

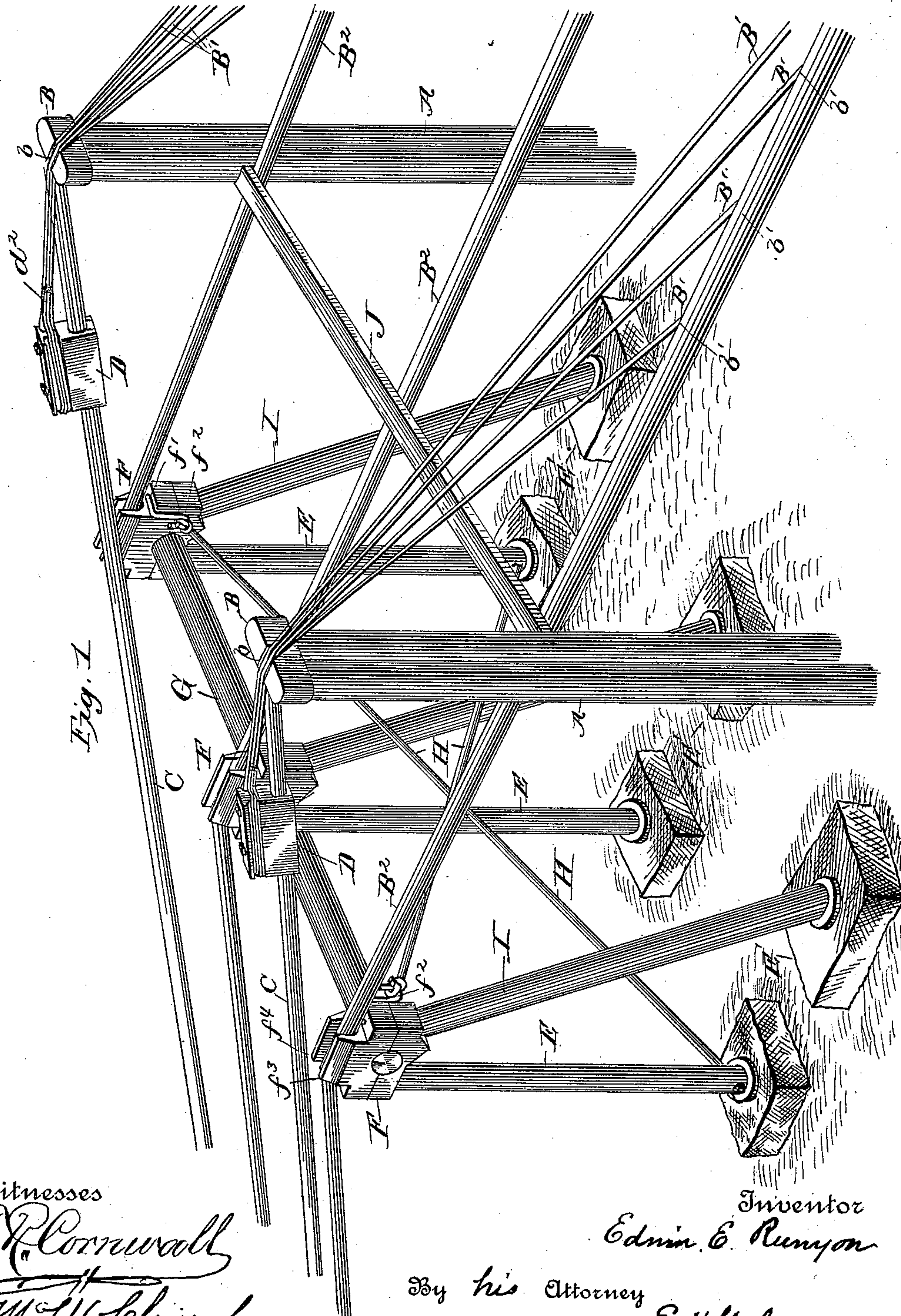
(No Model.)

2 Sheets—Sheet 1.

E. E. RUNYON.  
SUSPENSION BRIDGE.

No. 446,209.

Patented Feb. 10, 1891.



