R. S. Merrill.
Truss Bridge.

No. 78,000. Patented May 19, 1868.

Fig. 1.

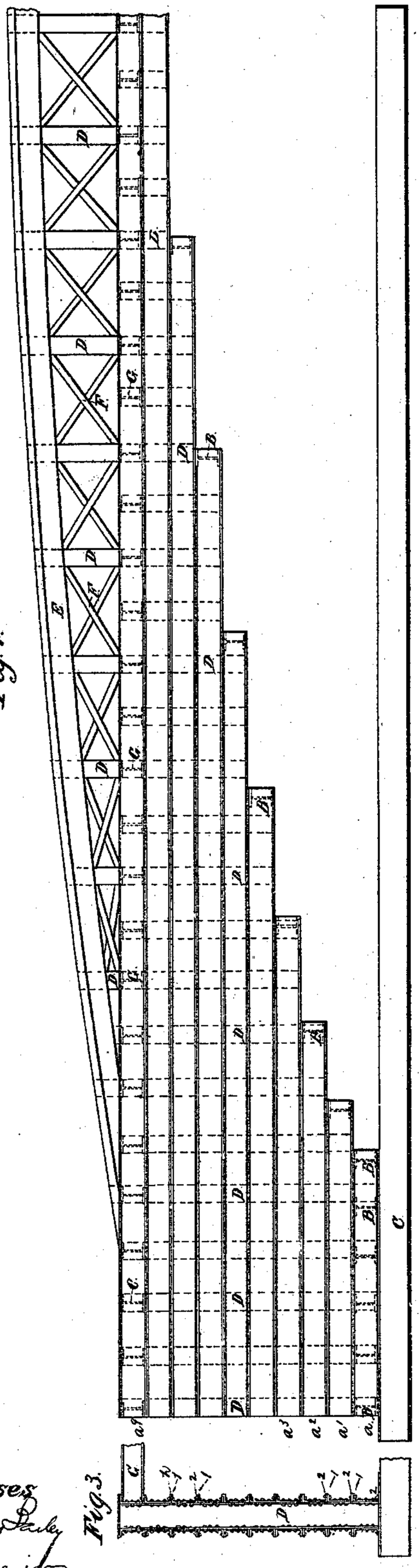
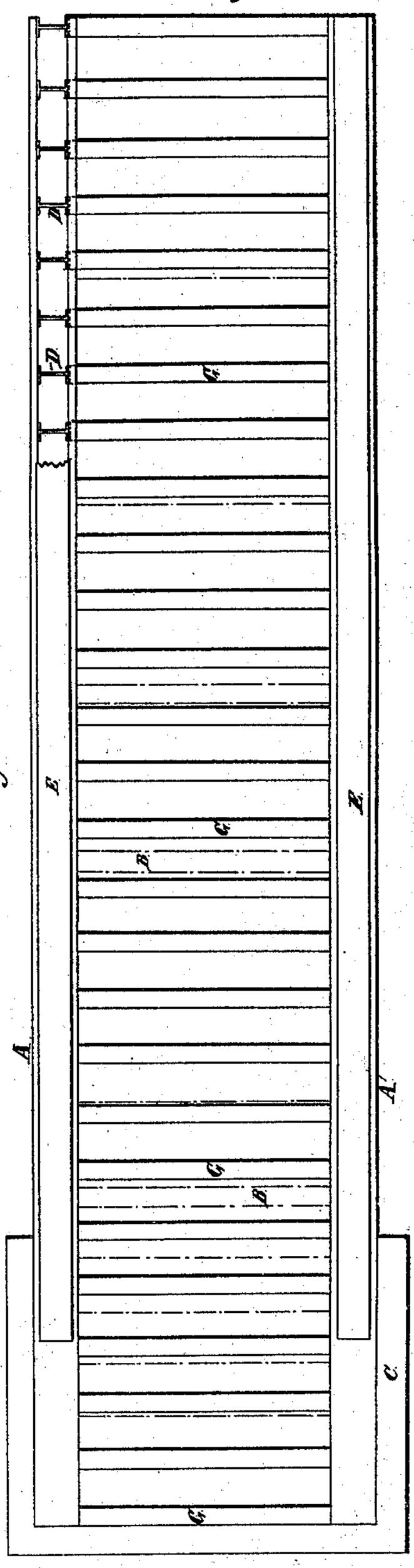


Fig. 3.

Fig. 2.



Witnesses
Leander Ellis Daley
L. W. Page jr.

Inventor:
Rufus S. Merrill
by his attorney
A. Bierk

United States Patent Office.

RUFUS SPAULDING MERRILL, OF BOSTON, ASSIGNOR TO HIMSELF, LEVI LISCOM, AND WILLIAM LINCOLN, OF BROOKLINE, MASSACHUSETTS.

Letters Patent No. 78,000, *dated May* 19, 1868.

IMPROVEMENT IN BRIDGES.

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

TO WHOM IT MAY CONCERN:

Be it known that I, RUFUS SPAULDING MERRILL, of Boston, in the county, of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in the Construction of Bridges; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section, on the line *x y*, fig. 2.

Figure 2 is a plan view of a bridge made in accordance with my invention; and

Figure 3 is a transverse vertical section, through one of the sides of the bridge, and represents more clearly the details of construction.

