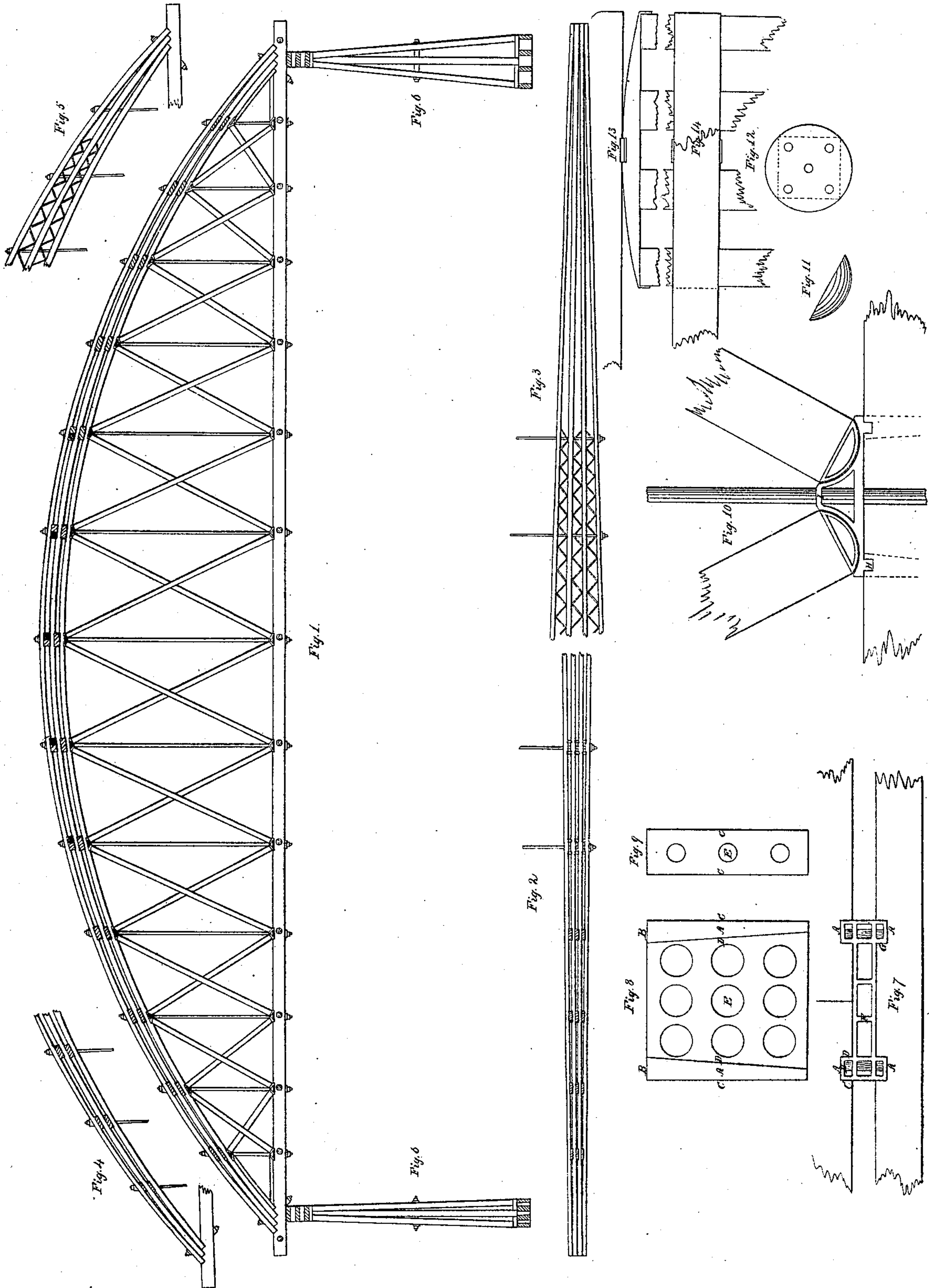


G.S. Avery,
 Bridge,
 No 17,864, Patented July 28, 1857.



UNITED STATES PATENT OFFICE.

GEORGE S. AVERY, OF LEWISBORO, NEW YORK.

SEGMENTAL TRUSS FOR BRIDGES, &c.

Specification of Letters Patent No. 17,864, dated July 28, 1857.

To all whom it may concern:

Be it known that I, GEORGE S. AVERY, of the town of Lewisboro, in the county of Westchester and State of New York, have invented a new and Improved Mode or Plan of Constructing Bridge-Trusses; and I do declare that the following is a full and exact description thereof.

The nature of my invention consists of an improvement in segmental truss bridges, by a combination of the following devices, viz: The arched top chord, horizontal bottom chord, X braces, vertical tie rods, packing blocks or boxes, and self-adjusting shoes for the braces to rest against, thus forming a segmental truss of greater strength and stability, than such as is generally used, with the same amount of building material.

To enable others skilled in the art of bridge-building, to make and use my invention I will proceed to describe its construction and operation.

