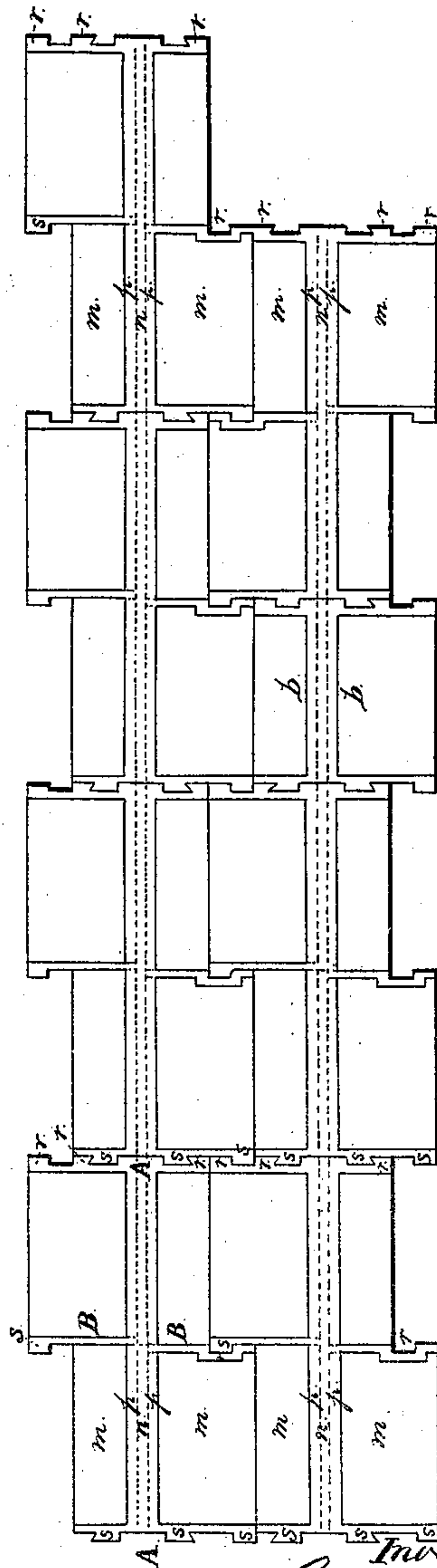
