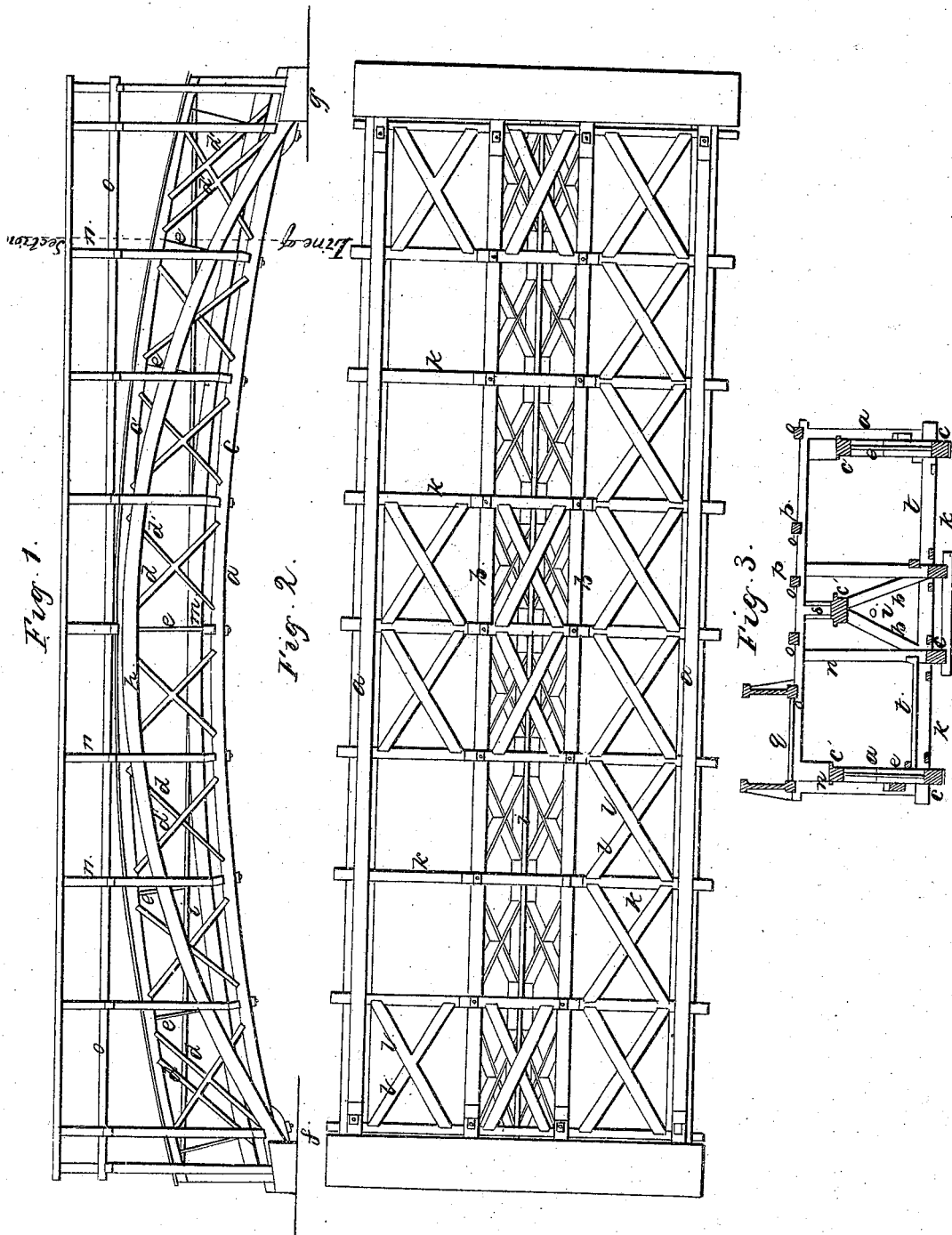


I. Gay. Truss Bridge.

N^o 4,837.

Patented Nov. 4, 1846.



UNITED STATES PATENT OFFICE.

LOWMAN GAY, OF CHILI, NEW YORK.

BRIDGE.

Specification of Letters Patent No. 4,837, dated November 4, 1846.

To all whom it may concern:

Be it known that I, LOWMAN GAY, of Chili, in the county of Monroe and State of New York, have invented new and useful Improvements in Wooden Bridges, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a longitudinal elevation; Fig. 2, a plan of the bottom and Fig. 3 a vertical cross section taken at the line (X X) of Fig. 1.

