J. Beard.

Truss Bridge.

No. 41,594. Patented Feb. 16, 1864.

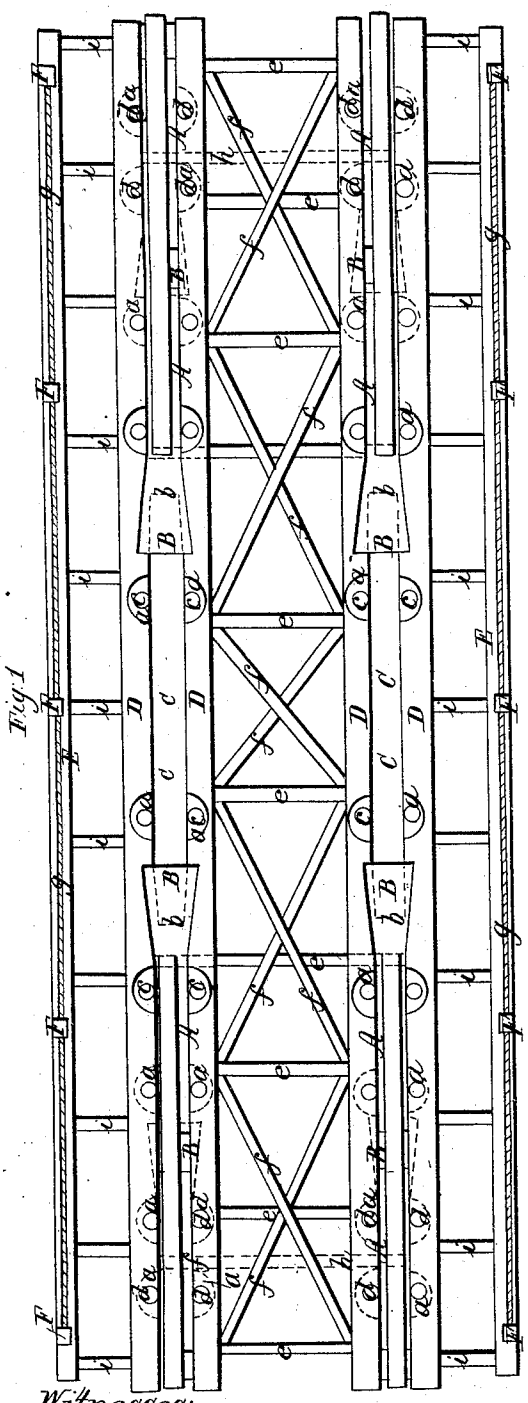

Fig. 1

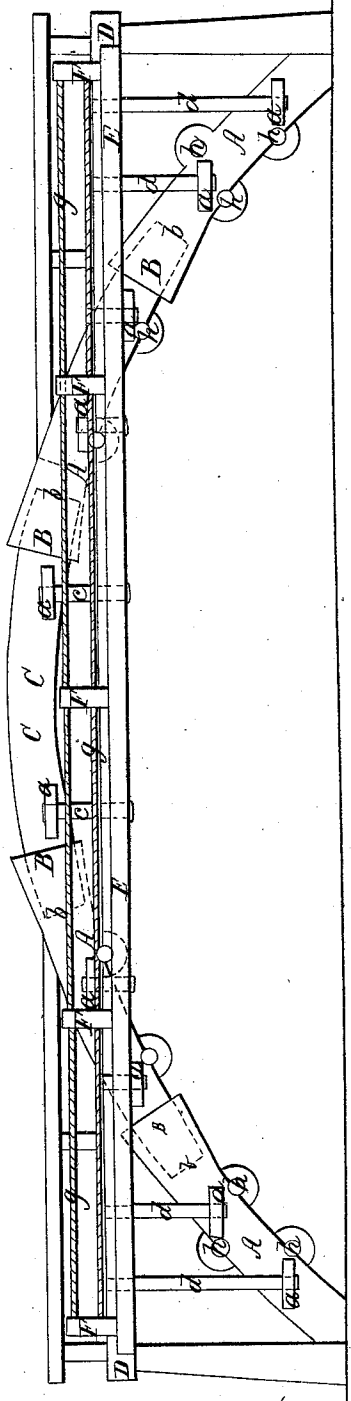

Fig. 2

Witnesses;
J. B. Woodruff
Edw. F. Brown

Inventor;
James J. Beard

UNITED STATES PATENT OFFICE.