Witnesses  
*J. H. Cornwall*  
*M. W. Church*

Inventor  
*Edwin E. Runyon*  
By his Attorney  
*E. A. Gelston*



(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

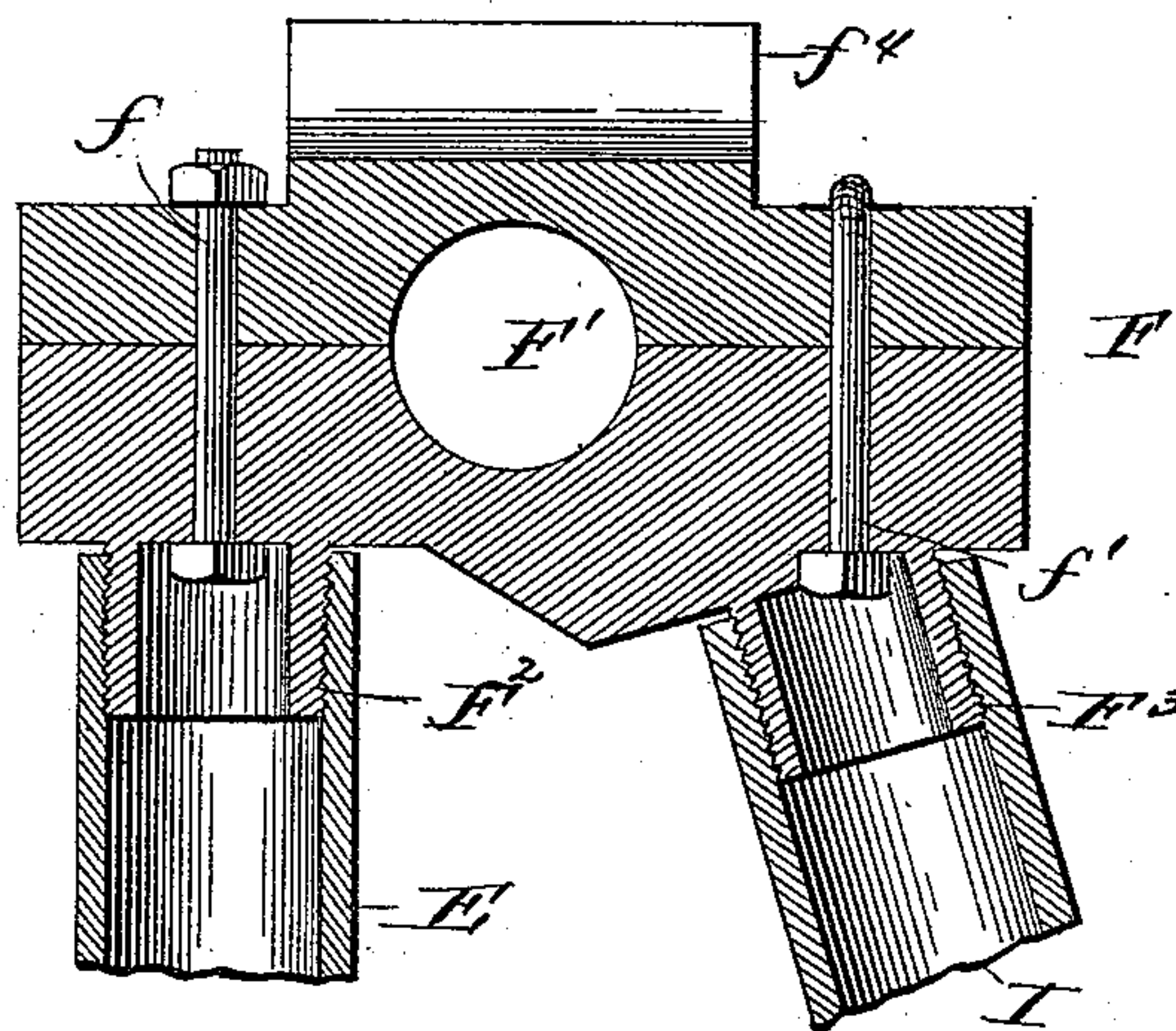


Fig. 3.

