D. HAMMOND, H. G. MORSE & J. ABBOTT.

TRUSS BRIDGE.

No. 184,520. Patented Nov. 21, 1876.

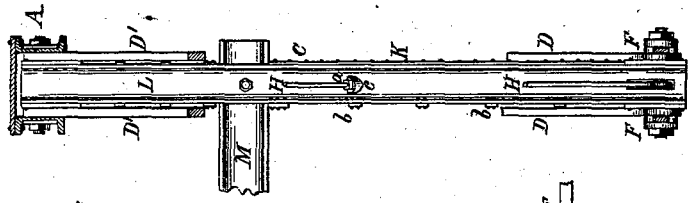

Fig. 3.

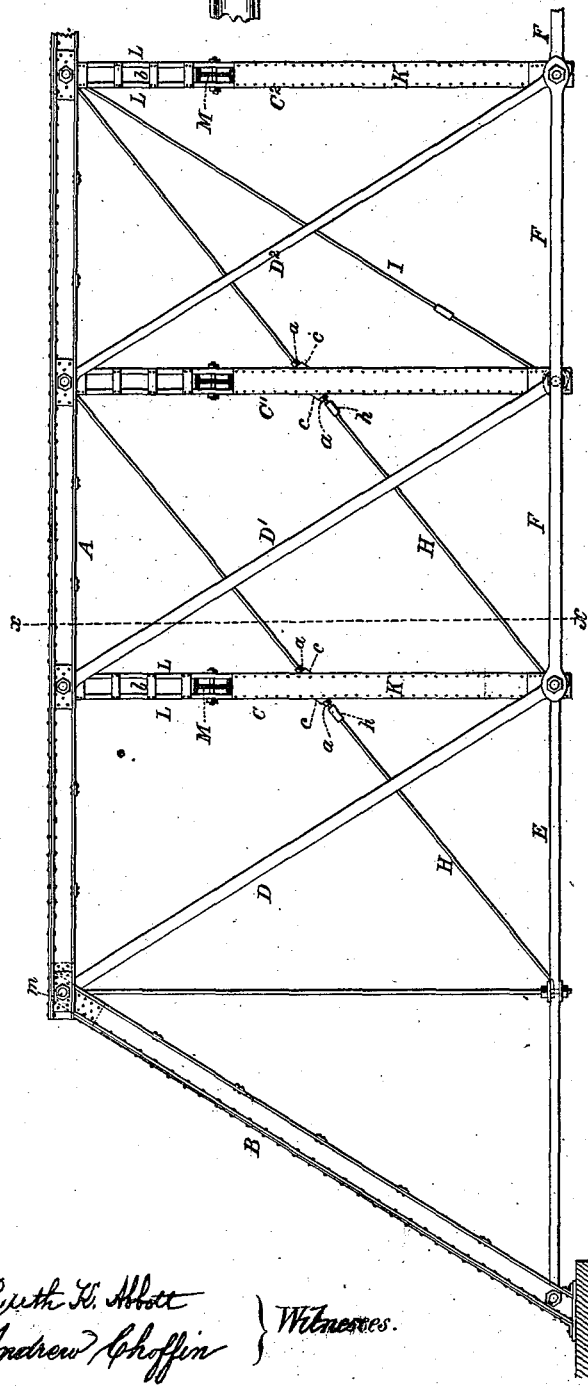

Fig. 1.

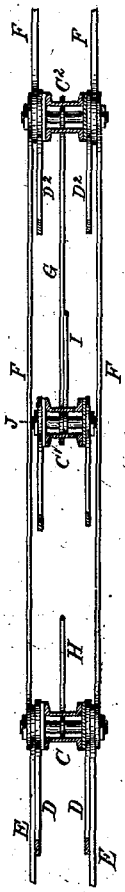

Fig. 2.

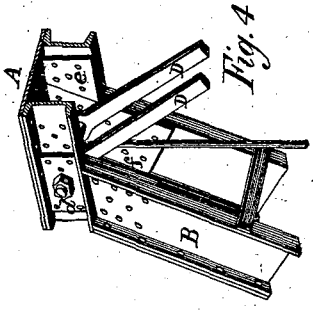

Fig. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

DAVID HAMMOND, HENRY G. MORSE, AND JOB ABBOTT, OF CANTON, OHIO.

IMPROVEMENT IN TRUSS-BRIDGES.

Specification forming part of Letters Patent No. **184,520**, dated November 21, 1876; application filed August 19, 1876.

To all whom it may concern:

Be it known that we, DAVID HAMMOND, HENRY G. MORSE, and JOB ABBOTT, of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Truss-Bridges; and that the following is a full, clear, and exact specification thereof, which will enable others skilled in the art to make and use the said invention.

Our invention relates to certain improvements in the construction of truss-girders for bridges and other structures, by which greater economy and stiffness in construction is secured.

