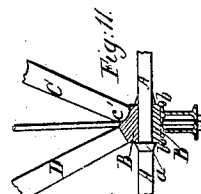
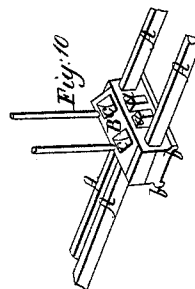
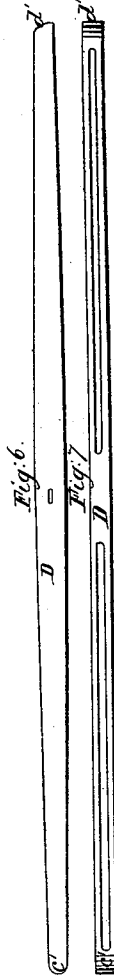
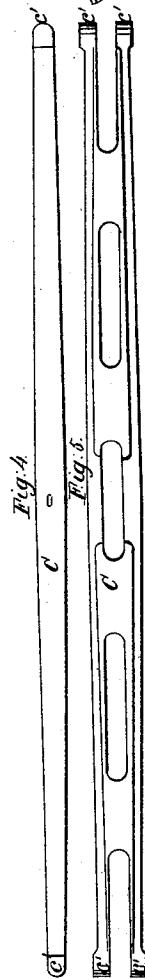
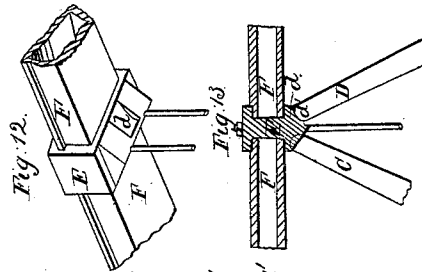
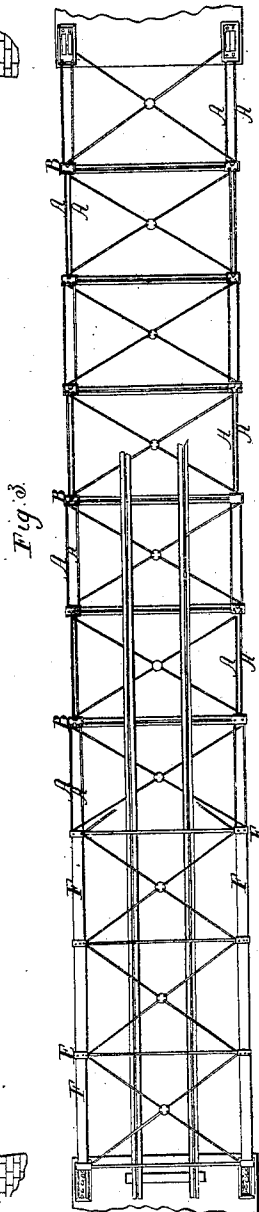
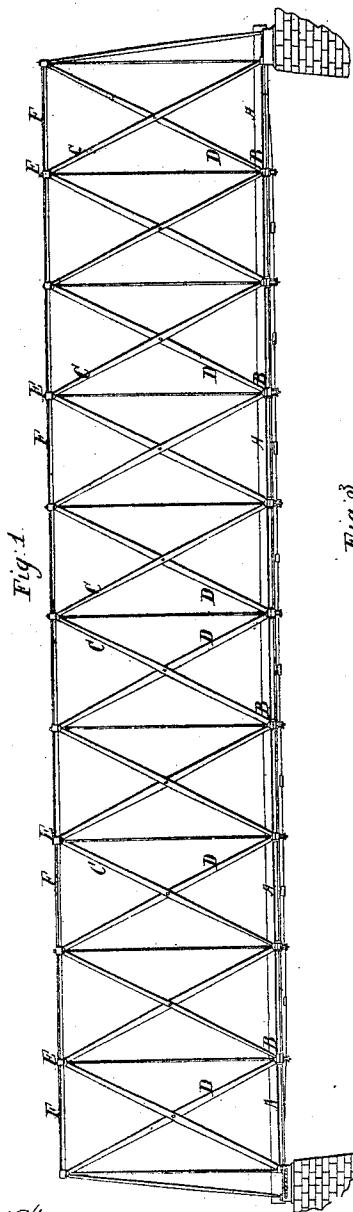
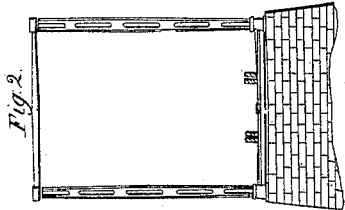


Rust & Herrmann. Truss Bridge

N^o 81,950.

Patented Sep. 8, 1868.



Witnesses;
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A. Gross

Inventors;
Rust & Herrmann

United States Patent Office.

HENRY A. RUST AND LUDWIG HERRMANN, OF CHICAGO, ILLINOIS.

Letters Patent No. 81,950, dated September 8, 1868.

IMPROVEMENT IN BRIDGES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, HENRY A. RUST and LUDWIG HERRMANN, of Chicago, in the county of Cook, and State of Illinois, have invented a new and useful Improvement in Metallic Trusses for Bridges; and we do hereby declare and make known that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form part of this specification.

Our said invention consists in a novel mode of securing the ends of the main braces in the top and bottom blocks, whereby provision is made for the variations in the position of the said braces incident upon the downward flexion of the bridge, as hereinafter more fully set forth.

