

J. GROVES.

Metallic Arches for Tunnels, &c.

No. 140,498.

Patented July 1, 1873.

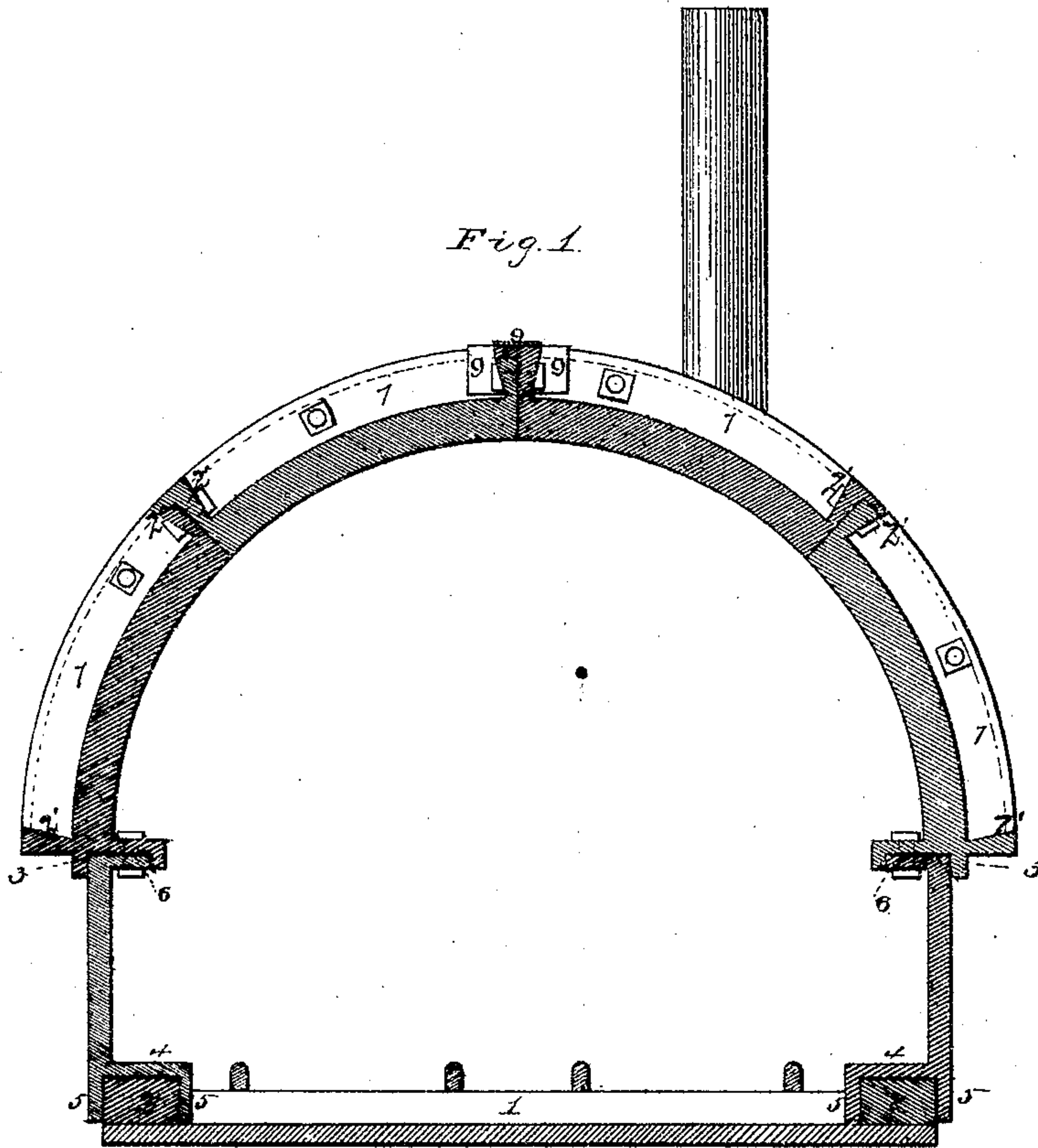


Fig. 2.