Said improvements consist in the construction of a truss-girder with pin-connections, having the posts held longitudinally at or near their centers by means of diagonal ties, which run through and have jam-nuts and washers on each side of the post, thus halving the length and increasing the stiffness of posts without the addition of useless or unsightly rods in the girder; also, in arranging the screw end of the diagonal tie which passes through the post so as to serve both as the screw for the nuts by which the post is held at the center, and as a screw for the sleeve-nut, by which the length of the rod is adjusted; also, in the construction of a truss-girder in which the main ties run from the head of one post to the foot of the next post, or across one panel, and the counter-ties run from the head of one post across the next post to the foot of the second post, or across two panels, by which arrangement the posts of a single intersection-truss can be held longitudinally at the center by the counter-ties; also, in the construction of a truss-post having the cross-section below the floor-beam greater than the cross-section above said beam, thus adapting the post economically to partial-deck spans; also, in the construction of the lower chord-bars of a truss-girder in pairs running across two or more panels, with secondary chord-bars running over single panels, and taking up the longitudinal strain from the intermediate diagonal ties, thus reducing the number of heavy bar-heads and chord-pins; also, in the construction of the upper corners of a wrought box-chord truss-girder by planing the end post to fit under the end of the upper chord, and uniting the two posts by inside plates and corner-pin, with additional beveled bearing-plates for battered end trusses, thus forming an economical all wrought-iron corner-connection, all of which is hereinafter more fully shown.

In the accompanying drawing, Figure 1 is an elevation of half-girder embodying our improvements. Fig. 2 is a partial plan of lower chords. Fig. 3 is a cross-section through the line *x x* in Fig. 1, and Fig. 4 is a view of corner-connection.

A is the upper chord, and B the end post, made of channel-bars and plate, in the ordinary form. The upper end of post B is planed off to fit under the end of chord A, and inside plates *f f* are riveted in the post and up between the chord channel-bars, as shown. The chord ends are re-enforced by plates *d* when required, and the corner-pin *m* runs through the chord ends and the plates *f f*, thus uniting the chord and end posts, the bearing-plates *e e* being riveted on the inside of the chord-channels against the plates *f f*, to take up part of the longitudinal thrust of the post.

The diagonals D D^1 D^2 are eye-bars of ordinary form, as also are the chord-bars E F G, the end chord-bars E being run over the two end panels, in the usual manner.

Instead of running the chord-bars in the intermediate panels in single lengths, as has been the previous practice, the bars F F run across two panels, or from post C to C^2, and an intermediate bar, G, is put in between posts C and C^2, to take up the longitudinal strain from the diagonal tie D^1, thus saving the four large bar-heads and heavy pin usually required at post C, and using only a short pin and lighter bar-head for bar G at said point.

The posts C C^1 C^2 are made of two channel-bars as principal members, and are arranged to receive the floor-beams M for a "partial-deck" truss, having the floor midway between the upper and lower chords. Above the beams M the posts are made of proper cross-section to sustain the vertical strain from the ties d^1 d^2, the channels being united by double-riveted cross-bars *b b*, while below said beams the cross-section of the post is increased by means of the plate K sufficiently to sustain

the additional load brought upon it by the beam M.

The counter-ties H H run across two panels, as shown, being secured to the upper and lower chords at their ends. They are run through the posts C C near the center, and have the sleeve-nuts *h* placed near the post, as shown, so that the screw end on the upper half of the tie serves as a screw end for the sleeve-nut *h*, and also forms a screw for the jam-nuts *a a*, which, with the oblique washers *c c*, act to clamp the tie in the post.

In the double-intersection form of truss, where both diagonal and counter ties run across two panels, the posts near the ends, where no counter-ties are required, can be economically held at the center by a rod placed between the main diagonal ties, which can be reduced in section to an amount equal to the section of this center rod.

The advantages resulting from securing the centers of the posts in a pin-connection truss will be more evident by noticing that the posts have rounded ends in the longitudinal direction, in which they are held by the ties, while their bearings in a lateral direction, or in the line of the pins, are square-ended; and as the strength of a round-ended post is equivalent to a square-ended post of twice its length, with same diameter, by making the post twice as wide laterally as it is longitudinally, and holding it at the center, as specified, it will have the same strength as a square-ended post of the same section, and with both its lateral and longitudinal dimensions equal to the lateral diameter of the centrally-held post. The strain on the center post C^2 of the truss is usually so small as to make it unnecessary to hold said post in the center, in which case the center counter-tie I is only run across one panel.

What we claim herein as new, and desire to secure by Letters Patent, is—

1. A pin-connection truss having the posts held longitudinally at the center by diagonal ties run through and secured by jam-nuts and washers in the posts, substantially as and for the purpose specified.

2. The combination, with a truss-post, of a diagonal tie having sleeve-nut adjustment, and with one screw end for said sleeve-nut secured by jam-nuts and oblique washers in said post, substantially as and for the purpose specified.

3. A truss-girder having the main diagonal ties run across one panel, and the counter-ties run across two panels, and secured to the posts at the center, substantially as and for the purpose specified.

4. A truss-post for partial-deck spans, having the section below the floor-beams greater than the section above said beams, substantially as and for the purpose specified.

5. The construction of the lower chords of a truss-girder in pairs, running over two or more panels, with intermediate bars to take up the strains from intermediate diagonal ties, substantially as and for the purpose specified.

6. The within-described corner-connection for box-chord trusses, formed by fitting the end post under the chord end, and uniting the same by inside plates, bearing-plates, and corner-pin, substantially as and for the purpose specified.

As evidence of the foregoing, witness our hands this 26th day of July, A. D. 1876.

DAVID HAMMOND.
H. G. MORSE.
JOB ABBOTT.

Witnesses:
WM. BRITTON,
E. W. ECKERT.