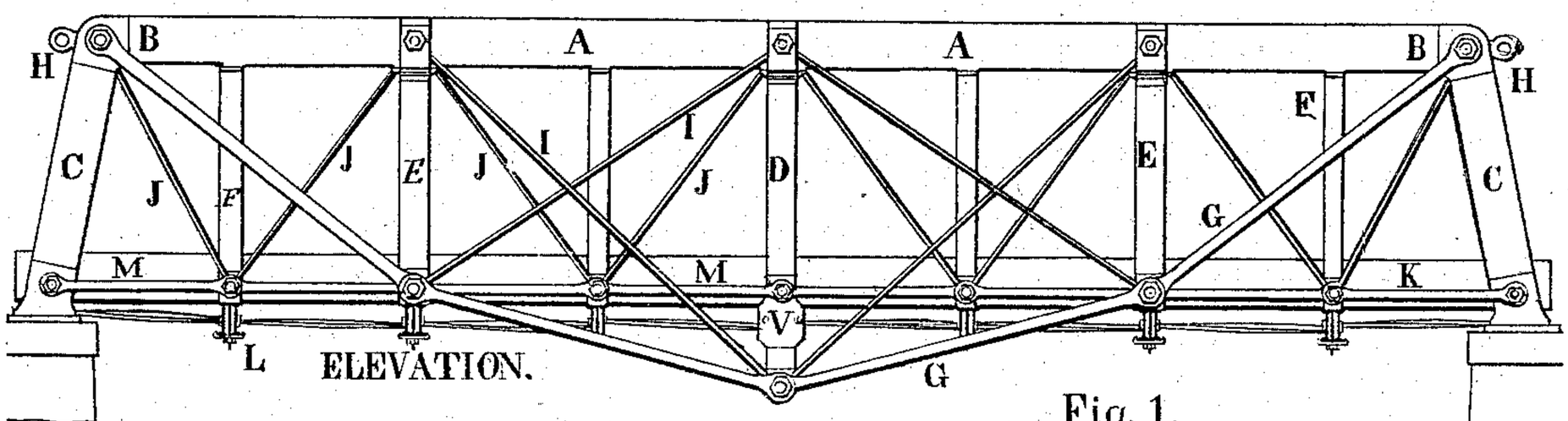
L. L. BUCK.

Truss-Bridges.

No. 158,197. Patented Dec. 29, 1874.



ELEVATION.

Fig. 1.

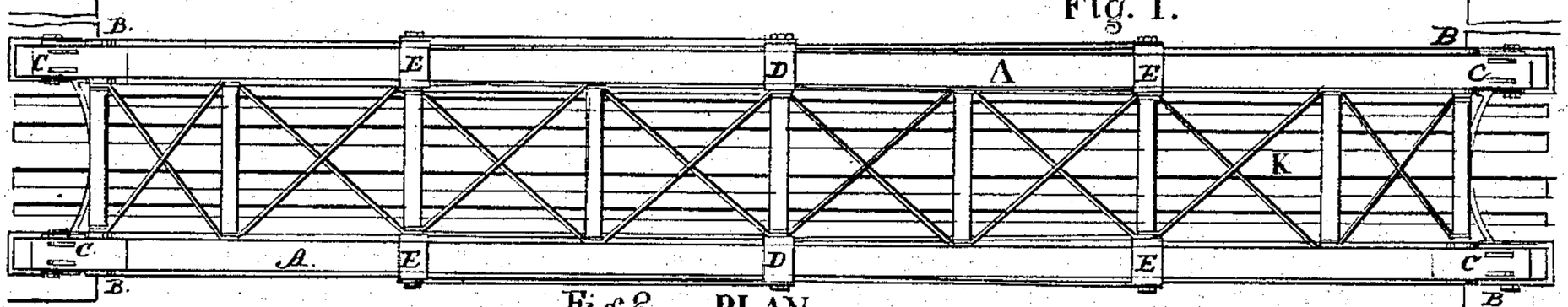


Fig. 2. PLAN.

Fig. 5. PLAN OF BOTTOM CHORD.

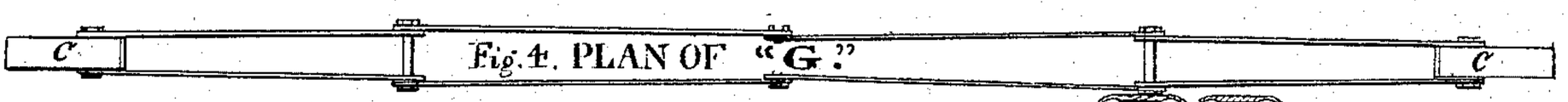


Fig. 4. PLAN OF "G."

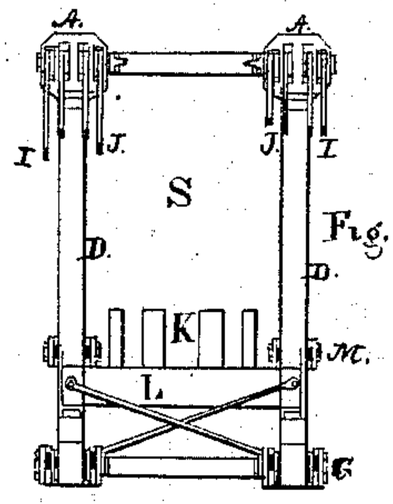


Fig. 6.

