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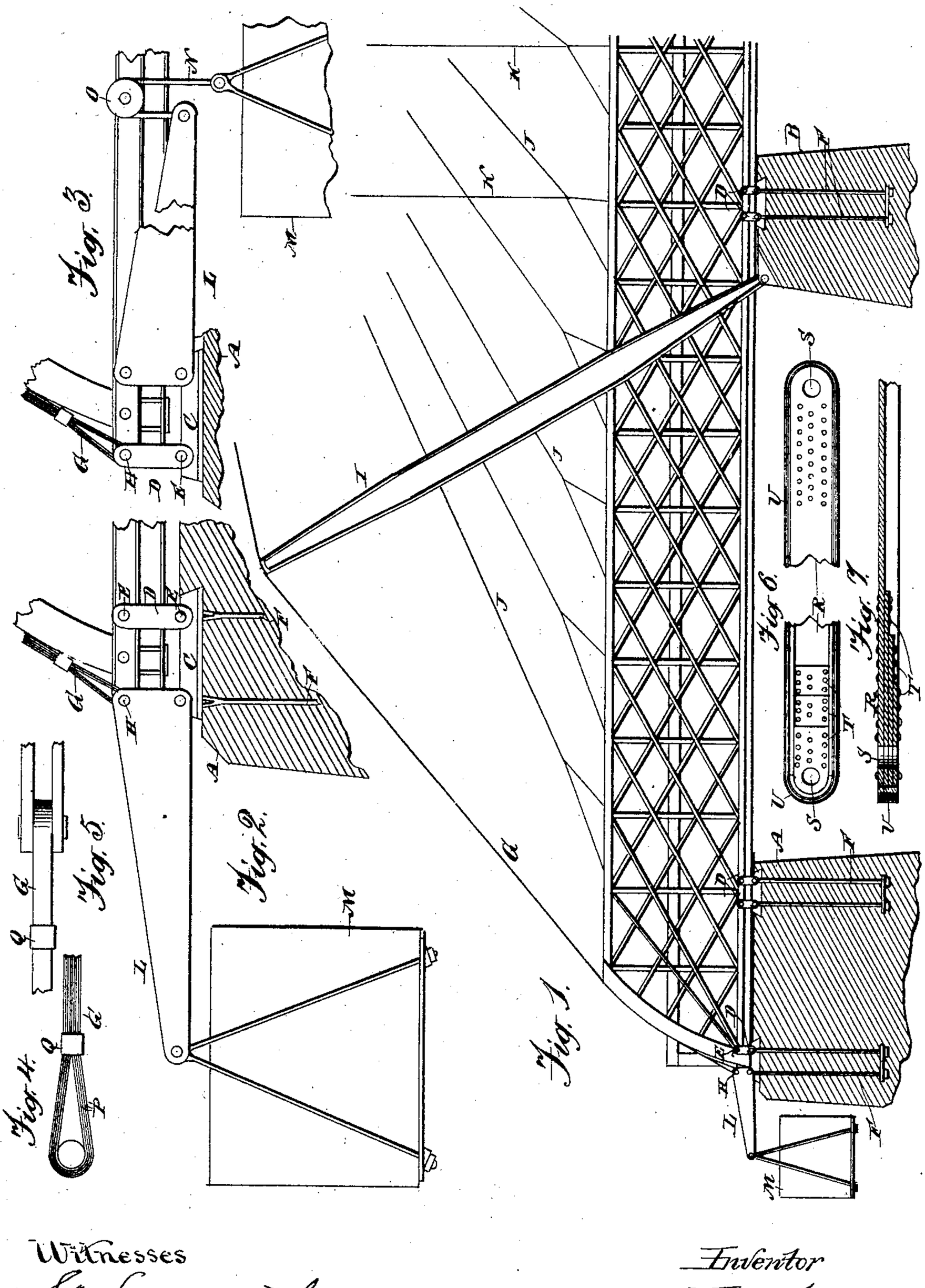
J. TOMLINSON.

CANTALIVER SUSPENSION BRIDGE.

APPLICATION FILED JAN. 3, 1905.



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UNITED STATES PATENT OFFICE.

JOSEPH TOMLINSON, OF CEDAR RAPIDS, IOWA.

CANTALIVER SUSPENSION-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 785,686, dated March 21, 1905.

Application filed January 3, 1905. Serial No. 239,515.

To all whom it may concern:

Be it known that I, JOSEPH TOMLINSON, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Cantaliver Suspension-Bridges, of which the following is a specification.

This invention relates to cantaliver suspension-bridges and similar structures supported by eyebar chains, cables, or the like, and embodies certain improvements upon the invention shown in my Letters Patent No. 729,016, bearing date the 26th day of May, 1903, together with other features which will appear in the description following.