JAMES J. BEARD, OF COLUMBUS, OHIO.

IMPROVEMENT IN IRON BRIDGES.

Specification forming part of Letters Patent No. **41,594**, dated February 16, 1864.

To all whom it may concern:

Be it known that I, JAMES J. BEARD, of Columbus, in the county of Franklin, State of Ohio, have invented new and useful Improvements in the Mode of Constructing Iron Bridges, which I call the "Jointed Iron-Arch Bridge;" and the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a plan or top view of section or span of the bridge. Fig. 2 shows a side elevation, or a single arch in segments which support the structure.

My invention consists in the construction of the arch, made of cast-iron bars or segments, each having a socket in one end to receive the other end of a segment, the same having cast therewith, upon their sides, knobs or ears, upon which the stringers are secured, and entirely supports the structure and the weight passing over it.

To enable others skilled in the art to make my improved jointed iron-arch bridge, I will describe it more fully, referring to the drawings, and to the letters of reference marked thereon.

The segments A A A A, which being put together, form the arch of a span of any desired length. The sections are made of cast-iron, in such lengths that they can be transported and put up in their places with facility, one end of the segments being enlarged, so as to retain their strength, while they admit of sockets B B B B being cast in, of such dimensions that the lower end of the segment *b b* will fit in to a considerable depth, so that a strong joint is made and becomes more firm by its own weight and the weight put upon it.

The number of joints or segments to be used will depend upon the span of the bridge and the height of the arch.

The center piece or crowning-stretcher C C is made to fit into the sockets B B at both ends, thus, as it were, forming the keystone of the arch.

On the sides of the segments A A, and on the center piece, C C, are protuberances or bosses *a a a a a*, on which the sills or stringers D D are supported by strong hanging bolts *c c c c c*, their length varying according to their places on the arch, and also by having standards or stiff bolts *d d d d* at the ends where the sills or string-pieces D D come above the flanges of the arch, the sills D D and the whole platform of the bridge being placed at such a height on the jointed arches as to about equally divide the distance that is supported on the hanging bolts *c c* in the center of the arch, and the standards *d d* at or nearer the ends of the bridge. Thus the weight and pressure are equalized on each segment, or the several pieces of which the jointed iron arches are composed. The string-pieces or sills D D being thus securely fastened to the arches, ties *e e e e* and the braces *f f f f f f* are put in and secured in the ordinary manner, thus making the foundation for a railroad-track or the floor for a wagon-road. The arches are secured and fastened together underneath the bridge by iron rods *h h h*, extending across the width of the bridge. To the sills D D, outside of the arches, may be framed in sleepers or iron bars *i i i i*, with an outside sill, E E, secured to their ends, on which posts F F and guards *g g* are placed for the purpose of sidewalks over the bridge.

One of the peculiar advantages of my mode of constructing iron arches for railroad and other bridges is that there is much less strain on any of the parts, caused by the expansion or the contraction of the metal by heat and cold, and although the structure appears to be as firm as though it were made of one casting, yet the rigidity does not prevent the vibration necessary to counteract the shock of a heavy weight coming suddenly upon it, and the vibration suddenly ceases.

It is generally admitted by those who have observed and studied the subject of iron for bridges that the long-continued vibration of the metal is the cause of its losing its tension and strength by becoming granulated.

It is a well-known fact in mechanics that the metals put together with joints will emit no sound, and consequently there is no continued vibration. To illustrate, a bell being cracked to any extent loses its vibration, the

crack being equivalent to an opening or joint, no matter how close the parts or surfaces come together.

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

The arrangement and combination of the segments A A, having bosses *a a a* on both sides with which to connect the bolts *c c*, and the pillars *d d*, for securing the beams or string-pieces D D and supporting the structure, in the manner as and for the purposes specified.

JAMES J. BEARD.

Witnesses:

J. B. WOODRUFF,

EDM. F. BROWN.