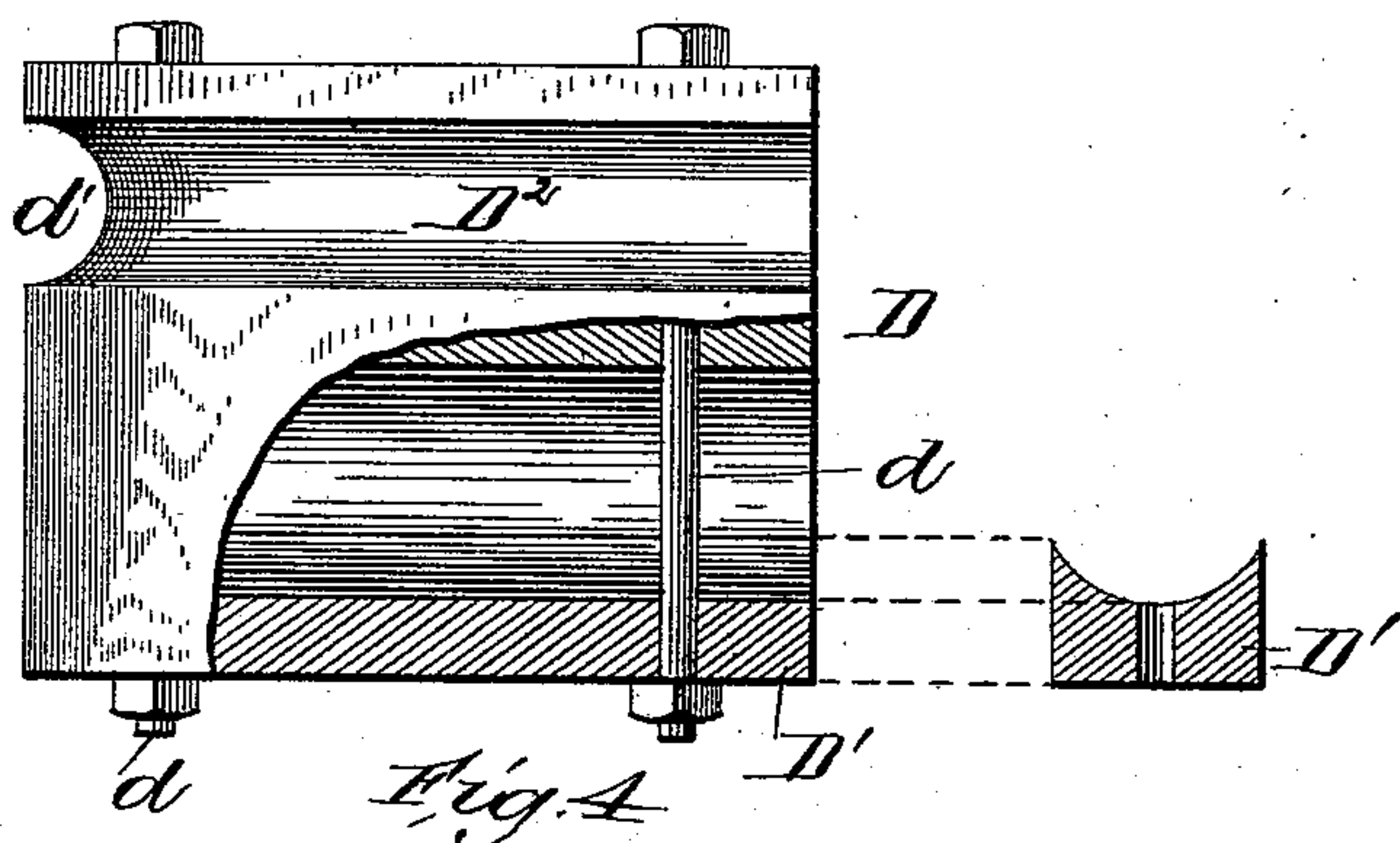
