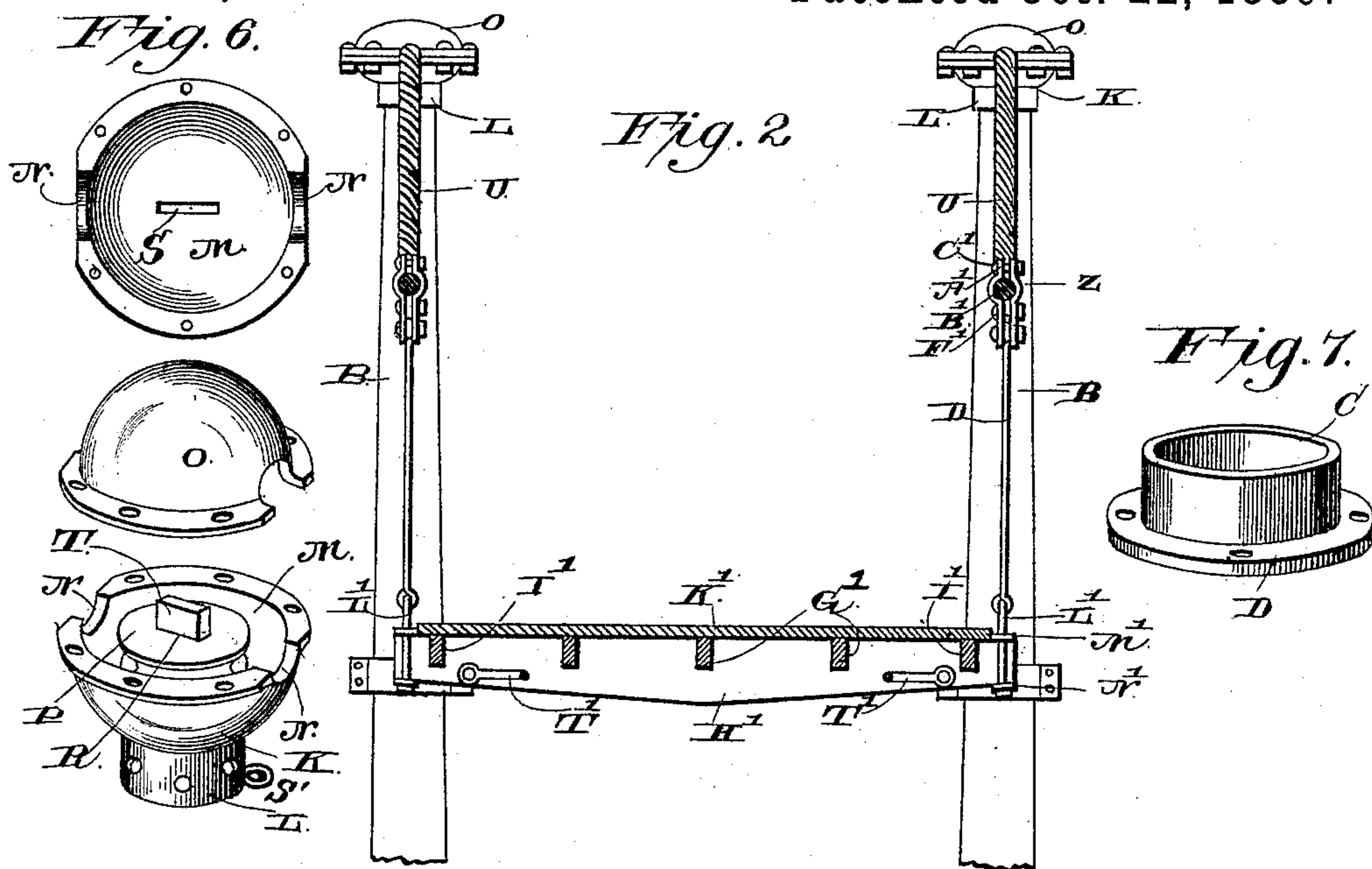
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# UNITED STATES PATENT OFFICE.

GEORGE N. CLYMER, OF BLOOMINGSBURG, INDIANA.

## SUSPENSION-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 413,172, dated October 22, 1889.

Application filed March 22, 1889. Serial No. 304,246. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE N. CLYMER, a citizen of the United States, residing at Bloomingsburg, in the county of Fulton and State of Indiana, have invented new and useful Improvements in Suspension-Bridges, of which the following is a specification.

My invention relates to improvements in suspension-bridges; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a suspension-bridge embodying my improvement. Fig. 2 is a transverse sectional view of the same. Fig. 3 is a bottom plan view. Figs. 4, 5, 6, 7, and 8 are detail views.

On opposite sides of the approaches or abutments A are erected hollow tapered posts B, the same having their lower ends socketed in collars C on base-plates D, which base-plates are bolted on mud-sills E. The said posts are filled with cement or other suitable substance, and on the same at points level with the deck of the bridge are secured collars F, each of which is composed of a pair of separable semicircular sections G, having flanges secured together by bolts H. Formed with each collar F is an eye I. To the upper ends of the posts are secured castings K, which have depending sockets L to receive the posts, and have concavities M in their upper sides, and semicircular openings N on opposite sides of the concavity. Cap-plates O are adapted to fit on the castings M and have base-flanges adapted to fit and be bolted on the flanges at the upper sides of the castings, and also formed in the said cap-flanges are openings, which register with the openings N and complete the rotundity of the latter. In each concavity M is arranged a rotatable cam or block P, which is substantially elliptical in shape and has a grooved perimeter, and in the center of each block or rotatable cam is an opening R, which is angular in shape and is adapted to register with a similar opening S in the bottom of the casting. A bar or key T is adapted to be inserted in said openings, and thereby serves to retain the cam or block in the casting.