Our said invention further consists in a novel mode of securing the counter-braces in said top and bottom blocks, whereby said counter-braces are caused automatically to tighten and brace the truss, when the downward flexion of the bridge would relieve the counter-braces from action, and permit an upward movement or vibration to the bridge, after the weight causing the downward flexion had been removed.

To enable those skilled in the art to understand how to construct and use our said invention, we will describe the same with particularity, making reference in so doing to the aforesaid drawings, in which—

Figure 1 represents a side elevation of a bridge.

Figure 2 is an end view of the same.

Figure 3 is a top view thereof, showing in part the top and in part the bottom chords.

Figures 4 and 5 represent, respectively, a side and edge view of one of the main braces.

Figures 6 and 7 are corresponding views of one of the counter-braces.

Figures 8 and 9 are corresponding views of the bars which form the bottom chords.

Figure 10 is a detailed perspective view of one of the bottom blocks, showing the mode of connecting the bars forming the bottom chords.

Figure 11 is a vertical section through one of the bottom blocks, showing the mode of arranging the lower ends of the braces and counter-braces therein.

Figure 12 is a perspective view of one of the top blocks, and a section of the top chord, and

Figure 13 is a vertical central section through the parts represented in fig. 12.

Similar letters of reference, in the several figures, denote the same parts of our said invention.

A represents the bars which are employed in forming the bottom chords of the bridge, which are constructed with upset heads, *a*, as clearly shown in the drawings, or said heads may be formed by forging. The bottom blocks B are constructed in two sections, the lower ones being provided with flanges, *b b*, as shown, which fit down upon each side of the floor-beams, thus securing the said floor-beams firmly in their proper positions.

Across the lower face of the upper section, and the upper face of the lower section, of said bottom blocks are formed four channels, to receive the bars A, which are arranged in place, and the top section of the block secured to the lower section, by means of the truss-bolts, and also the pressure of the braces, which rest upon said blocks, as shown. The heads *a* prevent the bars from being withdrawn from the blocks, and thus the chord is formed without the necessity of welding, or the use of bolts, pins, or rivets.

The edges of the channels or grooves, in which the bars A are placed, are enlarged slightly, so as to permit the bars to have vertical action, as the bridge has an upward or downward flexion.

By constructing the bars A in the manner described, and connecting the same by means of blocks, as specified, the risk of weakening the chord by imperfect weldings, and the positive weakening of the same by boring or forming holes to receive pins, bolts, or rivets, is entirely avoided.

The main braces, which are marked C, may be constructed double, as shown, or in any other suitable form, and have their upper and lower ends, *c'*, made in a convex form, as shown in the drawings, and are entered in corresponding concave sockets, *c*, formed to receive and hold them firmly, but movably, in the top and bottom blocks, as shown, so that their angles may change, to conform to the varying position of the panel.

Instead of having both ends of said main braces made in a convex form, as specified, and having both ends rest in the concave sockets *c* in the blocks, as described, one of said ends may be connected to its block by means of a pin, or be fixed in any other suitable manner thereto, the other end of the brace resting in a concave recess or socket, and being made convex, as described.

The object of this arrangement is to avoid rigidly attaching or fixing the ends of the brace both to the top and bottom chord, so that, when the bridge is flexed downward by the passing of a weight over it, the said brace, in being shortened, may have a movement to conform itself in position to the altered form of the panel, produced by said downward flexion, which result cannot be attained when both ends of the braces are rigidly attached or fixed to the upper and lower chords, or to the top and bottom blocks.

The lower ends, *c*, of the counter-braces, which are marked *D*, are constructed with convex or rounded bearings, and rest in corresponding concave recesses in the bottom blocks, or said lower ends may be fixed to the block, but not rigidly. The upper ends, *d'*, of said counter-braces, however, must be constructed with an inclination, substantially as shown, and must be in a corresponding inclined recess in the top block, *F*, which construction and arrangement are clearly seen in figs. 6, 12, and 13.

The object of this feature of our invention is to render the counter-braces self-adjusting, so that, in the downward flexion of the bridge, which has the tendency to shorten the main braces, but to lengthen the counter-braces, or, rather, which has the tendency to throw the truss-panels from a rectangular to a rhomboidal form, thus bringing the angles joined by the main brace nearer together, and moving the angles joined by the counter-braces farther apart; the said upper ends of the counter-braces will, from their own weight, slide down in the inclined socket *d'*, and thus hold the panel firmly braced, and prevent its swinging upwards, when the pressure, which caused the downward flexion, is moved, and thus the counter-brace is made to adjust itself under all circumstances, and keep the truss firmly and properly braced.

The braces and counter-braces, at the point where they cross each other, are connected by bolts passing through slots, shown in figs. 4 and 6, which admits of the aforesaid change or movement of said braces and counter-braces, as desired.

The sections of the top chords *F* are secured in concave recesses in the sides of the top blocks, and have corresponding convex ends, so that, in the flexion of the bridge, the requisite vertical action can be allowed in the chord, the edges of said recesses in the top blocks being made slightly flaring, to allow said action.

Having described the construction and operation of our invention, we will specify what we claim, and desire to secure by Letters Patent.

1. We claim the arrangement of one or both ends of the main braces, when constructed in a convex or rounded form, in corresponding concave grooves or recesses in the blocks *B* and *E*, substantially as specified.
2. We claim the arrangement of the inclined end of the counter-braces in a corresponding inclined recess in the top block, to operate substantially as set forth.

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L. HERRMANN.

Witnesses:

W. E. MARRS,
A. J. CROSS.