The principal objects sought in this invention are to improve the manner of supporting the main truss from the cables, to simplify and improve the means for anchoring the bridge at the ends so that the whole structure may expand and contract together, this feature being a carrying forward of the invention set out in the patent above referred to, and to provide a novel type of cable and brace of simple yet efficient construction.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side view showing one of the shore ends of a cantaliver suspension-bridge embodying my improvements. Fig. 2 is a larger detail view showing the extreme end of the bridge and its anchorage. Fig. 3 is the same, but with the anchorage-lever reversed. Fig. 4 is a side view of the looped end of my improved cable. Fig. 5 is a top view of the same. Fig. 6 is a side view (fragmentary) of one of the braces. Fig. 7 is a central longitudinal section of the same.

In the drawings, A designates the shore abutment, and B the first pier. These may be of the usual construction and are provided at the top with suitable socket-plates C to support the main truss by means of links D and pivot-pins E, securely held in place by anchor-rods F. The cable G, which furnishes the main support to the truss, terminates at each end thereof, connecting by a pin H with each end of the bottom chord. Between these points and the first tower (not shown) the cable passes over a diagonal member I, which may be called a "boom," the purpose of which is, by carrying the cable well up, to better transmit the lift of the cable to the end of the truss. The foot of this boom rests on the pier B, and its position and inclination are such as to secure perfect support from the cable at the extreme end of the truss and at the same time allow for the use of stays J between the end and the first pier and springing from a common and stable support, the tower, to which they all converge. Additional support is given to the truss from the cable by the introduction of suspenders K, of which there may be as many as circumstances require.

In my former patent, which relates more especially to suspension-bridges having a shore anchorage, the expansion and contraction of the bridge is compensated for by levers and weights introduced between such shore anchorage and the main truss.

This invention relates more particularly to bridges of the cantaliver type and dispenses with the need of any shore anchorage other than the necessary shore abutment or pier, which should, however, be of stable construction, according to the length of the bridge-span.

As above specified, the main cable terminates with the main truss. To the pin connecting the end of the cable and the truss also connects a lever L, fulcrumed on one of the pins E. The long arm of the lever extends at right angles to this short arm, and from it is suspended a heavy weight M. This, as will be evident, allows the whole structure to expand or contract together, the weight descending or rising accordingly, and without any change in the stresses of any part or in the form of the structure, under the influence of heat or cold.

In Fig. 3 the direction of this lever is shown reversed from that illustrated in Fig. 2, so that it becomes a lifting-lever. In this case the gravity of the weight is transmitted to it by a cable N, passing over a sheave O, mounted on the truss. This construction has the

advantage of adding the gravity of the weight itself to the structure to aid in anchoring the ends thereof.

In Figs. 4 and 5 is illustrated a laminated cable formed of successive layers of band iron or steel P and suitably bound together at intervals by bands or housings Q. In the construction of the cable the longitudinal band is supposed to begin at the center and the strips of band-steel to pass from end to end, over and over, the ends of the separate pieces being suitably joined together and the extreme end secured to the whole cable at last.

In Figs. 6 and 7 the same principle is applied in the construction of tension-braces. These may consist of a core of channel-steel R, bored at S for connecting-pins and with reinforcing-plates T riveted to the main plate to bring the bored ends of the braces up to the requisite strength. The ends are rounded, and around the entire plate or bar is drawn a laminated reinforcement U, of band-steel, in substantially the same manner employed in forming the cable above described.

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

1. In a cantaliver-bridge, of the type specified, the combination with the main truss and cable, of an inclined boom to carry up the cable in the stretch between its shore end and the first tower.

2. In a cantaliver suspension-bridge, the combination of a main truss, a supporting-cable, stays connecting with different panels of the truss and converging to a common supporting-tower for said stays and cable, and a boom inclined at an angle transverse to the stays and carrying the cable up in the stretch between the tower and the cable end, substantially as and for the purpose set forth.

3. In a cantaliver suspension-bridge, the combination of a main truss and cable made conterminous at the shore abutment, a shore abutment to which the truss is anchored by suitable links to allow for expansion and contraction, a saddle-plate and bearing or pivot-pins for said links, a lever pivoted thereto and to the cable and truss, and a weight depending from its longer arm.

4. In a cantaliver suspension-bridge, the combination with supporting piers and abutments, of a main truss and cable terminating at the shore abutment, linked anchorages therefor, comprising links, pins and saddle-plates, substantially as described, a lever pivoted at one point to the truss and cable, at another point to the saddle, and adapted to rise as regards its longer arm, with the expansion of the truss, a sheave mounted on the truss, a cable passing over the same and connecting at one end with the long arm of said lever, and a weight depending from said lever-connected cable.

5. An improved cable for suspension-bridges and the like, composed of band-steel folded over in successive layers from end to end, with terminal loops, the ends of the sections of band fastened together, and the outer end secured to the cable, with inclosing bands or housings, substantially as described.

6. An improved tension-brace for bridges and the like, composed of an inner bar, with terminal pin-holes and adjacent reinforcing-plates, and an outer wrapping along the sides and over the ends of said bar, of band-steel, substantially as described.

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

JOSEPH TOMLINSON.

Witnesses:
J. M. St. John,
F. J. Kubicek.