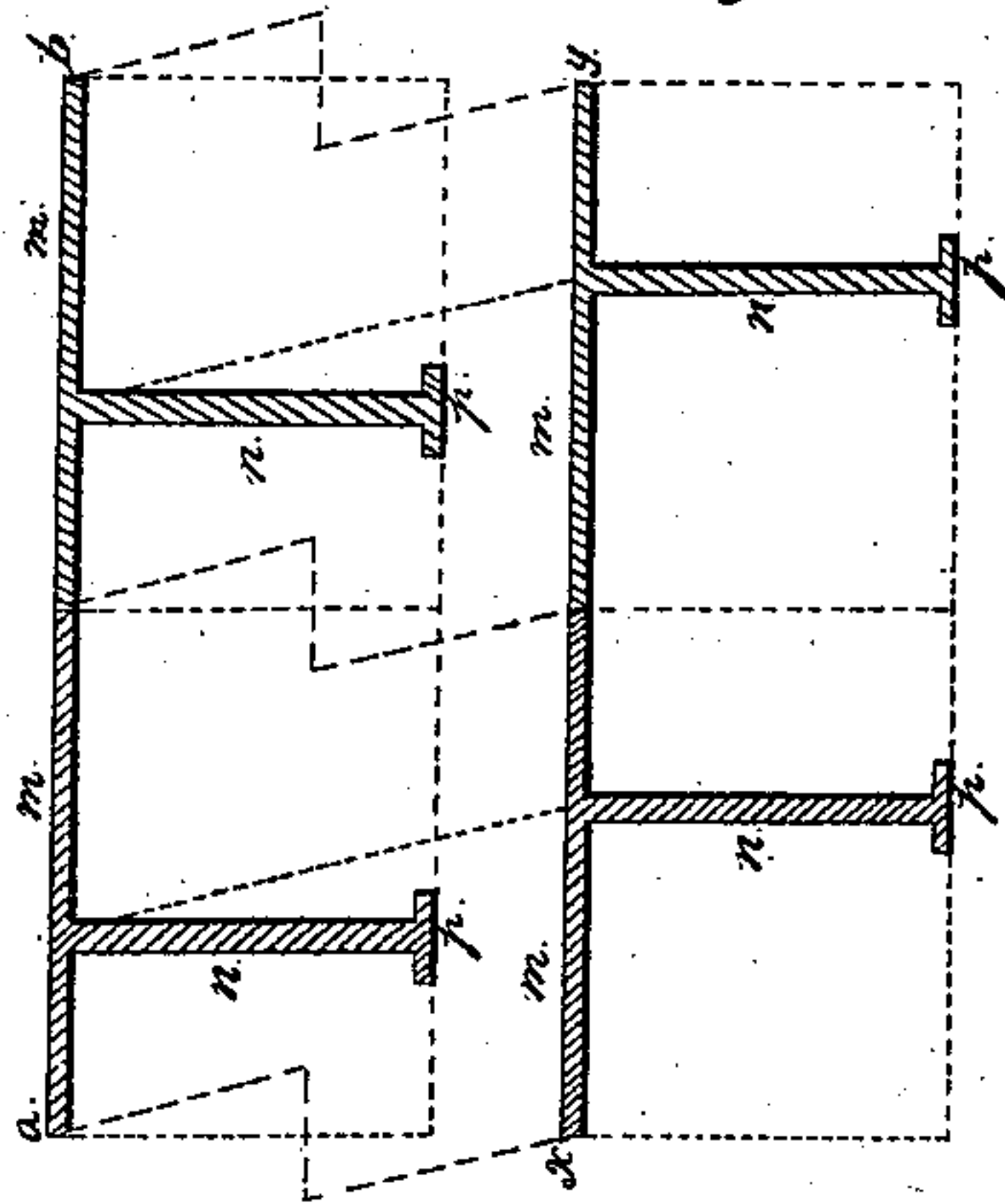
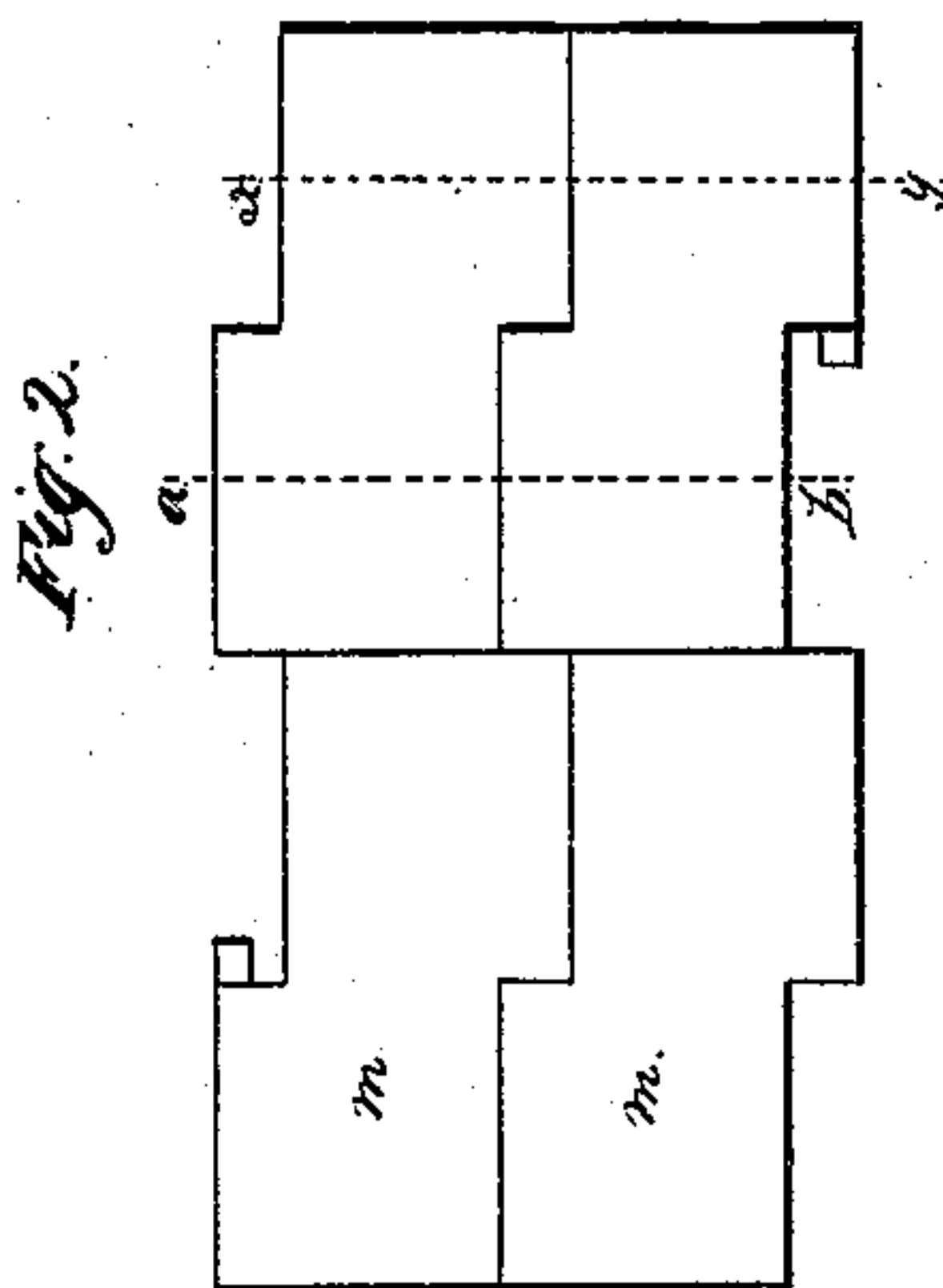
