Robert W. Smith,

Bridge.

No. 97,714.

Patented Dec. 7, 1869.

Fig. 1.

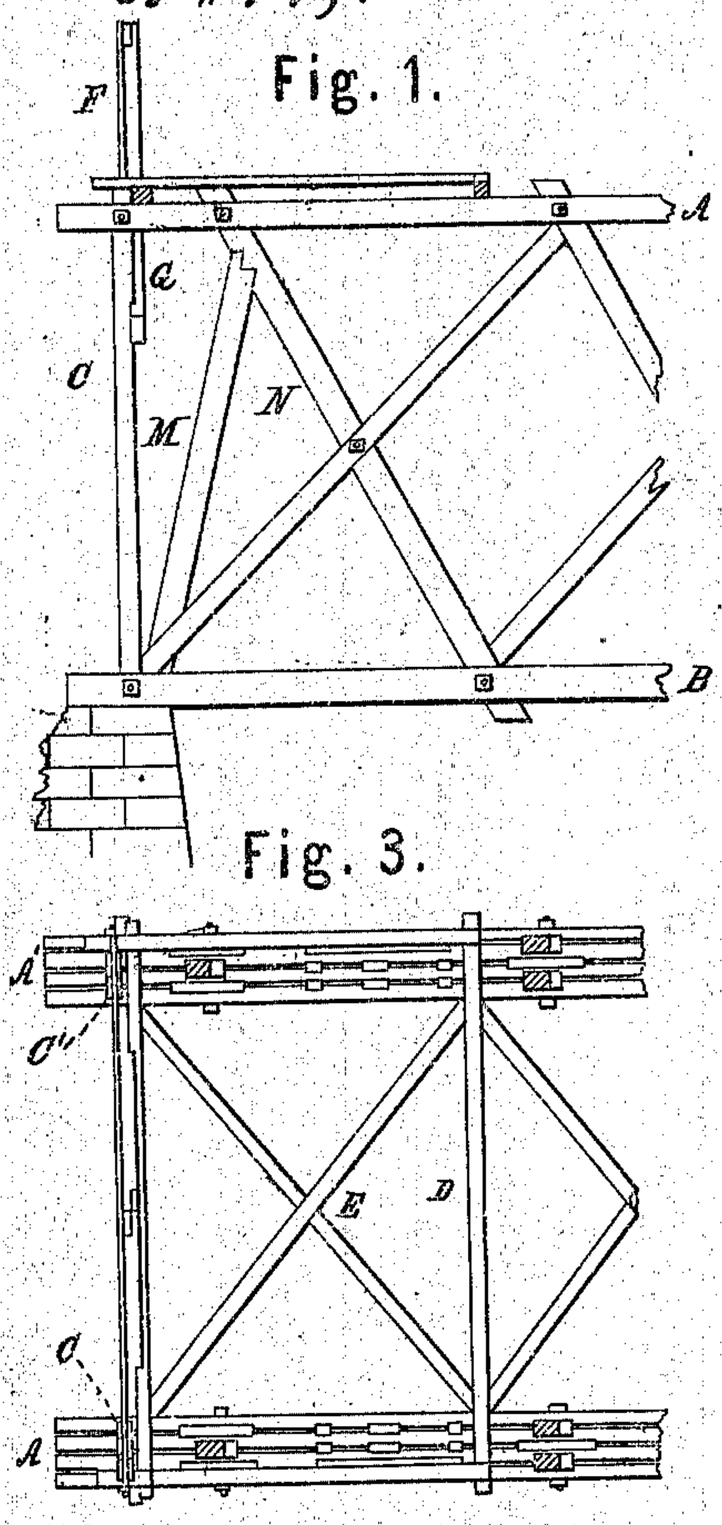


Fig. 2.

