

No. 653,118.

Patented July 3, 1900.

J. N. QUINN.
FURNACE.

(Application filed Feb. 15, 1900.)

(No Model.)

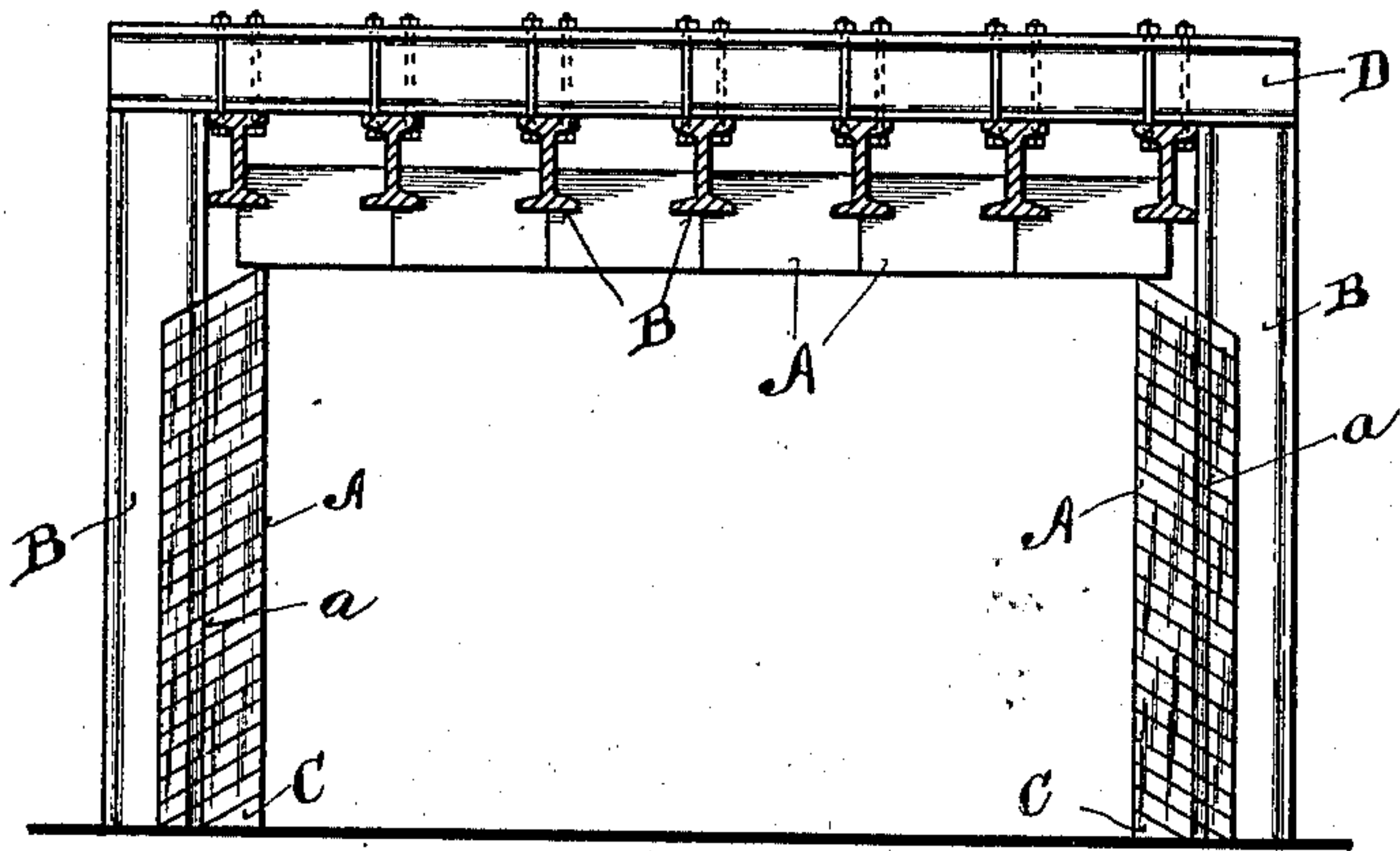


Fig. 1.