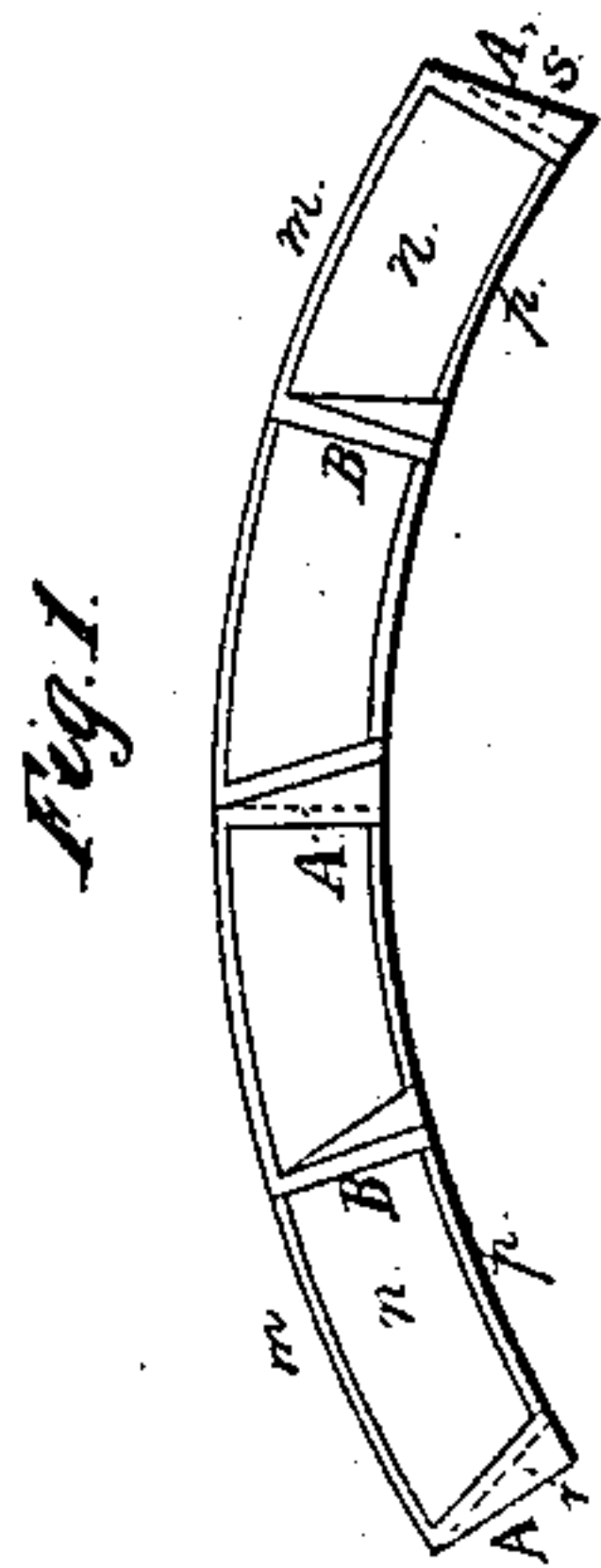