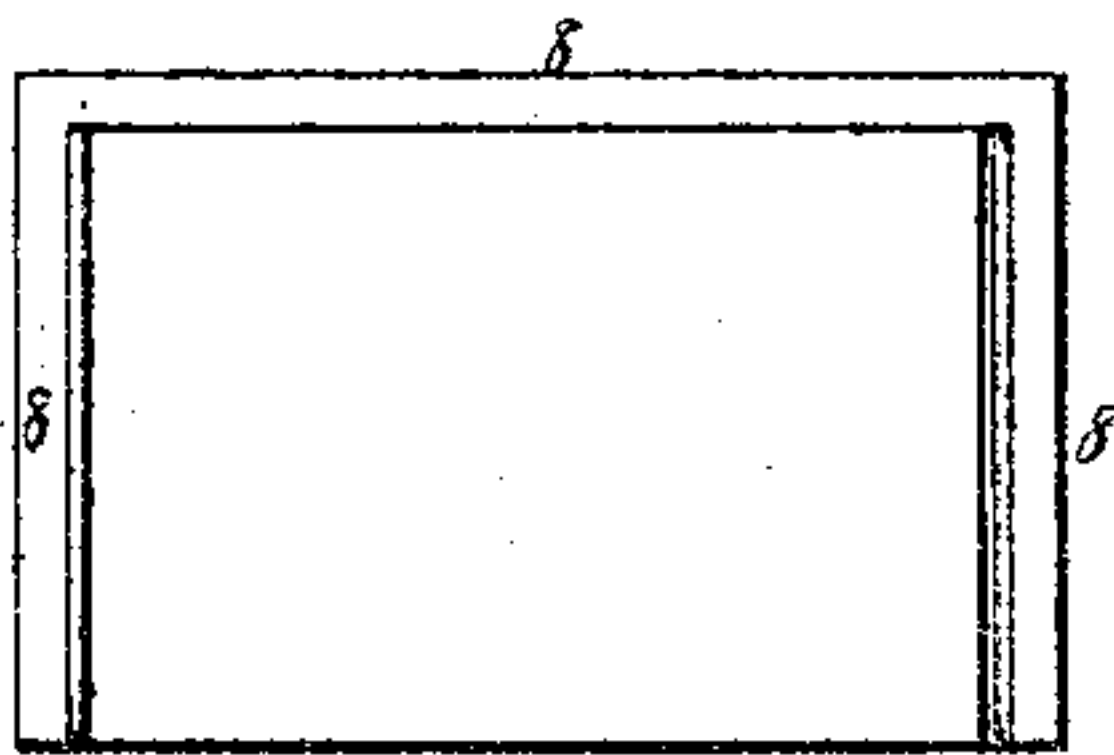
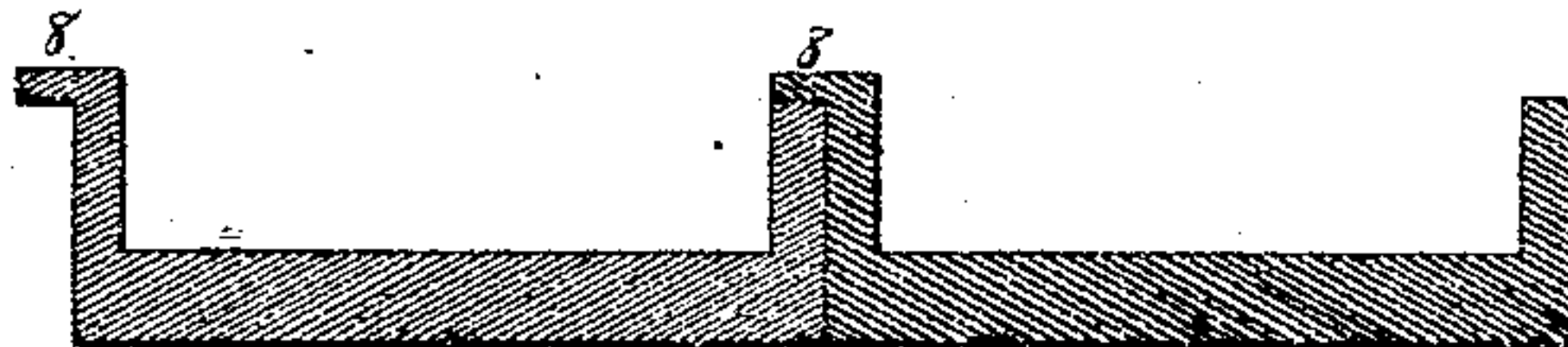


