

Hammond & Abbott,

Truss Bridge.

No 102,393.

Patented Apr. 26. 1870.

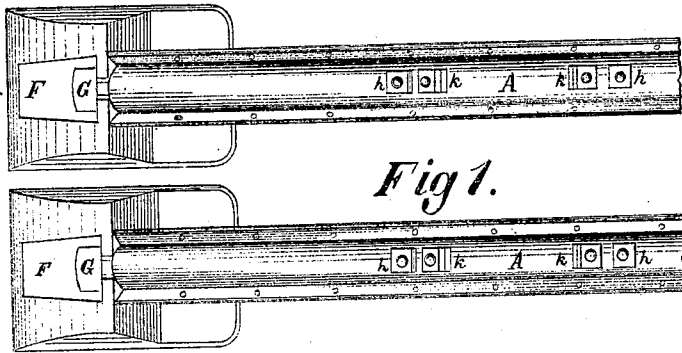


Fig 1.

Fig 3.



Fig 4.

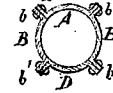


Fig 2.

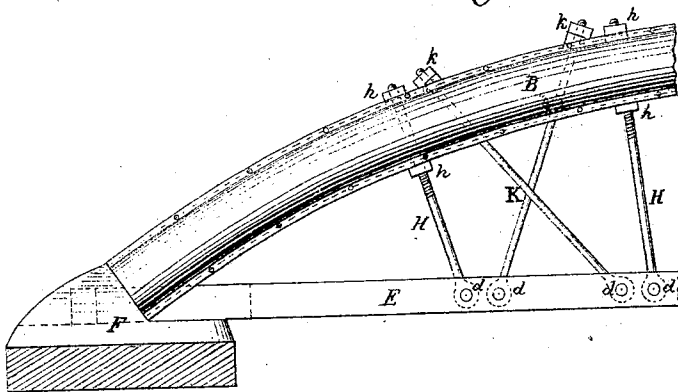
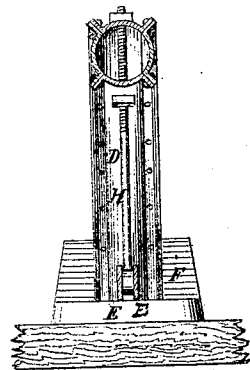


Fig 5.



J. P. Ok. Lang.
Fred. Arto's } *Witnesses*

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United States Patent Office.

DAVID HAMMOND AND JOB ABBOTT, OF CANTON, OHIO.

Letters Patent No. 102,393, dated April 26, 1870.

IMPROVEMENT IN TUBULAR ARCH-GIRDERS.

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

To all whom it may concern:

Be it known that we, DAVID HAMMOND and JOB ABBOTT, both of Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Tubular Arch-Girders; and we do hereby declare that the following is a full, clear, and exact description of that portion of the invention which we have designated as part B, reference being had to the accompanying drawings forming a part of this specification, and to the letters of reference marked thereon, of which drawings—

Figure 1 is a plan, showing two modifications of our girder.

Figure 2 is an elevation of the lower girder shown in fig. 1.

Figures 3 and 4 are cross-sections of the arches of girders shown in fig. 1.

Figure 5 is a cross-section of the girder shown in fig. 2.

The nature of our invention consists in the construction of a girder with an arch composed essentially of three pieces of rolled iron, each constructed with a curved or polygonal web with flanges at each edge, and a fourth piece of rolled iron, made either with a curved or polygonal web and edge flanges, or of an ordinary channel-bar section, said arch being combined with suitable arch-shoes, chords, posts, and tie-rods, so as to form a bow-string girder, thus enabling us to construct a light, cheap, strong, and durable girder for bridges or other structures of like character.

To enable others skilled in the art to make and use our invention, we will proceed to describe more fully its application and construction.

