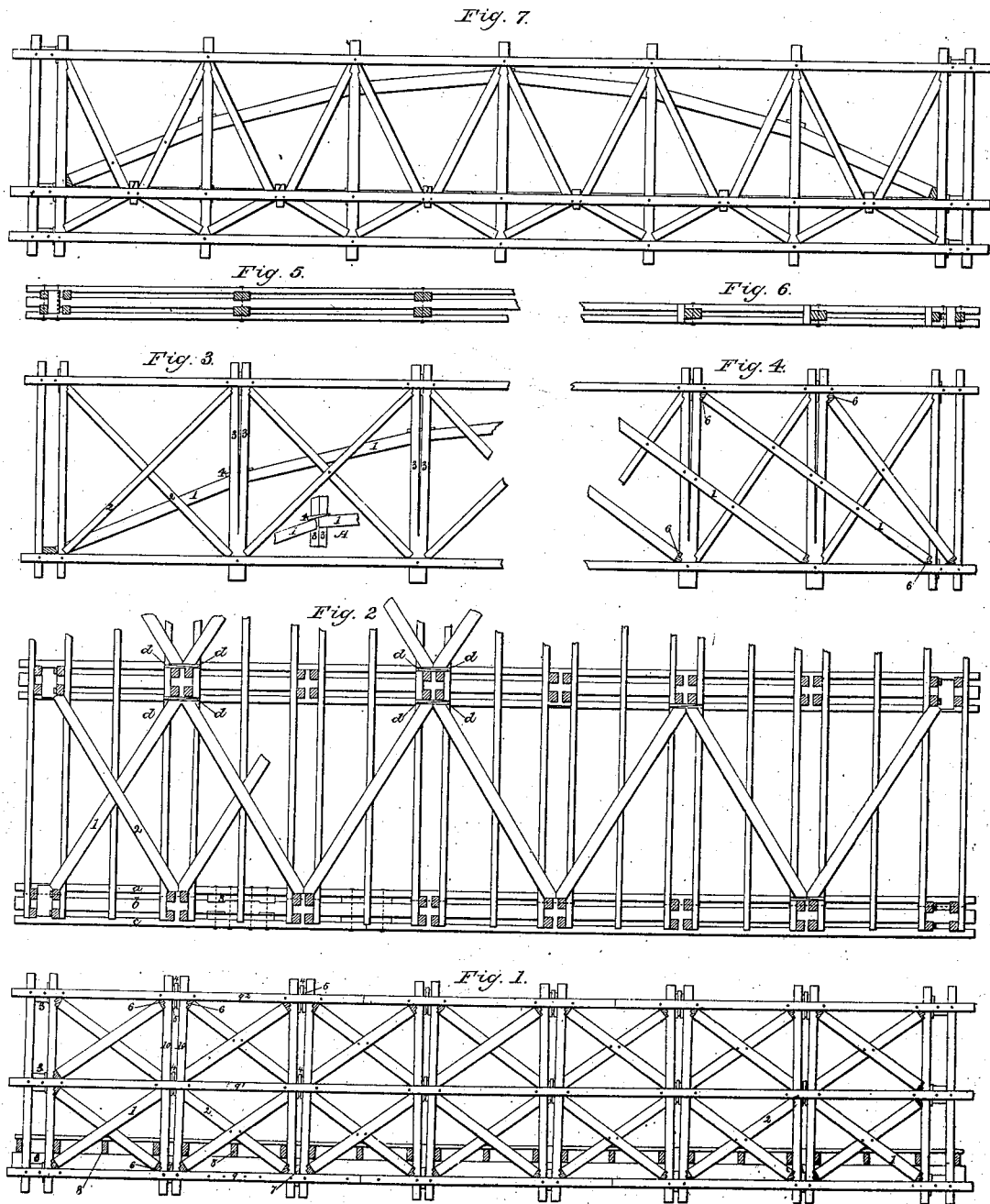


W. HOWE.

Truss Frame for Bridges.

No. 1685.

Patented July 10, 1840.



Witnesses:  
Jesse T. Perkins  
Jeffrey Bacon

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William Howe

# UNITED STATES PATENT OFFICE.

WILLIAM HOWE, OF WARREN, MASSACHUSETTS.

## TRUSS-FRAME FOR BRIDGES.

Specification of Letters Patent No. 1,685, dated July 10, 1840.

*To all whom it may concern:*

Be it known that I, WILLIAM HOWE, of Warren, in the county of Worcester and State of Massachusetts, have invented certain Improvements in Truss-Frames, by means of which improvements my truss-frame can be so strained up as to give a tensile or stretching force longitudinally, and thus preventing that tendency to vibration which exists in truss-frames as ordinarily constructed, while at the same time a degree of camber may be given, which will raise the truss-frame in the center above a horizontal line.

This truss-frame, although intended for bridges, is applicable to roofs and various other structures; and I do hereby declare that the following is a full and exact description thereof.