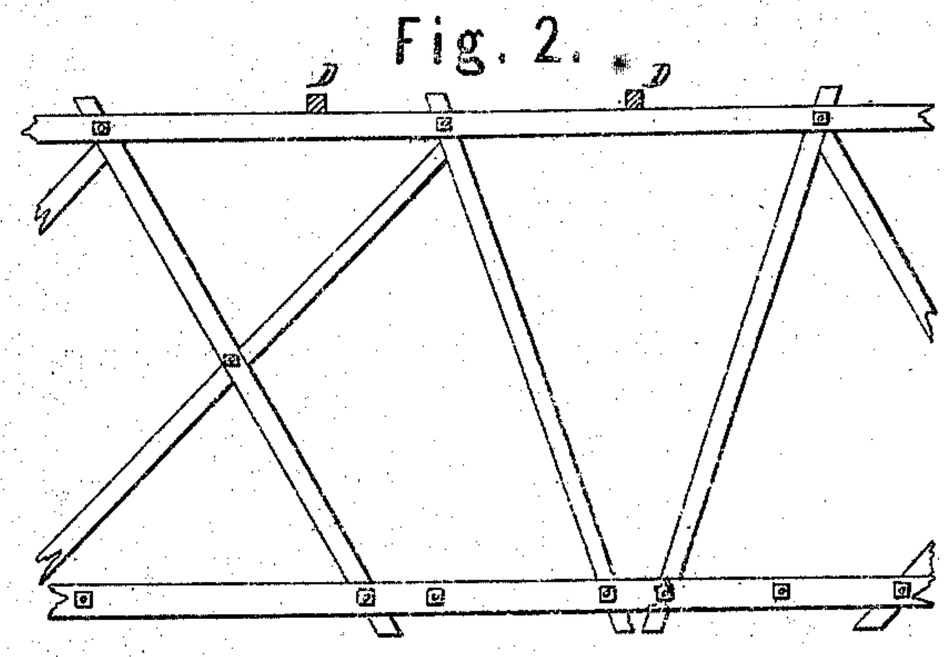


Fig. 3.

Fig. 4.

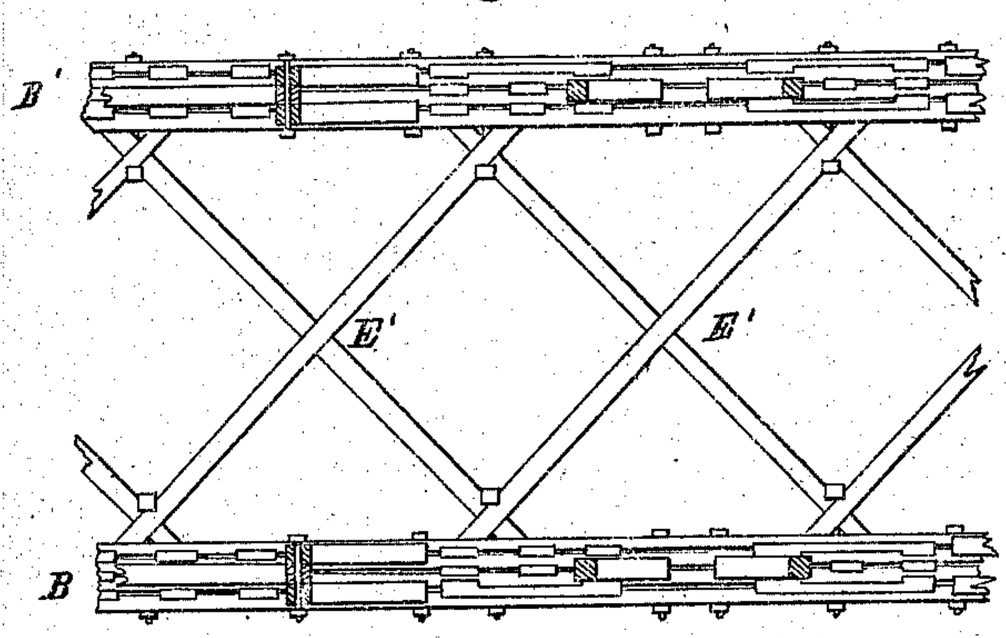


Fig. 5.