The same letters indicate like parts in all the figures.

In the construction of arch bridges with diagonal braces between the under and upper arch pieces, the practice has heretofore been to abut the braces against the posts and arch pieces at the junction of the two so that the two braces on opposite sides of each post apply all the strain to the arch piece at one point. This necessarily tends to break it at this point and does not transfer the strain from one part of the arch to the other parts, a result so important in a good bridge.

The object of the first part of my invention is to arrange the diagonal braces between the lower and upper arch pieces or arch piece and its chord and at a sufficient distance within the posts and vertical connecting rods as to make that portion of the arch pieces perform the function of a lever, the post or connecting rod being the fulcrum, and thus to transfer the strain applied to any part of the arch from one diagonal brace to another throughout the series, and in this way give to the arch truss the greatest amount of stiffness due to the amount of timber employed. It is also well known that bridges are exposed to much lateral strain from wind, tending to force the arch trusses over out of plumb, and as an arch loses much of its strength when out of plumb, it has become a matter of great importance to protect a bridge against such tendencies.

The second part of my invention consists in making the middle arch truss of the bridge in two parts inclined in opposite directions, connected together at top and sepa-

rated at bottom, so that they resist the action of the wind in opposite directions.

In the accompanying drawings (*a, a*) represent the two outside arch trusses, and (*b, b*) the two inside inclined arch trusses.

The trusses (*a, a*) are composed of a bottom and top arch piece (*c, c'*) of different curvature or an arch and chord connected together by means of metal rods (*e*) placed at equal distances apart from end to end and converging to the center of the curvature of the arch. In each division between the rods there are two diagonal braces (*d, d'*) each extending diagonally and in opposite directions from the top to the bottom arch piece and mortised into them at a distance from the rods about equal to one sixth of the width of each section, so that the rods at their junctions with the arch pieces become fulcrum for the arch pieces to transfer the strain from one brace to the next throughout the series. The first section at the end which rests on the abutment (*f*) has two diagonal braces (*d*) and the last at the other end which rests on the other abutment (*g*) has two braces (*d'*) to resist the greater strain which the ends of the arch have to sustain. The middle truss is formed of two arch trusses (*b, b*) constructed in the same manner as the outside trusses, but inclining toward each other at an angle of about (70°) from the vertical and united together at top in any desired manner. The outside arches may be further stiffened by an additional arch piece (*h*) of a curvature so much smaller than the arch pieces (*c, c'*) as to be connected at the abutments to the lower arch piece (*c*) and in the middle of the length of the bridge to the top arch piece (*c'*) and properly secured by pinning or bolting to the arch pieces (*c, c'*), and to the diagonal braces (*d, d'*). And the inside arches may be stiffened by a tension rod (*i*) connected at either end with the upper arch pieces and running along horizontally between the two inclined arches. The sleepers (*k*) are then placed on the bottom arch pieces (*c, c, c, c*), and two diagonal braces (*l, l*), are placed in each section formed by the sleepers and arch pieces to resist lateral horizontal strain, and over the sleepers are placed four more arch pieces (*m*) properly secured to the arch trusses (*a, a*) and (*b, b*) and to the sleepers.

On the sleepers may be placed four series of vertical posts (n), (the outside series being properly secured to the outside trusses (a, a)) and the tops of these posts sustain
5 the top rafters (o) on which may be placed the rails (p, p) of a rail road, a canal (q), or if desired a roof. That part of the rafters on which the rails (p, p) are laid is further supported by vertical posts (s) which
10 rest on the tops of the two middle arch trusses, and resist the jar consequent upon the passage of a train of cars.

The road ways (t, t) are made on the sleepers between the two outside and the
15 middle trusses.

It will be obvious that my first improvement may be employed independent of the other, and that my second improvement may also be applied to arch bridges constructed
20 with any system of bracing, although I prefer employing all my improvements together.

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

1. The method of bracing together the upper and lower arch pieces of the arch trusses, connected together with rods or posts, by connecting the ends of the braces with the arch pieces at a sufficient distance from the rods or posts and from each succeeding
30 brace to cause the parts of the arch pieces between the ends of the brace to act as levers to transfer the strain from one brace to another throughout the series, substantially as described.

2. And I also claim the method of sustaining the bridge against a lateral thrust by means of the two inclined trusses connected together at top, substantially as herein described.
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LOWMAN GAY.

Witnesses:

J. J. GREENOUGH,
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