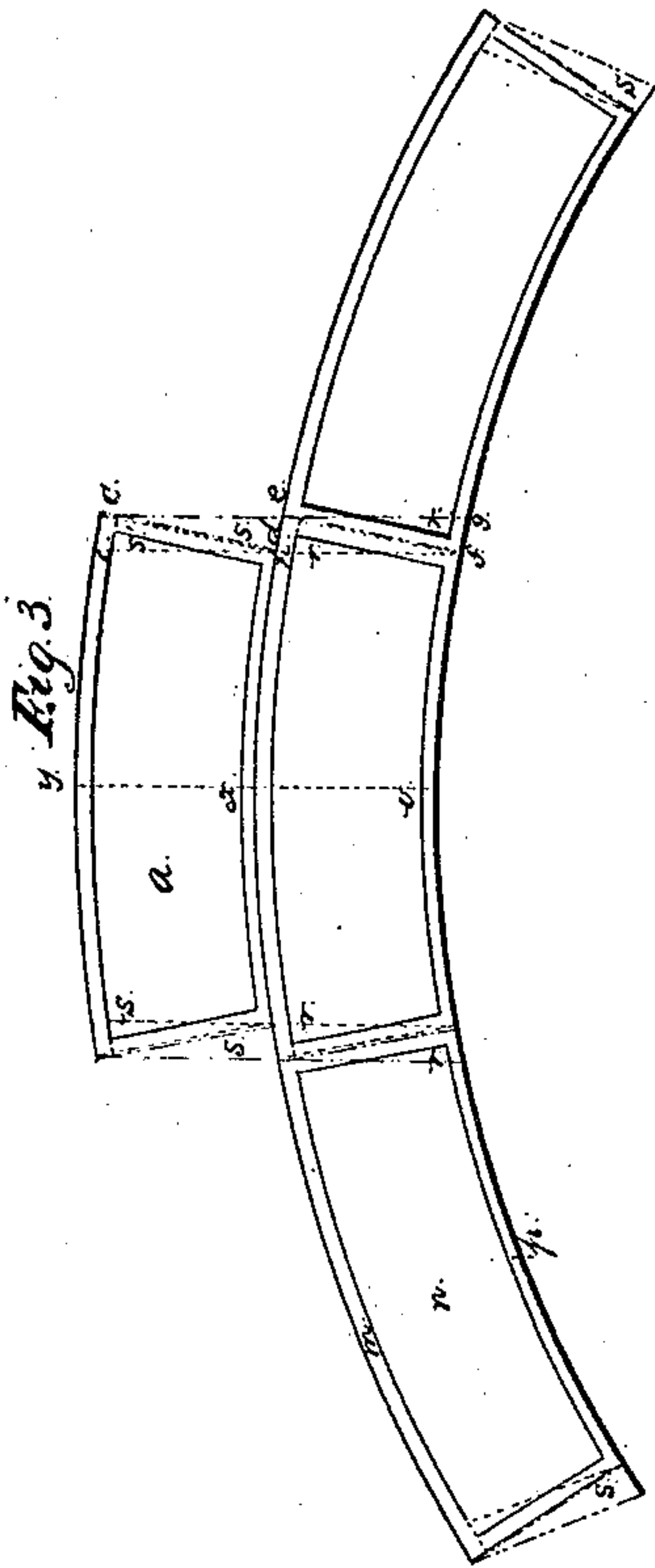