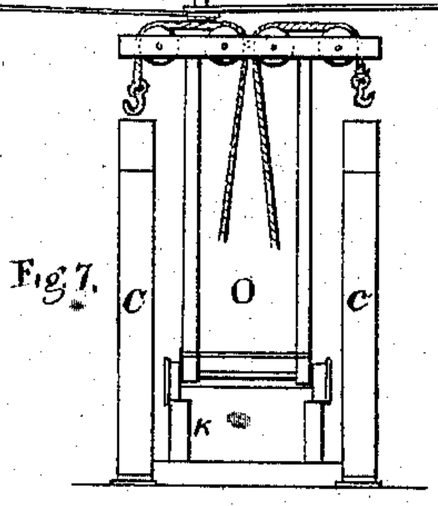


Fig. 7.

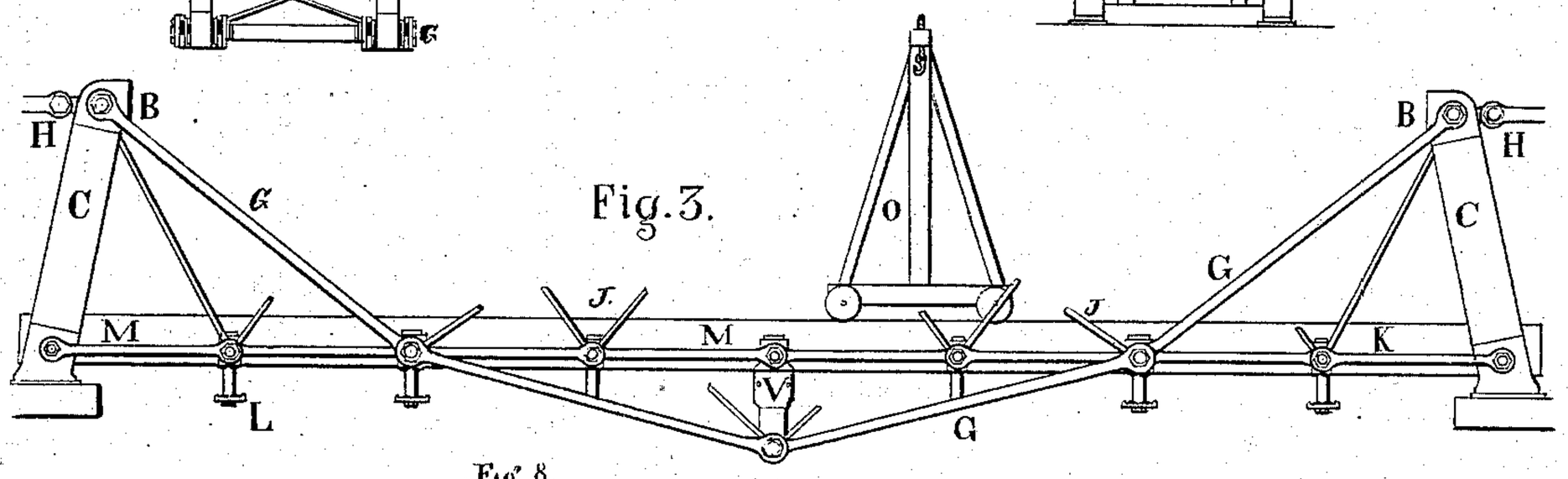
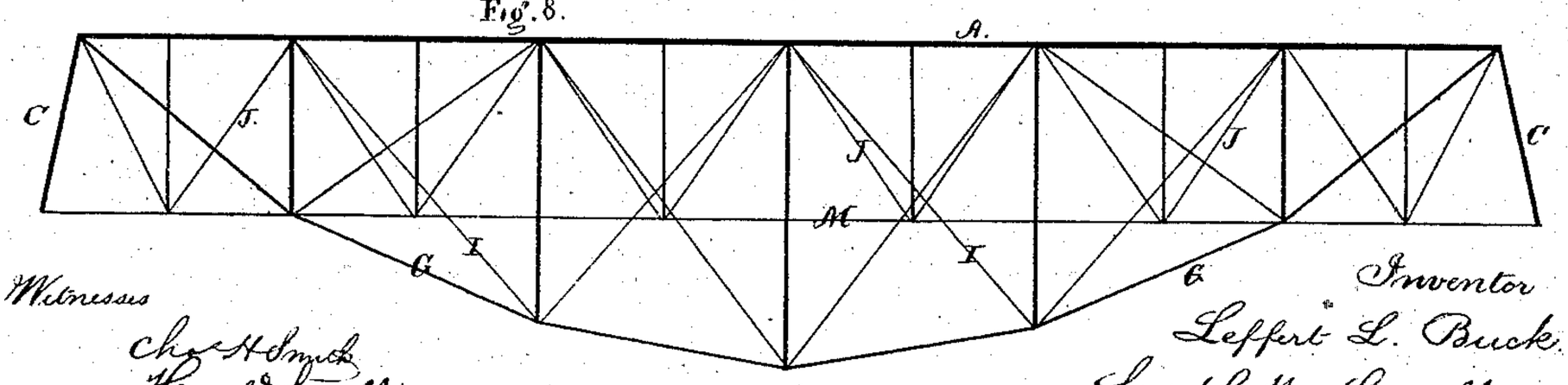


Fig. 3.