The cables U are passed through the openings N and serve to span the stream, and are supported on the upper ends of the posts. The ends of the cables are untwisted, and the strands thereof are separately attached to anchor-posts V, which are driven into the ground or otherwise supported in place at the approaches to the bridge. Collars or clamping-rings W are placed on the cables to prevent further untwisting thereof, the said collars or clamps being split and having flanges X at their open sides and clamping screws or bolts Y to bind the said flanges together, and thereby compress the said clamping rings or collars on the cables. The cables are given a turn around the cams or blocks, after which the keys T are withdrawn from the sockets S, but left in the openings R of the cams. Now, through the medium of a suitable wrench or key applied to the upper ends of the keys T, said cams may be revolved and take up the desired amount of cable, and when this is accomplished the key is returned to the socket S and the cam prevented from a retrograde movement.

A series of clamps Z are strung on the cables at suitable distances apart, each of the said clamps comprising a pair of plates A', having transversely-grooved offsets B' near their upper ends to receive the cables, and being connected together by bolts C'. Rods D' have eyes at their upper ends inserted between the plates A' and secured by bolts, and a pair of truss-rods E' are also attached to each clamp Z by having their upper ends provided with eyes inserted between the plates and pivoted on bolts F'.

The stringers G' are arched in the usual manner, have their ends supported on the piers or abutments and connected transversely at suitable distances apart by iron girders H', the latter having recesses or rabbets I' in their upper edges to receive the stringers, and being narrowed from their centers to their ends by having their lower edges inclined, as shown in Fig. 2. The ends of the said girders project beyond the outside stringers, and on the stringers are secured the floor or deck boards K'.

Inverted-U-shaped bars L' have their arms arranged on opposite sides of each girder, at the ends thereof—that is to say, the ends of



the girders are arranged between the said arms, and plates M' N' have openings through which the said arms extend, and said plates bear, respectively, upon the upper and lower sides of the girders, and are provided with vertical ears or lugs O', which are bolted to the girders, as shown. Nuts P' are screwed on the arms of the bars L', and serve to clamp the plates in position on the girders, and the said bars have their central upper portion passed through eyes at the lower ends of the rods D' and truss-rods E'. The said U-shaped bars and plates constitute saddles, which are adapted to support the ends of the girders and suspend the same from the cables, as will be readily understood.

Each truss-rod E' is provided with a turn-buckle R', by means of which it may be adjusted longitudinally in such manner as to cause each truss to bear its proportionate share of the load and to add the necessary stability to the bridge. The truss-rods E' at the ends of the bridge have their outer ends attached to the eyes I of the collars F and to eyes S', formed or provided with the castings K.

In order to provide against undue lateral vibration, I employ a series of crossed truss-rods T', a pair of which are arranged between each pair of the girders throughout the length of the bridge, the said truss-rods being provided with turn-buckles U' for adjusting them. Said rods have openings or eyes at their ends to receive bolts V', which are passed transversely through openings in the girders.

A suspension-bridge thus constructed is extremely strong and durable, is adapted to distribute the weight of a moving load throughout the entire length of the bridge, so that no part thereof will be subjected to an undue strain, and may be erected in a comparatively short time.

Having thus described my invention, I claim—

1. In a suspension-bridge, the posts having the caps with concavities M, in combination with the cables strung through the caps, the cam-blocks around which the cables are wound, and the removable keys inserted in openings in said blocks and in said caps, for the purpose set forth, substantially as described.

2. In a suspension-bridge, the posts B, having the caps K, with flanges having openings N, and the caps O, bolted on the caps K and having the flanges provided with the openings registering with openings N, whereby the cables are adapted to pass through the said openings, substantially as described.

3. The supporting-saddles for the girder of a bridge, these saddles comprising the inverted-U-shaped bars L', having opposite arms, through which the girders are passed, and the upper and lower plates notched to receive the arms, adapted to embrace the girders, and nuts threaded on the ends of the arms, and the vertically-opposite pairs of lugs O', bolted to the inner surface of the plates and to the girders at opposite sides, substantially as specified.

4. The combination, in a suspension-bridge, of the cables, the clamps Z, attached thereto, the stringers, the girders connecting the same, the saddles at the ends of the girders, the supporting-rods D', having their upper ends attached to the clamps and their lower ends attached to the saddles, and the truss-rods E', crossed midway between the supporting-rods, and also having their upper and lower ends attached to the clamps and saddles, substantially as described.

5. In a suspension-bridge, the cables strung over the posts and having their ends untwisted, the separate strands of the cables being attached to independent anchor posts or devices, substantially as described.

6. In a suspension-bridge, a post provided with a cable-receiving rotatable drum, in combination with a key for locking the drum against rotation, substantially as specified.

7. In a suspension-bridge, opposite pairs of posts, each provided with rotatable cams locked in position thereon, in combination with cables wound intermediate their ends around the blocks, and anchors arranged in rear of the posts and connected with the ends of the cables, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GEORGE N. CLYMER.

Witnesses:

CYRUS DAVIS,  
LEVI SHOEMAKER.