2 Sheets--Sheet 1.

J. B. EADS.

Iron Bridge Foundations.

No. 142,382. Patented September 2, 1873.

Fig. 1.

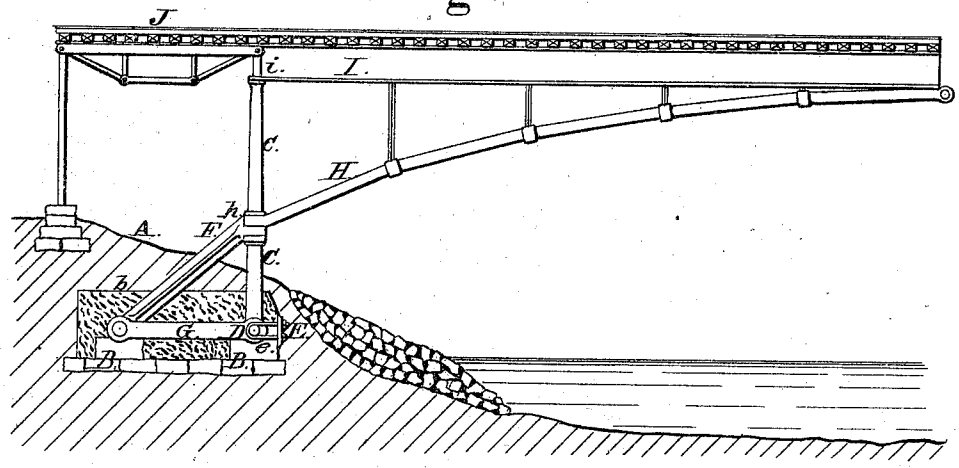
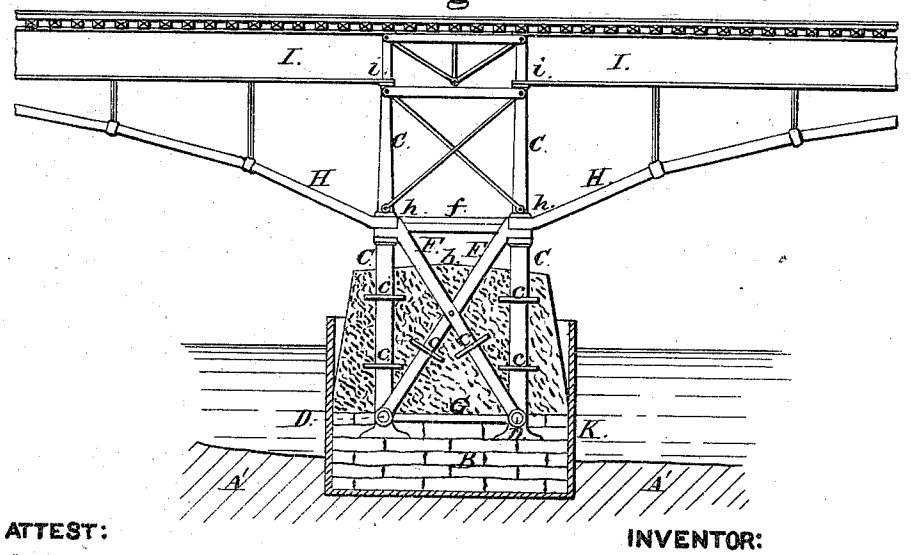


Fig. 2.



ATTEST:

Walter Allen

Henry F. Farmer

INVENTOR:

James B Eads

By Knight Bros

Attys.

2 Sheets--Sheet 2.

J. B. EADS.

Iron Bridge Foundations.

No. 142,382. Patented September 2, 1873.

Fig.3.

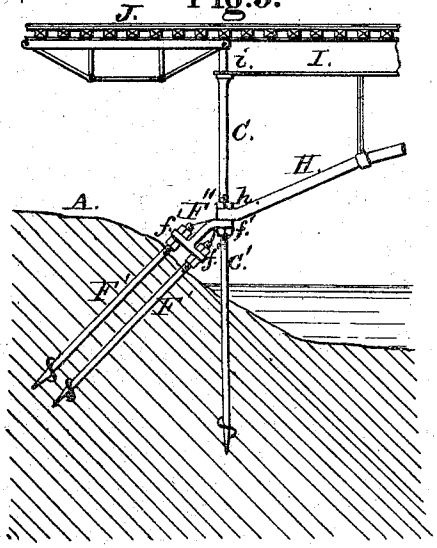


Fig.4.

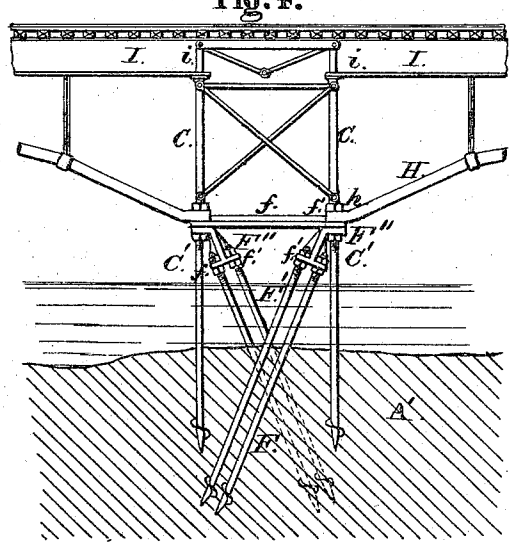


Fig.5.