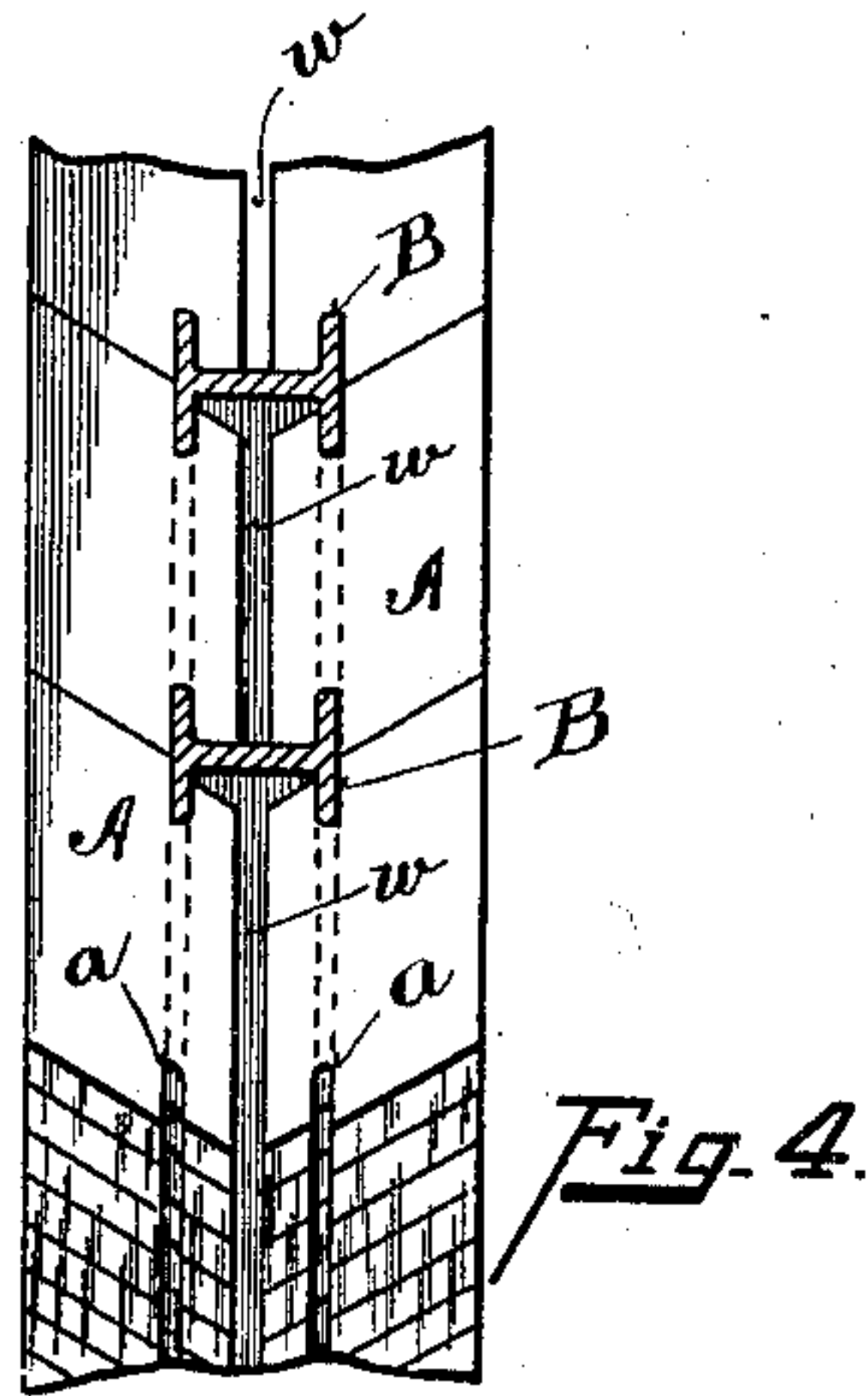


Fig. 4.