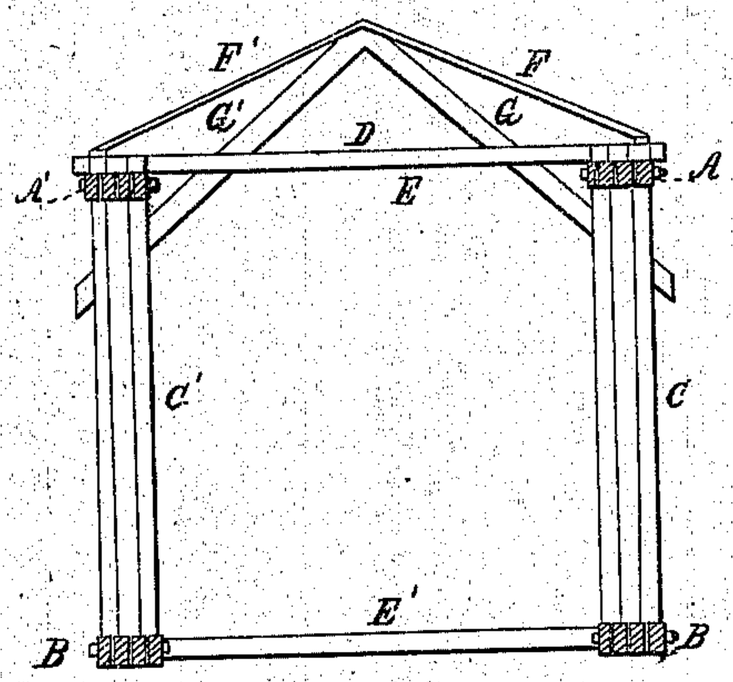


Fig. 6.

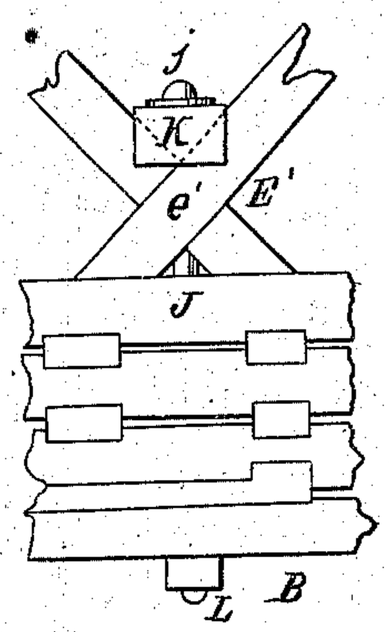


Fig. 7.

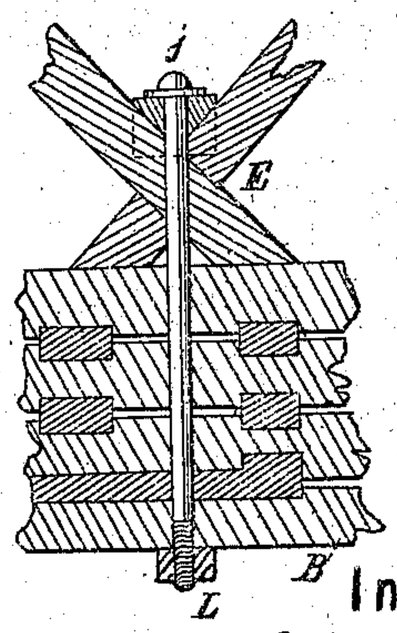
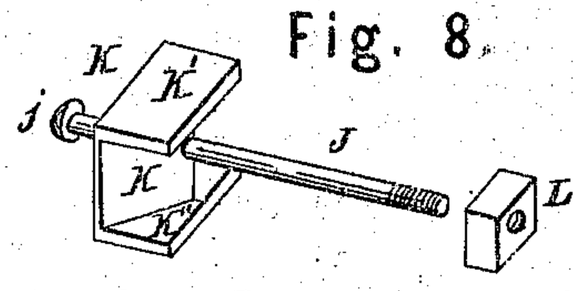


Fig. 8.