The central arch-piece A is formed with the web A of the circular cross-section shown, or of a polygonal or other cross-section closely approaching a circular section, if preferred, and has a flange, *a*, at each edge, as shown. These flanges may be inclined to each other at any angle less than one hundred and eighty degrees, as before stated; but it will be usually found convenient to have them inclined at some angle between sixty and one hundred and twenty degrees, the angles shown in drawings being ninety degrees. This arch-piece A is curved, to conform to the required shape of the arch, by bending it at right angles to the web A, as shown in figs. 2 and 5.

The side pieces B B are formed with the circular section shown, or a polygonal section, if preferred, and have the flanges *b b*, as shown. These arch-pieces B B are curved, to conform to the required curve of the arch, by bending them in, or nearly in, the plane of their webs, as shown, and they are united to the central piece A by riveting together the flanges *a b*, the flanges *b b* being arranged so as to fit up to

the flanges *a a* after the three pieces A B B have been curved, as before shown.

The angle between the plane of the flanges *b b*, after the side pieces B B have been united to the central pieces A, may be any angle less than one hundred and eighty degrees, as before stated, and will depend somewhat on the character of the arch required; for example, if the three arch-pieces of themselves have sufficient cross-section to sustain the crushing strain on the arch, and it were desired to simply unite the flanges *b b*, those flanges should be made so as to be parallel to each other, as shown in fig. 3, when they can be united by rivets, with thimbles placed around them, and between the flanges *b b*, in a manner readily seen.

If a small increase of cross-section is required, the channel-bar C may be introduced between the flanges *b b*, where it is secured either by two rows of rivets, one through each flange *b* and a flange of the channel-bar, or by a row of long rivets passing through both flanges *b b* and the flanges of the channel-bar, the first being the preferable method.

In order to bring more material to the sides of the arch, and thus stiffen it against lateral bending, the flanges *b b* may be placed out directly under the flanges *b b*, as shown in fig. 4, where they are united by the piece D, as shown, said piece being continuous or in pieces, according to the cross-section and stiffness required in the arch.

The general plan of construction for the arch having been thus described, the manner of completing the girder is readily seen.

The ends of the arch rest on shoes F, in which are formed seats for the heads, G, of one or more chords, E E, which unite the ends of the arch.

The posts H H are made with an eye at their lower ends, which is placed between the chords E E, where it is secured by a bolt, *d*, which passes through the chords and eye on the posts, as shown in fig. 2.

The upper ends of the posts pass through the pieces C or D, which unite the lower flanges of the arch-pieces B B, and through the central arch-piece A, and are secured by jam-nuts, *h h*, above and below the arch, as shown in figs. 2 and 5.

The tie-rods K, which form, with the posts H H, a system of vertical trussing, which prevents any vertical bending of the arch, are united to the chords E E by an eye and bolt, *d*, as shown in fig. 2; and their upper ends are passed through the central arch-piece A, where they are secured by nuts *k k*, resting on oblique washers, as shown.

It is readily seen that this construction of arch makes it very easy to unite the posts and tie-rods to the arch, as said posts and tie-rods pass squarely

through the bars C or D, or between the flanges *b' b'*, and through the center of the central arch-piece A, as shown.

Having thus fully described our invention, we do not claim the construction of a girder having a tubular arch composed of two channel-bars with flat or plane webs and edge flanges and two flat plates, as this has been before shown; but

What we do claim herein as new and of our invention, and desire to secure by Letters Patent, is—

1. The combination of the tubular arch, composed of the three arch-pieces B A B, of rolled iron, with curved or polygonal webs and edge flanges, and the channel-bar C, arch-shoes F F, chords E E, posts H H, and tie-rods K, the whole forming a bow-string girder, substantially as is herein specified.

2. The combination of the tubular arch, composed of the four arch-pieces A B B D, of rolled iron, with curved or polygonal webs and edge-flanges, arch-shoes F F, chords E E, posts H H, and tie-rods K; the whole forming a bow-string girder, substantially as is herein specified.

As evidence that we claim the foregoing, we have hereunto set our hands in the presence of two witnesses this 28th day of June, 1869.

DAVID HAMMOND.
JOB ABBOTT.

Witnesses:

J. P. TH. LANG,
FRED. ARTÓS.