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JOSIAH GROVES, OF ELLICOTT CITY, MARYLAND.

IMPROVEMENT IN METALLIC ARCHES FOR TUNNELS, &c.

Specification forming part of Letters Patent No. **140,498**, dated July 1, 1873; application filed May 31, 1873.

To all whom it may concern:

Be it known that I, JOSIAH GROVES, of Ellicott City, in the county of Howard and State of Maryland, have invented certain new and useful Improvements in Arches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

The nature of my invention relates to an improvement in the construction of arches to be used for tunnels, buildings, sewers, and all other purposes; and it consists in the construction of flanged sections, which can be put together so as to form an arch without the trouble of erecting centers or frame-work upon which to build. It also consists in the construction of details, which will be more fully described hereafter.

Figure 1 is a vertical cross-section of my arch. Fig. 2 is an inverted view of one of the flanged sections. Fig. 3 is a longitudinal section of two of the sections.

1 represents the road-bed of a railroad, upon each side of which is erected the foundation-wall 2 of masonry. If so desired, this wall may be extended on up to the point 3 at which the arch begins; but I prefer that these side walls should be made entirely of iron and put together in sections, being provided with the shoulder 4 and downward-projecting flanges 5, which straddle the top of the foundation-wall 2, and a flange, 6, on top, to which the bottom section of the arch is bolted. These iron sections will be found to be much cheaper, and can be put up and secured in position as rapidly as the tunnel progresses, and are much to be preferred. The arch consists of any desired number of cast-iron sections, having the upward-projecting flanges 7, through which the bolts pass for securing the sections together, and the flanges 8 parallel with the body of the section, which lap over the other sections for the double purpose of supporting the sections in position and closing the joints, where they come together, so as to prevent leakage.

In erecting the arch it is necessary to erect only a single center at the beginning, upon which the first line of sections is secured, and

then all the other sections require only to be hoisted into position, and the flanges 8, overlapping those already up, will hold the sections in place, without any further fastenings, in any form. In order to make them doubly secure, however, bolts are passed through the flanges 7 and a coupling, 9, of any desired construction, passed over the top of flanges wherever three or four come together. Upon the sides of the arch only three of the flanges meet at any one point, as the joints are broken as much as possible; but in the center of the arch four meet at the end of every section.

As the space on top of each section between the flanges 7 is intended to be filled in with mortar, cement, or brick-work so as to make the arch as thick and solid as possible, where these flanges extend straight outward, on a line from the center, any pressure which comes upon this filling and is not equally distributed over the whole of it tends only to crowd it outward at the edges. In order to obviate this I construct the flanges with a bevel, 2', which projects inward over this filling, so that any uneven pressure only tends to pack it solidly under this projection.

Through the sections, at any desired point, an opening may be made, and which will extend on upward to the surface, through which the smoke and gas from the locomotives can escape.

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

1. An arch composed of cast-iron sections, provided with overlapping flanges 8, which rest upon the top of the raised flanges 7, and serve to support the sections in position without the aid of bolts, and to prevent leakage, substantially as shown and described.

2. The side walls, consisting of iron sections provided with the shoulder 4 and flanges 5 6, substantially as set forth.

3. The inwardly-beveled flanges 7 2', in combination with the cast-iron sections, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of May, 1873.

Witnesses: JOSIAH GROVES.

F. A. LEHMAN,
W. G. KENDIG.