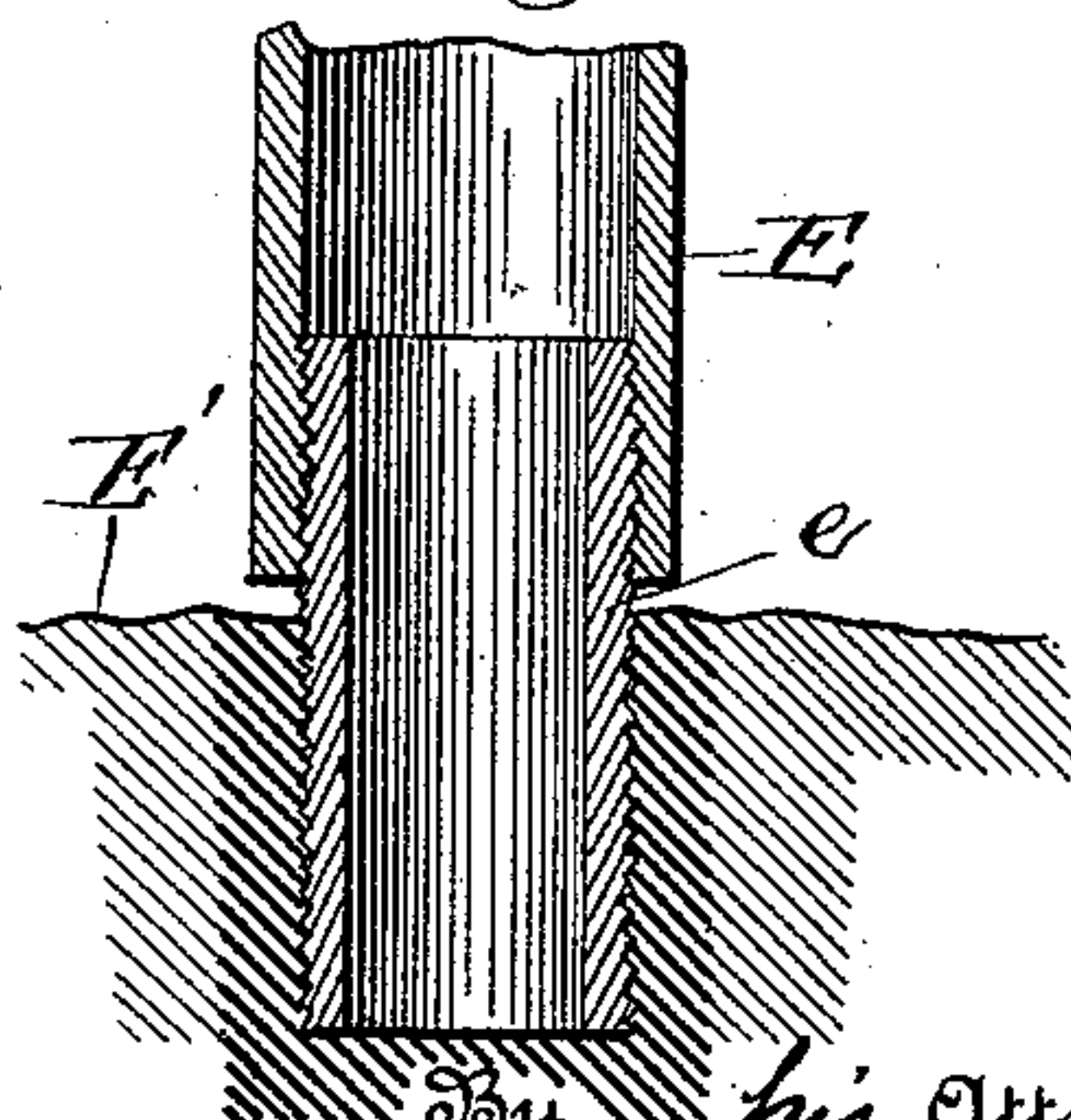


