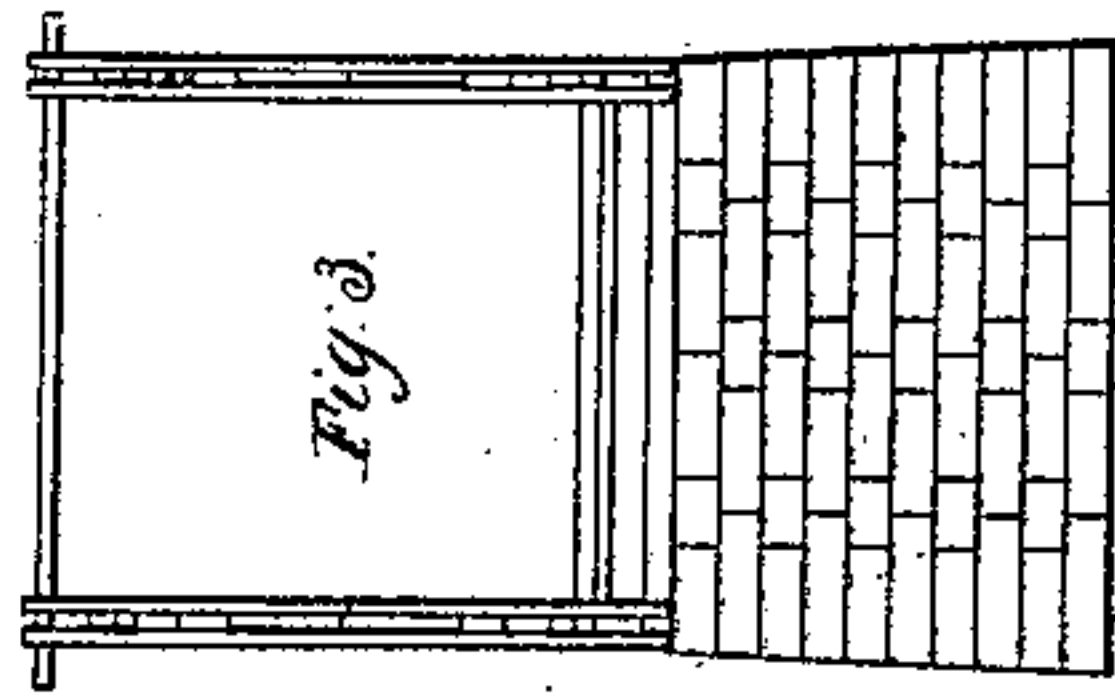
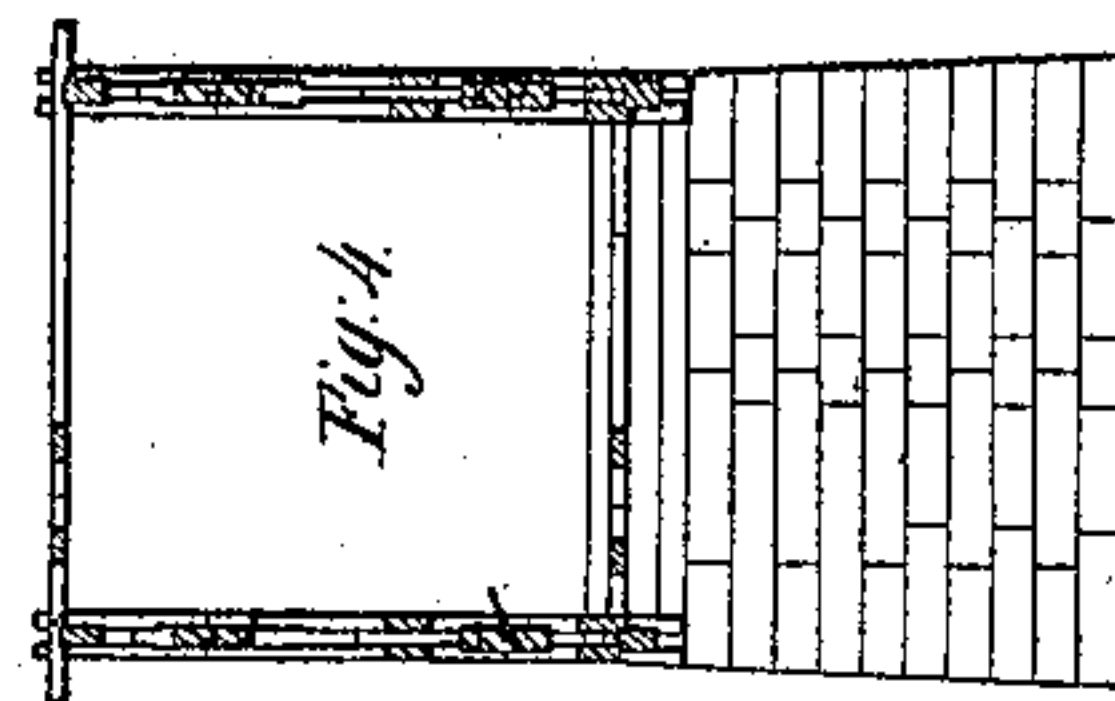