Fig. 8.



Witnesses

Chas. H. Smith

Howard Sewell

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UNITED STATES PATENT OFFICE.

LEFFERT L. BUCK, OF NEW YORK, N. Y.

IMPROVEMENT IN TRUSS-BRIDGES.

Specification forming part of Letters Patent No. **158,197**, dated December 29, 1874; application filed December 3, 1874.

To all whom it may concern:

Be it known that I, LEFFERT L. BUCK, of the city and State of New York, have invented an Improvement in Bridges, of which the following is a specification:

My invention relates to the combination, with parts of a through truss, of a catenarian tension-arc, which serves as the main tensile member of the truss, and at the same time this tensile member may be used so as to dispense with ordinary scaffolding or false work in erecting the structure.

In the drawing, Figure 1 is an elevation of the bridge. Fig. 2 is a plan of the same. Fig. 3 represents the catenarian tension-arc in use as a support in the construction of the bridge in place of a scaffold. Fig. 4 is a plan of the catenarian arc. Fig. 5 is a plan of the bottom chord. Fig. 6 is a cross-section of the bridge, and Fig. 7 represents the traveling derrick used in constructing the bridge; and Fig. 8 is a diagram, illustrating the directions in which the braces of the truss and of the catenarian arc run in cases where the number of panels is increased.

The chord A is adapted to resist the compression at the top chord of the truss. This chord A is united at the sockets B with the end posts C, the parts being riveted or otherwise secured; and M represents the bottom chord of the truss, which is exposed to a light tension. This portion of the truss, in its general outline, is quadrilateral, and the posts C may be vertical or inclined, as shown. The intermediate posts D, E, and F are introduced at suitable distances apart, and the counterties I I and diagonal rods J are introduced, as shown, between the posts and the top and bottom chords. The truss, as thus described, is of a similar character to portions of bridges before constructed.

My improvement relates especially to the catenarian suspension-arc G, applied to and combined with the aforesaid truss. This arc G is formed of a series of straight links or bars connected to the truss at the joints, and hanging in the form of a parabola, or nearly so, (the curve that known to mathematicians as the catenary,) the points of suspension commencing at the junction of the end posts C and top chord A; and where the catenarian tension-arc G passes below the lower chord the main post, as at D, is produced to meet the tension-arc G at the point where it changes direction, namely, the junction of the links. The tension-arc will also be connected with the lower chord and foot of posts E, where it intersects them. This arrangement gives greater depth of truss without increased section of posts, as the longer of them are stayed by the lower chord and lower lateral system of braces seen in Fig. 6.

In order to put this bridge together without the use of the ordinary scaffolding, I proceed to erect the posts C C, and secure their lower ends to prevent their slipping, and the upper ends are secured by guys connected to the eyes H, and securely anchored. The links composing the catenarian suspension-arc are connected together, and drawn across between the posts C C, and secured at the ends, as represented in Fig. 3. The lower portions of the posts D which pass below the floor are put in place and secured by diagonal bracing, as shown in Fig. 6. The bars of the lower chord are connected and secured in place and to the joints of the bars G, and upon these, or suspended below them, the cross-beams L are applied, and upon these the string-pieces K are placed to form a platform for the traveling derrick O that is used in erecting the posts, top chords, and braces.

The long posts, or those that pass from top chord to the catenarian tension-arc, may be provided with a joint at their intersections with lower chord; or they may be made in one piece with just a pin-hole at said intersection, and the guys at H may require to be tightened from time to time, in order to bring the parts into place as they are put together.

The diagram, Fig. 8, illustrates the arrangement of the chords, posts, and catenarian suspension-arc for a bridge of larger span than that in Fig. 1.

Temporary guys to other portions of the bridge than the eyes H may be required during the progress of the construction of the bridge.

By this construction of bridge the strength is greatly increased without increasing the weight of the posts, as the longest posts are stayed at intermediate points by the floor and

braces, and the catenarian tension-arc acts to suspend the weight, and transfer the weight and strain directly to the ends of the top chords A at their union with the posts *c*.

I am aware that bridges have been made of a catenarian suspension-arc united at its ends to the top chord, and that the floor of the bridge has in some cases been above the chord, and in other cases suspended below the arc. In these bridges there is not a rectangular or trapezoidal truss to sustain the lateral and irregular strain of passing weights, as in my bridge.

I claim as my invention—

The combination, with a complete rectangular or trapezoidal truss, of a suspension-arc extending from the ends of the upper chord and hanging below the lower chord, and sustaining the posts of the truss at its junction, substantially as and for the purposes set forth.

Signed by me this 28th day of November, 1874.

LEFFERT L. BUCK.

Witnesses:

EDMUND B. NOYES,

W. H. JACK.