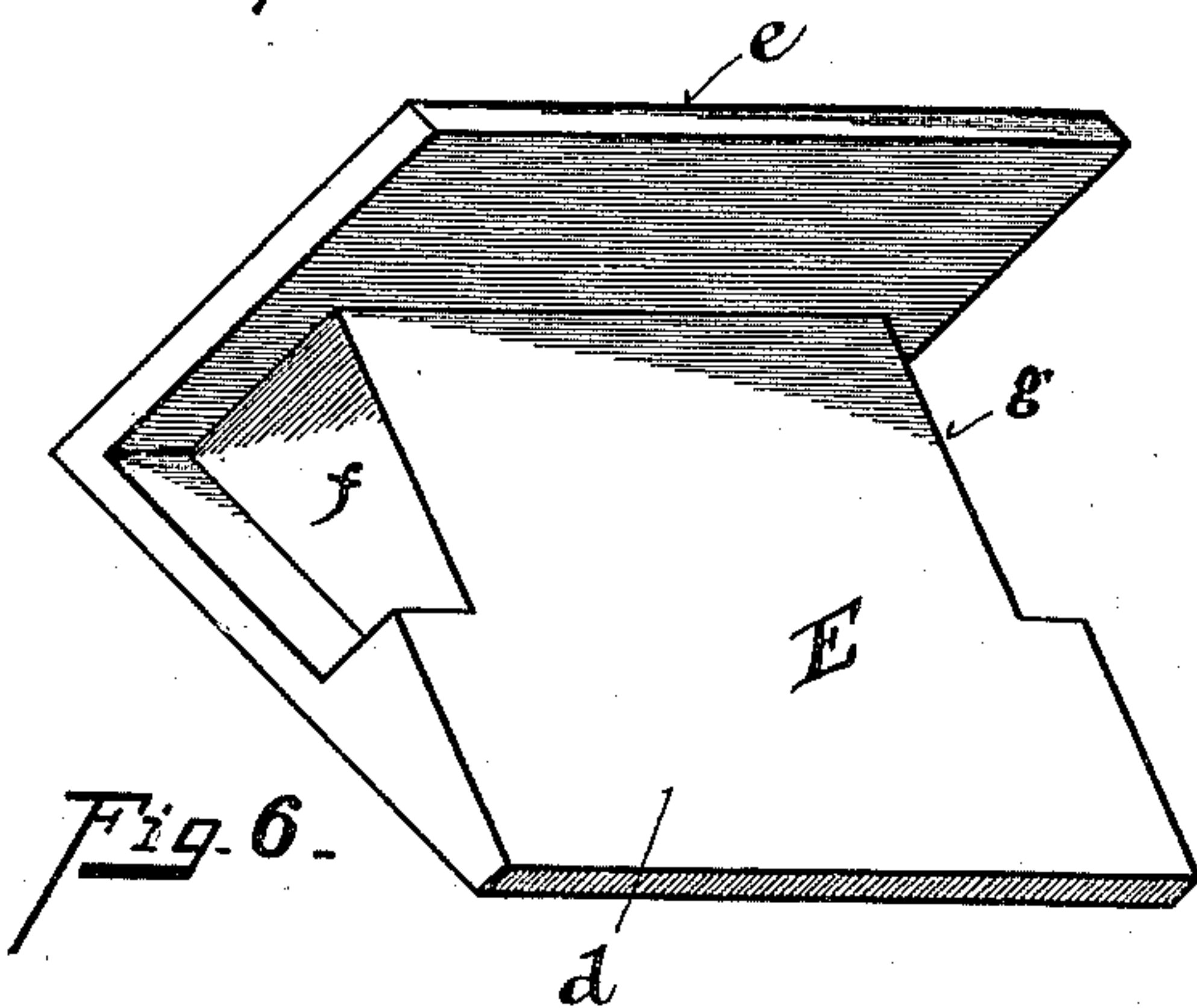


Fig. 6.