Witnesses.

Sam'l Knight

Wm. Bauer

Inventor.

R. W. Smith

By Knight Bros.

Attys

United States Patent Office.

ROBERT W. SMITH, OF TOLEDO, OHIO.

Letters Patent No. 97,714, *dated December* 7, 1869.

IMPROVED BRIDGE.

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

To whom it may concern:

Be it known that I, ROBERT W. SMITH, of Toledo, Lucas county, Ohio, have invented certain new and useful Improvements in Bridges; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings making part of this specification.

My invention relates to that class of wooden structures known as truss-bridges; and

My improvement consists in certain devices whereby the bridge is rendered more secure, and much lighter, besides which, it will retain its proper shape for a greater length of time than ordinary bridges will.

In the accompanying drawings—

Figures 1 and 2 are side elevations of one end and the middle portion of a bridge, embodying my invention.

Figures 3 and 4 are, respectively, a top view of the bridge at one end, and a bottom view of the bridge at the middle.

Figure 5 is an end elevation of my bridge.

Figures 6 and 7 are a top view and a horizontal section (on a larger scale) of my tie-bolt J and accessories.

Figure 8 shows said bolt with its saddle and nut detached,

The first part of my invention, which consists in certain devices for preventing the bridge from sagging down at its sides, and thereby losing its shape, and diminishing its strength, is clearly illustrated in fig. 5, in which A A′ and B B′ are, respectively, the upper and lower chords of an ordinary truss-bridge, the two being united by the uprights C C′.

The upper chords are united together by stout transverse head-beams, D, which prevent their separation.

Diagonal beams E E′ also serve to brace and connect both upper and lower chords, A A′, B B′.

Securely attached at their lower ends to the upper chords A A′, are the rafters F F′, upon which the sheathing of the roof is laid, and the upper ends of these rafters have secured to them the elevated ends of two inclined ties, G G′, whose lower portions are bolted to the uprights C C′.

The ties, near their mid-length, intersect with, and are attached to the transverse beams D, and it will be seen that these ties preserve the uprights C C′ in their vertical position, and thus prevent either side of the bridge from sagging down and losing its shape or verticality.

The second part of my invention relates to a new way of securing the diagonal floor-braces to the chords of the bridge, and figs. 4, 6, 7, and 8 illustrate the devices by which the connection is made.

In these four views, B B′ are the lower chords of the bridge and E′ the diagonal braces, and *e e′* the intersections of these braces, where they are gained together.

Bolts J, having heads *j*, are passed through saddles K, and through the intersecting portions *e′* of the diagonal braces E′, and through the chords B B′.

The saddles K have V-formed centre-portions, *k*, which fit and occupy the receding angles formed by the intersections *e′* of the braces E′, and flanges, *k′ k′*, which, embracing the upper and lower sides of said braces, serve to hold them firmly.

The outer extremities of the bolts J are screw-threaded, for the reception of nuts L, on the outside of the chords.

The flanged saddles K sustain the diagonal braces securely in position, and prevent any accidental displacement of them.

It will be seen that these bolts are more effectual and much lighter than the customary tie-rods, which extend completely across the bridge, from one chord to another.

In case the braces should draw away from the chords, they can be readily restored to their correct position by simply tightening the nuts L.

Inclined posts or struts, M, jogged and gained into the side-braces N, and into the lower chords, assist greatly in maintaining the longitudinal stiffness of the bridge against a force tending to sag the same, consequent on its weight.

I claim herein as new, and of my invention—

1. The provision, in a bridge, of the inclined lateral ties G G′, extending from the rafters F F′, across the beams D, to the uprights C C′, to which beams and uprights they are bolted, substantially as herein described and for the purpose explained.

2. In combination with the diagonal floor-braces E′, the tie-bolts J K *k k′* L, for the object herein described.

In testimony of which invention, I hereunto set my hand.

R. W. SMITH.

Witnesses:

GEO. H. KNIGHT,

JAMES H. LAYMAN.