G. T. Lape. Truss Bridge.

N^o 77,741.

Patented May 12, 1868.



Witnesses
Peter Van Antwerp
Thomas Van Antwerp

Inventor.
Geo. T. Lape

United States Patent Office.

GEORGE T. LAPE, OF SUMMIT, NEW YORK.

Letters Patent No. 77,741, dated May 12, 1868; antedated April 28, 1868.

IMPROVEMENT IN BRIDGES.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE T. LAPE, of Summit, in the county of Schoharie, in the State of New York, have invented a new and useful Improvement in the Construction of Bridges, Culverts, Tunnels, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, enabling others skilled in the art to make and use the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical projection or side view of two sections or voussoirs.

Figure 2, a horizontal projection or plan of the same.

Figure 3, in which a being taken as the key of the arch, shows the principle of combining the sections or voussoirs by means of dove-tails, tongues, and grooves.

Figure 4 shows an under view or development of several sections or voussoirs combined.

Figure 5 represents cross-sections on $a b$ and $x y$.

Similar letters are used to represent similar parts throughout.

The object of my invention is to provide a convenient and economical means of constructing bridges, culverts, and arches, and consists—

First, in preparing a series of sections or voussoirs which, when put together, as hereinafter described, will form the desired arch; and

Second, in providing a means to secure the several sections together.

Having determined the dimensions and form of the arch which it is desired to construct, I cast as many of the sections $m m$ as may be found necessary for the purpose of forming such arch, each section, of course, being cast in such form that when they are secured together in their respective proper relative positions, the desired arch will be produced.

The sections or voussoirs may be of any convenient length or breadth, and the several parts of any desired thickness, all of which is to be determined by the various uses to which they are to be applied, and the required strength or capacity of the structure; each voussoir or section having two abutting ends, $A A$, an irregular top plate or flange, m , in the form shown in fig. 2; a cross-plate, B , running across the entire section; a longitudinal rib, n , and a bottom longitudinal flange, P , all cast, from iron or other suitable metal, in one piece. The top plate or flange is jagged each way, at the centre cross-plate, about one-fifth of its breadth, so that the abutting longitudinal joints may be broken, as shown in fig. 2, and the centre cross-plate is grooved or tongued in the space left by the jogs, so that the tongue or groove of a corresponding part of an abutting section may be secured to it.

The top plate or flange, therefore, in all cases where the whole space is to be covered by it, will present the irregular or jagged longitudinal lines, shown in said figure, while the rib n and lower flange P are cast to such irregular top plate or flange in such position that they will always form a continuous straight line throughout, but the top plate or flange m may be varied in width according to the uses to which the sections are to be applied.

For railroad-bridges this top plate or flange need be no wider than the lower flange, the two flanges, with the rib, forming as it were an I-rail, but for tunnelling or light purposes the top plates or flanges should, when combined, extend all the way across the structure.

The centre cross-plate is employed for the several purposes of adding strength, breaking joints, and assisting in locking the sections and segments together.

Fig. 3, which although with its lines and letters more particularly refers to the key-section of the arch, shows the principle of the construction of the tongues, grooves, and dove-tails on the several sections, and the general manner of abutting and securing the sections to each other. This section, whose central radial line, $x y$, is brought to coincide with $x v$ prolonged, ($x v$ being its position when in place in the arch,) is moved down in a direct line into its required position, while the tongues $s s$, on its radial abutting ends, fitting into corresponding grooves $r r$ in the radial abutting ends of the adjacent sections, secure it in its true position. The triangle

e d e or wedge-shaped tongue projects from, and the triangle or wedge-shape groove *e f g* recedes into the radial abutting ends of adjacent sections. The triangles *h e f* and *d i c* show a reverse case, while the rectangles *c i d e* and *e f h g* combine the two cases, and form regular prismatic tongues and grooves, respectively projecting from or receding into the radial abutting ends of the section. The positions of these tongues *s s s* and grooves *r r r* in the abutting ends and cross-sections of the various sections are clearly shown in fig. 4, as they appear respectively cast in and upon the abutting ends of the sections, and at abutting portion of the centre plate, some of them showing the form of the ordinary tongues and grooves, and others in the form of dove-tails.

In fig. 4, the half section *b* is introduced to show the manner of breaking the cross-joints in the structure. To effect this, the right-hand abutting end of *b* has the order of its grooves reversed, as will be seen by comparing it with the right-hand abutting end of the adjacent left-hand section, and this order of reversal of tongues and grooves will be necessarily continued where a half section is introduced for a similar purpose.

The abutment or mason-work being in readiness, with a proper skew-back grooved to receive the tongues of the sections in place, the construction is commenced at each end of the arch by first securing a section to each skew-back. This is done by slipping the tongues of the section in the grooves of the skew-back, then uniting to these respectively section by section until the whole is ready for the key-section, which is then hoisted above the open space left for it, as shown in fig. 3, and lowered in place, the abutting ends travelling in the direction hereinbefore stated, and clearly shown in said last-mentioned figure.

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

1. The construction of sections or voussoirs, consisting of abutting ends, flanges, rib, and cross-plate, with tongues, grooves, and dove-tails, all arranged substantially as and for the purposes specified.
2. The construction of bridges, arches, &c., by combining a series of sections or voussoirs, and securing them to each other, substantially as herein specified.

The above specification of my invention signed by me, this 15th day of June, 1867.

GEO. T. LAPE.

Witnesses:

PETER VAN ANTWERP,
THOMAS VAN ANTWERP.