Figure 1, in the accompanying drawing is an elevation of a truss-frame; 1, 1, are principal braces running in a direction from the abutments, or ends of the frame, toward the center, and 2, 2, are counter braces. The ends of these braces bear against pieces of wood or iron 6, 6, which are retained in place by being notched into the posts 10, 10, as shown in the drawing. The posts 10, 10, are double, that is to say, there is one on each side of the braces 1 and 2, said braces passing, and being embraced, between them where they cross each other at their center. Between the two end posts there is a piece of timber 3, 3, 3, which serves to cause the outer posts to bear their portion of the strain from tightening the braces, and to give them equal bearing on the string pieces. To give the required longitudinal strain to the truss-frame, wedges, marked 4, 4, are inserted between each of the pairs of posts 10, 10, on each side of the truss frame, in a line with the upper and middle string pieces. To enable these wedges to act properly, and to prevent them from bruising the posts, I insert pieces of wood or metal 5, 5, between them and the said posts. The effect of driving the wedges, or keys, 4, 4, will be to force the posts upon the ends of the braces; and as these wedges or keys are driven between the upper string pieces, they may be made not only to stiffen the truss frame, but to camber it to any desirable extent. Between the posts 10, 10, and against the lower string piece, I place blocks, or pieces, 7, 7, to afford a proper bearing to the posts in that part; 8, 8, are the ends of the floor beams; 9, is

the lower string piece, 9' the middle, and 9<sup>2</sup> the upper string pieces. In this truss frame the upper and lower string pieces are treble, as shown at *a, b, c*, Fig. 2; the middle has two string pieces only, the braces crossing between the posts, where, of course, there cannot be a string piece.

Fig. 2, is a plan of the braced floor timbers, representing those on one side of a double track; 1, is a horizontal brace, halved into the top of the floor beams, or, if preferred, bolted on to them on their lower sides. When the track is single, the second brace 2, may be used. These braces are made to strain firmly against the posts of the truss frame by means of wedges or keys between their ends and the posts, as shown at *d, d*.

Fig. 3, is a portion of a truss frame having an arch-beam 1, 1, passing through the center of said truss. In this modification the posts 3, 3, are shown as made out of one piece of stuff, but slit down from the upper end so as to admit of the wedging up on the principle already described. The arch-beam when used is to be cut off between the posts 3, 3, as shown in the segment Fig. A; the two ends of the beam, in the cut, should have a piece of iron or of hard wood interposed between them to prevent their galling. By the driving of the wedge 4, which bears against a shoulder in the posts, the truss-frame will be raised, there being space left in the posts, below the arch beam, to admit of its being wedged down; 2, 2, are the braces and counter braces, operating as before described.

Fig. 4, represents another modification of the same principle, and differing only in arrangement from those described. The post is shown as in a single piece, and slit down as in the last described arrangement. In this the principal braces 1, 1, pass on the outside of the posts, to which they are pinned, or bolted, they being also notched in, so that their lower and upper ends may bear in part against the posts, as well as upon the pieces 6, 6, described in the first modification. The counter braces have their bearings between the posts.

Fig. 5, is a top view of Fig. 3, showing the string pieces and the ends of the posts; and Fig. 6, is a similar view of Fig. 4.

Fig. 7, shows another modification of my truss-frame, having an arch beam, as in Fig. 3. In this the keys, or wedges, 1, 1, 1, are

driven between the principal and resisting  
braces; and it will be seen upon inspection  
that the same effect will be produced, and  
that the principle of action is the same as in  
5 the other modifications. The dots in the  
foregoing figures represent the places of  
bolts, or dowels, through the timbers.

Having thus fully described the manner  
in which I construct my truss frame for  
10 bridges and similar structures, and shown  
various modes in which I apply the prin-  
ciple upon which I proceed in their forma-  
tion, what I claim therein as constituting  
my invention, and desire to secure by Letters  
15 Patent, is—

1. The manner in which I have combined  
and arranged the braces and counter braces,  
the double posts, and the wedges between  
them, as shown in Fig. 1, so that by the driv-  
20 ing of said wedges the truss frame may be  
cambered in any desired degree, the whole

being constructed and operating substan-  
tially as set forth.

2. I claim the manner of carrying the  
same principle into effect by this combined 25  
operation of the wedges, or keys, over the  
arch beam, and those between the posts 3, 3,  
as shown in Fig. 3.

3. I claim the application of the same  
principle by an arrangement of braces and 30  
counter braces, combined with an arch beam,  
the wedges or keys for combining being  
driven between the principal and resisting  
braces in the manner set forth, and repre-  
sented in Fig. 7, together with such other 35  
modifications or variations of the same prin-  
ciple by which the same end may be attained  
by means substantially the same.

WILLIAM HOWE.

Witnesses:

JEPHTAH BACON,  
DANIEL HITCHCOCK.