I construct my bridge trusses in the form of a segment of a circle or thereabout, with an arched top chord and a horizontal bottom chord connected together by vertical tie rods and X braces placed in panels or spaces decreasing in breadth from the center of the truss toward each end, in an arithmetical or other ratio, as shown by Figure 1 in the accompanying drawings, thus increasing the number of tie rods and braces at or near the ends of the truss, thereby increasing the strength and stability of the truss at the ends, and the better preparing it to receive and support a moving load over the bridge. I increase the depth of the top chord from each end toward the center by inserting packing blocks of wood or packing boxes of iron, increasing in thickness in an arithmetical or other ratio, between the timbers forming the chords, as shown by Fig. 4 in the accompanying drawings, or if a great width is required between the timbers, small braces (called in carpentry "bridging") may be used instead of packing blocks or boxes, for the purpose of keeping the timbers apart, as shown by Fig. 5 in the accompanying drawings. I increase the breadth of the bottom chord from each end toward the center in the same manner as the depth of the top chord is increased *i. e.* by inserting packing blocks of wood or packing boxes of iron increasing in thickness in an arithmetical or other ratio between the timbers forming the

chord as shown by Fig. 2 in the accompanying drawings, or if a great width between the timbers is required small braces (called in carpentry "bridging") may be used instead of packing blocks or boxes for the purpose of keeping the timbers apart, as shown by Fig. 3 in the accompanying drawings. The main braces I set with their feet or lower ends outside of a vertical plane passing through the top of the braces, thereby giving them a lateral bracing position, as shown by Fig. 6 in the accompanying drawings, thus producing an additional lateral strength and stability to the truss, and the better securing it against winds or other lateral forces.

The counter braces I set in the usual manner. If wooden packing blocks are used I construct them of the usual form. If iron packing boxes are used I make them hollow, and of a rectangular form, with projections on each side at the ends, as shown at A, Fig. 7, in the accompanying drawings; which is let into the timbers forming the chords to prevent their slipping endwise. These projections I make hollow, or solid as the case may require, and of the form of a frustum of half a wedge, with the top end of the projection, representing the base, as shown at B, Figs. 7 and 8, in the accompanying drawings, and the extreme edges of the box, representing the perpendicular, as shown at C, Figs. 7 and 8, in the accompanying drawings, and the side of the projection which is opposite the extreme edges of the box, representing the hypotenuse or wedge side, as shown at D, Figs. 7 and 8, in the accompanying drawings. In the sides and extreme edges of the packing boxes I make holes or openings as shown at E, Figs. 8 and 9, in the accompanying drawings, for the purpose of passing the lateral and other bolts through. I connect the sides of the packing boxes with partitions or cross pieces, as shown at F, Fig. 7, in the accompanying drawings, to prevent the boxes crushing, in screwing up or adjusting the lateral bolts.

By the use of iron packing boxes I obtain square, durable, and more perfect bearings and corners for the shoulders on the timbers to rest against, as shown at G, Fig. 7, in the accompanying drawings, and thereby obviate the difficulty of the shrinkage, crushing, and splitting off of the corners, of the packing blocks when made of wood, and at the same time combine the packing block

and wedge into one, in the form of a packing box as herein described, thus increasing the strength and durability of the truss.

5 The self-adjusting shoes or blocks for the ends of the braces to rest against I make, sectionally, of a triangular form, with a length equal to the breadth of the chord, and of a width for the bearing or bottom side, of about twice the depth or size of the braces
10 at the ends, and the two remaining sides, about half the breadth of the bottom or of sufficient width for the insertion of the spherical or conical segment blocks on which the braces rest. On the bottom of the bearing
15 side I make small projections as shown at H, Fig. 10, in the accompanying drawings, fitting into the packing boxes to prevent the shoes or blocks slipping by any unequal pressure of the braces, and on the two remaining
20 sides I make spherical or conical depressions, as shown in section by Fig. 10 in the accompanying drawings, for the purpose of receiving the small iron segments, as shown by Fig. 11 in the accompanying drawings,
25 against which the ends of the braces rest. The segments I make with small holes, as shown by Fig. 12 in the accompanying drawings, in the flat side, against which the

braces rest, for the purpose of allowing a small portion of the braces to press into the
30 holes to prevent their ends slipping out of their proper position. A flange may be used around the outward edge of the segment block for the same purpose. The top angle of the shoe I cut off as shown at I, Fig. 10,
35 in the accompanying drawings.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An improvement in segmental truss bridges, by a combination of the arched top
40 chord, horizontal bottom chord, X braces, vertical tie rods, packing blocks, and self-adjusting shoes; the whole constructed, as described in the foregoing specification, into
45 a segmental truss of greater strength and stability than such as are generally used, with the same amount of building material.

2. I distinctly disclaim the invention of the several devices taken in the construction of my bridge trusses, but I do claim the
50 combined arrangement of the different parts as described and set forth.

GEORGE S. AVERY.

Witnesses:

I. B. WHITLOCK,
D. PUTNEY.