My invention relates to that kind of bridge for which Letters Patent of the United States have been heretofore issued to A. Cottrell, and also to Levi Liscom, that is to say, a bridge built by projecting, from the opposite shores or banks, levers composed of superposed layers of beams, projecting one in advance of the other, until the opposite levers meet at or about the centre of the space to be spanned.

Heretofore, all such bridges have been made of wood, as it has been deemed impracticable to build them of iron. My object, however, has been to overcome the difficulties which have prevented the use of the latter material for this purpose, and in attaining this result, I have developed certain improvements in the construction of the bridge, and in the combination of its parts, which are the subject of the present patent.

The material used by me in the construction of the bridge is angle-iron, or iron plates, along the edges or sides of which are formed flanges or angle-irons of the desired breadth. Plates of each layer are placed as it were on edge, or so that their bottom flange shall rest on the support below, while the upper flange or angle-iron will be in readiness to receive and support the plates of which the superincumbent layer is composed. Each lever is composed of two parallel series of these plates, thus arranged in layers, connected by means of upright angle-iron plates, to which they are all securely riveted or bolted.

To enable others to better understand these and other features of my invention, I will proceed, however, to describe more particularly the manner in which the said invention is or may be carried into effect, by reference to the drawings accompanying and forming part of this specification.

The different layers of angle-iron plates of which each lever is composed, are indicated by the letters *a* a^1 a^2 a^3, &c. These layers project one in advance of the other, as indicated in fig. 1, the shore-end of the lever being weighted, as the projection increases, so as to compensate for the augmented weight of its projecting end. From each bank or shore two of these levers, A and A′, are thus projected, meeting the opposite levers in about the centre of the space to be spanned. The levers A A′ are connected by means of transverse beams B, fig. 1, (also shown in broken lines, fig. 2,) which are added as the different layers are completed, and serve to sustain a temporary flooring, over which the materials needed for the construction of the bridge are carried during the progress of the work.

The form of the plates of which the layers *a* a^1, &c., are composed, is shown clearly in fig. 3. Each plate is provided with top and bottom flanges or angle-irons 1 2, which project at right angles from the face of the plate. In forming either of the levers A A′, two parallel layers of angle-iron plates (fig. 3) are laid upon the foundation C, and are bolted to upright beams of angle-iron D, placed between the parallel layers, as represented in figs. 2 and 3. Each layer is not of course composed of a single continuous plate, but of a number of plates, according to the length required for the layer. The plates rest upon their bottom flanges 2. Upon the layers *a* are placed the plates, which are to compose the layer next above, the flanges 2 of the latter plates resting upon the flange 1 of the former.

When in this position the plates of layers *a′* are also bolted or riveted to the upright angle-iron beams D, while their flanges 2 are in like manner riveted to the contiguous flanges 1 of the plates beneath. In this manner layer after layer is added, each projecting in advance of the one below, the prescribed distance, as repre-

sented in fig. 1, and secured to the uprights D, and to the flanges of the layers next above and below, in the manner illustrated fully in fig. 3.

In proportion as the projection or length of the lever increases, uprights D are added, placed at a suitable distance apart, so as to give the necessary stiffness and solidity to the lever. The two levers A A′ are both built at the same time, and during the process of the work the transverse beams B, which are also of angle-iron, are laid, connecting the two, and serving as a support for a temporary flooring, over which the material needed in construction can be conveyed. It is of course understood that as the projection of the bridge increases, the shore-ends of the levers are weighted by masonry or other suitable means, so as to counterbalance the increased weight of their projecting ends.

In order to form the necessary truss on each side of the bridge, the length of every other upright angle-iron beam D is gradually increased as they approach the centre of the bridge, so as to form the uprights upon which the top chord E of the truss is secured and held, as shown in fig. 1. As these uprights are also connected, as above explained, with the different layers of plates of which the levers are composed, it will be seen that the whole structure is solidly and firmly held together, and that the whole bridge may be said in effect to constitute the bottom chord of the truss. The uprights to which the top chords F are attached, are strengthened or braced by means of cross-ties F, which may be also of angle-iron; the top chords E of course, placed in position after the levers projected from the opposite shores have met, and been united by means of the topmost layer a^9, which extends the whole length of the bridge. The transverse angle-iron beams G are then laid, extending between the levers A A′, their ends being held between the flanges 1 2 of the plates of the topmost layers a^9, and upon these beams the permanent flooring of the bridge is laid.

By this means, and at a comparatively small expense, I am enabled to build a bridge of this kind entirely of iron, and in such manner as to obtain the greatest strength and stiffness. The plates of which the levers are made can either be rolled in the form shown in cross-sections in fig. 3, or they may be ordinary plates of the requisite width, with angle-irons riveted to their top and bottom.

Instead of making the flanges or angle-irons both to project from the same side of the plate, one flange may be on one side and the other on the other side, but I prefer the form shown in the drawings as giving the best results.

Having now described my invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

The construction of iron bridges, substantially in the manner herein described.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

RUFUS S. MERRILL.

Witnesses:

EDM. F. BROWN,

CHAS. G. PAGE, Jr.