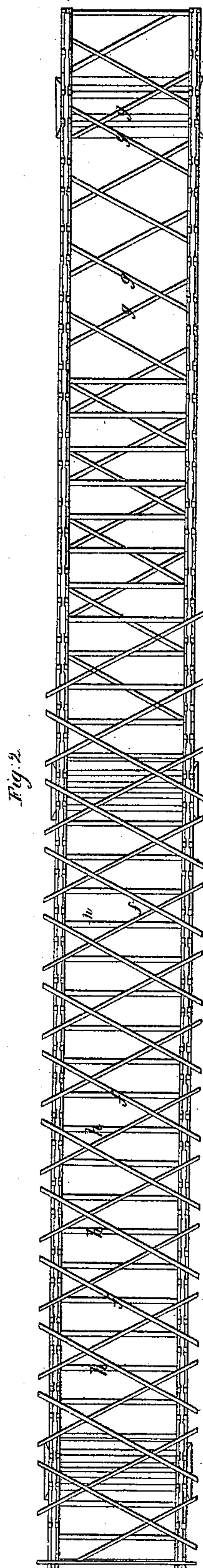
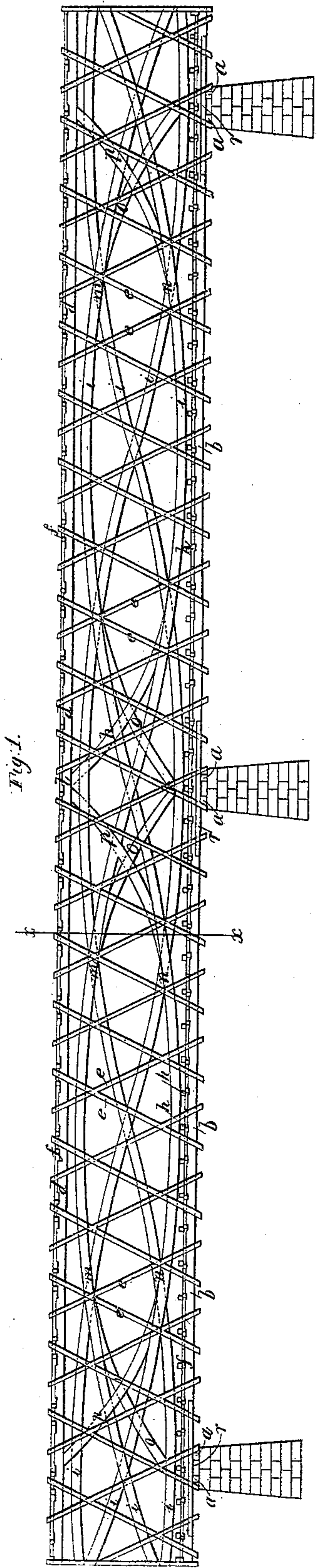