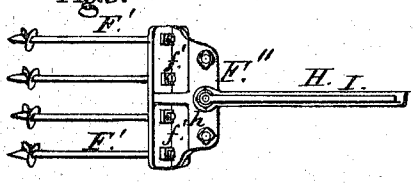
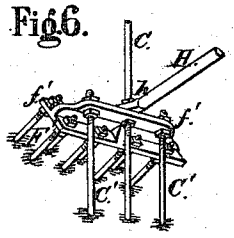


Fig.6.



ATTEST:

Walter Allen

Henry F. Farmer

INVENTOR:

James B. Eads

By Knight Bros

Attys.

UNITED STATES PATENT OFFICE.

JAMES B. EADS, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN IRON-BRIDGE FOUNDATIONS.

Specification forming part of Letters Patent No. **142,382**, dated September 2, 1873; application filed May 14, 1873.

To all whom it may concern:

Be it known that I, JAMES B. EADS, of St. Louis, St. Louis county, Missouri, have invented a certain Improvement in Bridge-Foundations, of which the following is a specification:

My improvement consists in the construction of the abutments and piers of arched bridges, whereby their cost may be greatly reduced. It relates to the manner of constructing the abutments or piers by which the bridge-arches are to be secured and upheld; and consists of two methods, either or both of which may be used on any bridge, according to the special requirements of the case: By the first, iron pillars, anchor-plates, and braces are secured and embedded in masonry or concrete to supply the necessary weight to resist the strains of the arches, and to bear their vertical pressure; by the second, metallic screw-piles form the medium of support and attachment to the earth, these being so placed and combined as to securely hold the arches.

In the drawings, Figure 1 is a side elevation of part of a bridge, exhibiting my improvement, with the abutment in vertical section, showing a vertical metal column, braces, and anchor-plates, constituting the metallic structure supporting one end of the arch, the pillar C bearing the weight of the arch, and the diagonals F the thrust of it. Fig. 2 is a like view, showing my improvement applied to a pier. Fig. 3 shows a modification, intended for a bridge of smaller span and cheaper construction. In this form the abutment or pier consists of vertical and oblique screw-piles, fixed in the bank or bottom of the river. Fig. 4 shows the screw-pile system as applied to a pier in the river. Fig. 5 is a top view, and Fig. 6 a perspective view, of the abutment shown in Fig. 3.

A is the river bank. B is a masonry foundation, whose upper portion *b* may be of concrete or other suitable weighty material. C is an upright pillar, to which the end of an arched rib is directly connected. In the connection shown the end of the rib is pivoted on the upright C. The pillars C stand in a line or series transverse to the bridge, and are secured together by suitable connections. G is a horizontal connecting-strap to join the pillars at their bases with the lower ends of diagonal braces F. These braces receive the severest strains in the structure, and these straps transmit the horizontal component of these strains to the anchor-plates E, Fig. 1, and thus cause the entire abutment to resist by its weight any horizontal force in the direction of the thrust of the arch. In Fig. 2 the same end is accomplished by joining the bases of the pillars against which the diagonals rest together with the strap G, thus bringing the weight of both pillars, and that of the masonry also, to resist the thrust conveyed by either diagonal. When the arches on both sides of the pier, Fig. 2, are equally loaded, this thrust will be equally balanced in the diagonals, if the arches are of equal span and weight; but when one only is loaded, the thrust in one diagonal will exceed that in the other, and create an increased tendency to move the base of the pillar. The anchor-plate E rests against the front of the masonry in Fig. 1, and is connected by a strap, *e*, to the transverse bar or pin D in the pillar C. There may be one or more of these stay-straps *e* to each pillar C, the said straps bringing the thrust of the arch onto the anchor-plates, and thus against the whole body of the masonry in Fig. 1. H is the arched member of the rib, and is shown pivoted at *h* to the pillar C. I is the upper member or truss of the rib, and is shown pivoted to the top of the pillar C at *i*. J is a part of the bridge approach.

In Fig. 2, K is a caisson of a river pier, having foundation in the river bottom A′. B *b* is the masonry. The braces F extend from one pillar at the arch-pivot to the base of the other pillar, and at their upper ends is a strut, *f*, extending from head to head of the diagonal braces. The pillars C are connected together transversely by any suitable braces and ties; but these constitute no part of my improvement, and would only appear on a sectional drawing. In this figure are shown anchor-plates or collars *c*, cast or secured on the pillars and diagonals, and embedded in the masonry to give them a firm hold therein.

Figs. 3, 4, 5, and 6 show a modification, intended more especially for bridges of lighter and cheaper construction. In these the pressure of the arch is resisted by piles C′ and F′,

which are screwed into the bank A and bottom A′ of the river. The connection between the piles and bridge is made by a suitably-formed skew-back or abutment plate, F″, through which the piles pass, and to which they are firmly secured by nuts *f′* above and below the plate. The pillar or upright C in this case may pass vertically through the skew-back plate, as shown, and its lower end may constitute one of the screw-piles C′, as shown; or it may be secured to the skew-back in any suitable manner; or it may be firmly secured to the rib H I, and its lower end turn in the skew-back plate to form the step-pivot to the rib.

In the drawings is shown only a single half-rib, which sufficiently exhibits my invention, as it relates to the manner of constructing the piers and abutments, and not the arches.

I claim as my invention—

1. The combination of the pillars C, diagonal braces F, connecting-straps G, and anchor-plates E, for the purposes described, and substantially as shown in the drawings, Figs. 1 and 2.

2. The arched rib H, pillar C, and diagonal F, connected together at *h*, in the manner herein shown and described.

3. The collars *c* on the pillars and diagonals, substantially as described, and for the purpose set forth.

4. The combination of the pillars C and diagonals F, substantially as and for the purpose set forth.

JAS. B. EADS.

Witnesses:

SAML. KNIGHT,

ROBERT BURNS.