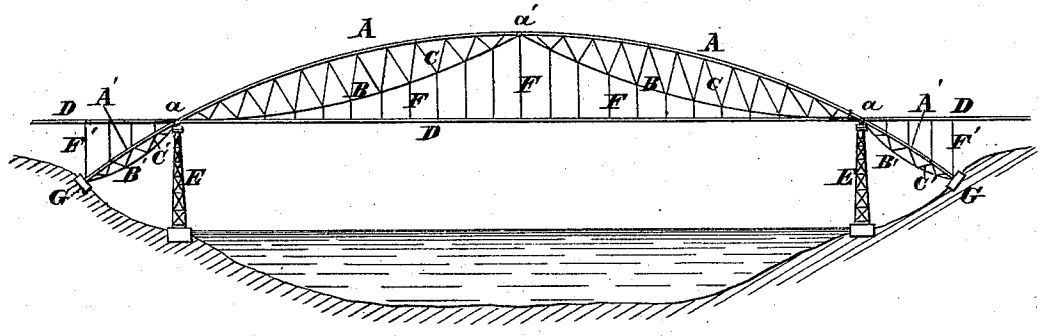
J. B. EADS.

METALLIC ARCHED TRUSS-BRIDGE.

No. 169,791. Patented Nov. 9, 1875.



WITNESSES

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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN METALLIC ARCHED TRUSS-BRIDGES.

Specification forming part of Letters Patent No. **169,791**, dated November 9, 1875; application filed October 21, 1875.

To all whom it may concern:

Be it known that I, JAMES B. EADS, of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improvement in Bridges, of which the following is a specification:

My invention relates to a system of bridge construction described in Letters Patent No. 142,381, granted to me on the 2d day of September, 1873, and reissued on the 25th day of May, 1875, in which I have described and claimed the construction of a bridge-span of two arches constituting half-spans, and connected together end to end, each of the said half-spans being strengthened by a system of bracing under or on the concave side of the arch.

My present improvement consists in prolonging or extending the arches landward beyond the abutment-joints, and downward nearly or quite to the earth, so as to reduce the quantity of the masonry on which to receive the thrust of the arches, and the cost of the abutments of the span.

The accompanying drawing is an elevation of a bridge-frame illustrating my invention.

The arches A A, inverted arches B B, and brace-work C C, may be constructed substantially as described in my Letters Patent hereinbefore referred to. These members, constituting the two half-spans, will be connected by hinged joints at *a a a* to the arch-extensions A′ A′, and at the center of the span by the hinged joints *a′*. D represents the roadway connected to the arches by vertical suspension-rods F; or this may be supported by struts on the arches, if the roadway be placed above the arches.

The arch-extensions A′ A′ may be of any suitable form and construction to sustain the thrust of the two half-arches constituting the span, and they may be arched or trussed to support the roadway D, as shown in the drawing.

G G are the abutments sustaining the entire arched structure, and if the main arch A A and its extensions A′ A′ are in the form of a parabola, the center of pressure will pass through the joints *a a* directly to the abutments G G, and no vertical strain will be put upon the columns E E if the bridge be either unloaded or equally loaded from end to end of the entire structure.

With an unequal load vertical strains will occur in the columns, compressive ones on the loaded side, and tensile or upward strains in the columns under the unloaded side. These will be very small, however, compared with the total weight of the span and its load, and therefore these columns will require very little material in their construction.

By slightly increasing the distance, as determined by the parabolic curve, between the abutments G G the line of pressure may, under all conditions of unequal loading, remain in or below the arch-extensions A′ A′, and then compressive strains only will occur in both columns. If this is not done the columns may require to be anchored down to restrict the tensile strains.

The arch-extensions A′ may be strengthened and supported on the under side by inverted arches B′, and brace-work C′, or by any suitable form of trussing.

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

The combination of the arch-extensions A′ A′ with the columns E E, the joints *a a*, and the half-span arches A A, substantially as and for the purposes set forth.

JAS. B. EADS.

Witnesses:
OCTAVIUS KNIGHT,
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