C.M. Pennington.

Truss Bridge.

Nº 7.890.

Patented Jan 7, 1851.



UNITED STATES PATENT OFFICE.

C. M. PENNINGTON, OF ROME, GEORGIA.

ARRANGEMENT OF ARCHES IN BRIDGE-TRUSSES.

Specification of Letters Patent No. 7,890, dated January 7, 1851.

To all whom it may concern:

Be it known that I, CUNNINGHAM M. PENNINGTON, of Rome, in the county of Floyd and State of Georgia, have invented
5 a new and useful Improvement in Bridges; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of the same, in
10 which—

Figure 1, represents a side elevation; Fig. 2, a top view with portions of the upper cross bracing removed to exhibit the lower braces, floor beams &c.; Fig. 3, an end view,
15 and Fig. 4, a section through the red line *x x* of Fig. 1.

The same letters in all the figures represent similar parts.

The nature of my invention consists in
20 a certain combination and arrangement of upright and inverted arches by which all thrust against the abutments or piers is prevented and at the same time securing a permanent structure.

25 To enable others skilled in the art to make and construct my bridge, I shall proceed to describe the same.

On abutments and piers of ordinary construction, I place the bearing timbers *a*,
30 upon which are arranged the lower cords or stringers *b*, which extend the whole length of the bridge unbroken, and at such distance or distances from each other as the width of the bridge may require. These cords
35 are made in one continuous piece and framed together in any well known manner.

The upper cords *d* are constructed in a similar manner with the lower ones, and the several cords are secured to each other,
40 by the side cross braces *e*, bottom cross braces *g*, and top bracing *f*, where the cross braces lap over each other and over the cords and arches, I cut gains of a suitable size in each, and the whole is secured at
45 each of such lappings with an iron bolt. There are two tiers of side braces on either side of the bridge, one set on one side of the cords and arches, and the other directly opposite, so that each bolt passes through
50 the various pieces constituting the side of the bridge. The bottom cross braces *g*, rest upon the cords *b*, and are so arranged that their ends shall rest upon the cords in the spaces between the side cross bracing *e*.

Where these bottom cross braces lap over 55 each other, and over the cord, gains are cut in each piece, so as to make them immovable in either direction, and the whole secured by a bolt at each and every such lapping, as before described in the manner of con- 60 structing the side cross braces *e*.

The upper cross bracing *f*, is constructed in precisely the same manner with the lower ones, and rests upon the upper cord *d*, directly above and over the lower bracing. 65 The ends of the upper braces project over the cords sufficiently far, to admit of being used as a support for the rafters, and forms the eaves of the roof. The floor beams *h*, are placed, and rest upon, the ends of the 70 lower cross bracing as seen in Fig. 1.

The arches *i, i, i, i*, which are made of plank put together flatwise, and sprung into the required curve of the arch while in course of construction, are continuous 75 throughout the several spans of the entire bridge, and are so arranged, as that they shall be alternately the upright and inverted arch through the whole length of the bridge, that is, the arch which was the upright in 80 the first span, will be the inverted arch in the second span, and so on through its entire length, and vice versa, the arch which was the inverted arch in the first span, becomes the upright arch in the second span 85 and so on through the entire length of the bridge, and are so arranged that one set of arches change from upright to inverted over the piers, while the other set change midway of the span. Directly over these cross- 90 ing points of one set of arches, the other set are at their remotest distance from each other, and at their strongest bearing or sustaining points, thus having two inverted and two upright arches in every portion 95 of the bridge, so arranged that while one set are approaching each other to change their direction at the crossing points, where they are the weakest, the other set is in position with regard to them, at their remotest 100 distance from each other and at their strongest sustaining point, thus distributing the weight upon the bridge evenly, and entirely preventing any cramping up in advance of, or sinking below any heavy 105 weight which may come upon it. Where these arches lap each other, or pass through between the double set of side braces, gains

are cut in each piece, and a bolt as heretofore described passes through the several pieces.

At the points *m*, *n*, on the arches, and
5 where they pass each other in changing from the upright to the inverted, and from the inverted to the upright arch, I arrange chuck-arches *o*, *p*, which may abut against the inverted arch as at *k*, or against the cord
10 as at *l*. When they abut against the arch a piece of timber is placed between the arch and cord to relieve the arch of the weight.

Where the cords or stringers pass the piers, I arrange pieces of timber *r*, let in
15 flush with the side braces by means of gains, and bolted through the entire side as heretofore described in other parts of the bridge, for the purpose of strengthening the cords at that point.

Having thus fully described my invention, 20 what I claim therein as new and desire to secure by Letters Patent, is—

The method herein described of combining and arranging the several arches of a bridge, so as to make each arch alternately 25 the upright and inverted arch, as it passes from one span of the bridge to another, and vice-versa, when one set of said arches have their remotest distance from each other, and their greatest sustaining point, 30 directly over and under the points where the other set of arches are changing from upright to inverted arches or vice versa.

C. M. PENNINGTON.

Witnesses:

S. C. DONN,
E. RIDGWAY.