Fig. 4.



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# UNITED STATES PATENT OFFICE.

EDWIN ELIJAH RUNYON, OF PILOT POINT, TEXAS.

## SUSPENSION-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 446,209, dated February 10, 1891.

Application filed August 23, 1890. Serial No. 362,885. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN ELIJAH RUNYON, a citizen of the United States, residing at Pilot Point, in the county of Denton and State of Texas, have invented certain new and useful Improvements in Suspension-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 of reference marked thereon, which form a part of this specification.

My invention relates to a new and useful improvement in suspension-bridges; and it consists in the construction and arrangement of parts, more fully hereinafter described, and afterward definitely pointed out in the claims.

The object of my invention is to provide a suspension-bridge which will be strong, compact, and simple, and one very easily constructed with but little expense; another is to provide a suspension-bridge which will permit the main cable to expand and contract in different temperatures without materially affecting the principal parts and causing them to become displaced by reason of the slack or increased camber. These objects I attain by the construction illustrated in the accompanying drawings, forming a part of this specification, wherein like letters of reference indicate corresponding parts in the several figures, in which—

Figure 1 is a perspective view of my improved bridge, the flooring and joints being removed. Fig. 2 is a vertical longitudinal section through one of the cap-pieces. Fig. 3 is a view, partly in section, of a clamp; and Fig. 4 is a section through the base of one of the pillars and supports or anchors.

In the drawings, A represents the high pillars, having cap-pieces or tie-bands B securing their upper ends. Across the upper surface of these cap-pieces are grooves *b* for the reception of the separated main cables B', said main cables being secured to the floor-cables B<sup>2</sup>, as at *b'*, along half the width of a span. Secured to these cap-pieces B are back-stays C, which are anchored or secured in any suitable manner at their outer ends.

D represents a clamp secured on the stays

C by bolts *d* passing through the face of said clamp, through the stays, and through a removable block D'. Near the upper edge of the clamp D are circular grooves D<sup>2</sup>, rounded, as at *d'*, for the reception of the main cables B', said cables being wrapped once or more around the grooves and fastened each to itself, as at *d*<sup>2</sup>.

E represents pillars secured by a connecting-piece *e* to supports or anchors E'. These anchors are preferably hard stone, having openings in which the pieces *e* are placed and then solder placed in the openings, making a firm and secure footing for the pillars, which may be tapped and screwed on, as shown, or they may be placed originally in the anchors and secured.

F represents a cap formed of two pieces connected by bolts *f* and *f'*, and having an opening F' in its center for the passage and reception of a horizontal beam or support G. The bolt *f'* is extended over the side and curved to form a hook or loop *f*<sup>2</sup>, on which is secured a wire guy-rope H, which extends to the opposite end post near its bottom and is there secured in any suitable manner. Depending from the lower section of the cap-piece are screw-threaded flanges F<sup>2</sup> and F<sup>3</sup>, the former forming a connection for the pillars E and the latter a connection for the brace pillars or posts I, which are placed at an angle to be more effective. Extending upwardly from the upper section are two flanges *f*<sup>3</sup> and *f*<sup>4</sup>, forming between them a groove in which are slidably secured the floor-cables B<sup>2</sup>.

The operation of my invention may be described as follows: The end pier being erected by setting up and securing the pillars and brace-post in position and the cap-piece being secured, the horizontal or supporting cables are laid in the grooves in the upper face of the cap-piece and extend the length of the bridge directly beneath and supporting the beam J. These supports are preferably anchored at their ends in any suitable manner. The main cables being fastened to the floor-cables half the width of a span, will also support the same should the anchor become displaced. The advantages of a bridge built in accordance with my invention will be obvious. The back-stays being anchored in a different position from the floor-cables affords



a much stronger bridge than if the main and floor cables were attached to the same pier.

I am aware that many minor changes in the construction and arrangement of the parts can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. A bridge consisting of end piers, pillars of greater height than said end piers, floor-cables supported in castings on said end piers, separated main cables supported on cap-pieces on the tall pillars, back-stays secured to said cap-pieces, and blocks on said back-stays, around the upper end of which are secured the separated main cables, substantially as described.

2. In a suspension-bridge, the combination, with the separated main cables and floor-cables, of metallic pillars rigidly secured to anchors, brace-posts placed at an angle to said pillars, cap-pieces consisting of two sections each, the lower section having depending flanges to afford connection with the pillar and brace-post, the upper section having

upwardly-extending flanges to hold the floor-cable, a bolt passing through said sections, extending over the side, and formed into a hook, a guy-rope attached to said hook, and a horizontal beam secured between the upper and lower sections, substantially as described.

3. In a suspension-bridge, the combination, with the pillars, brace-posts, and horizontal beam, all secured by a cap-piece formed in two sections, of pillars extending higher than said horizontal beam, having their ends connected by a cap-piece, a stay secured to said cap-piece, a clamp on said stay having a groove around three sides near its upper edge, a removable block in the lower portion of said clamp, bolts passing through said block, stay, and clamp to rigidly hold said clamp in position, and severed main cables passing through a groove in the cap-piece and around said clamp and each secured to itself, substantially as described.

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

EDWIN ELIJAH RUNYON.

Witnesses:

W. S. PRICE,

W. A. EWING.