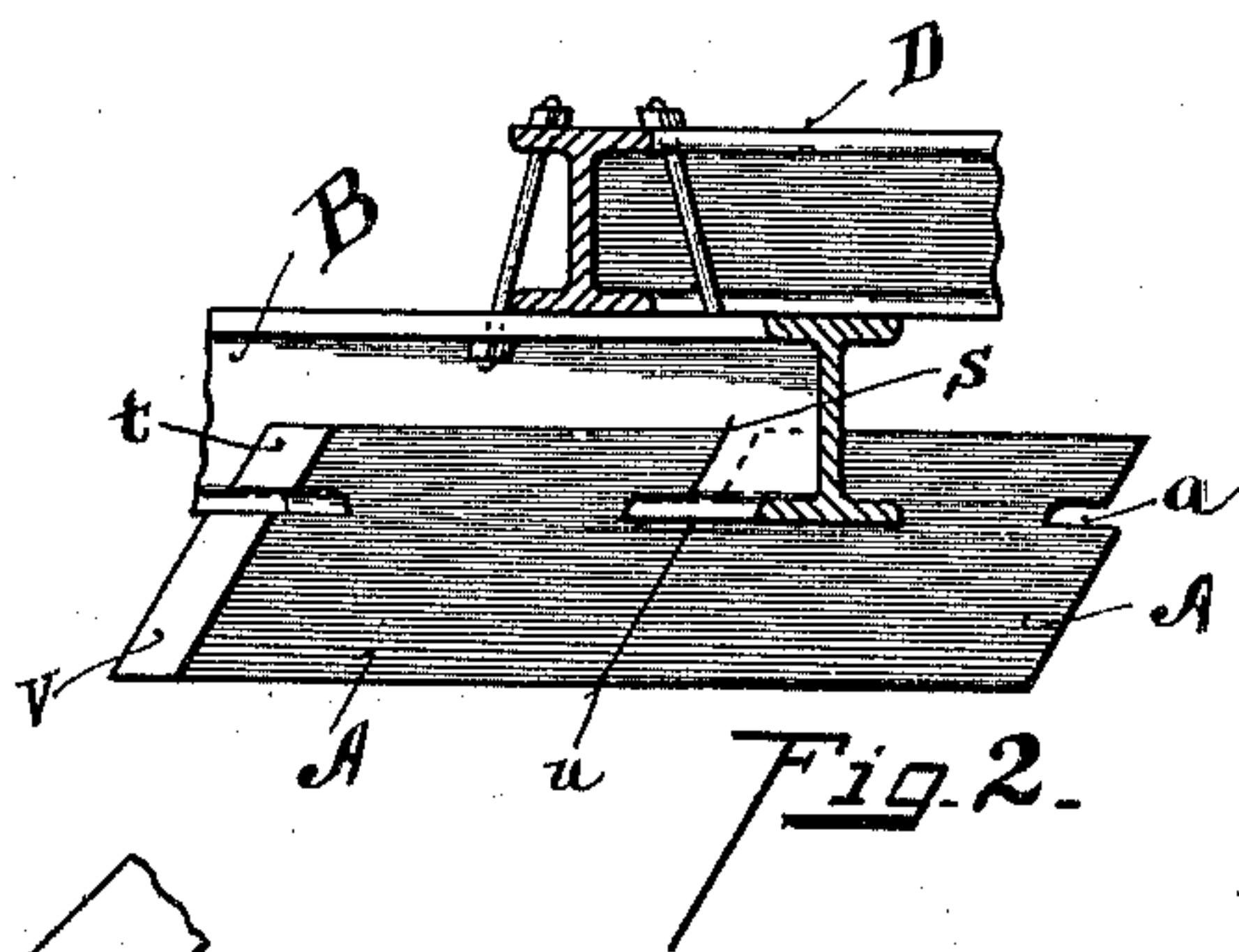


Fig. 2.

Fig. 3.

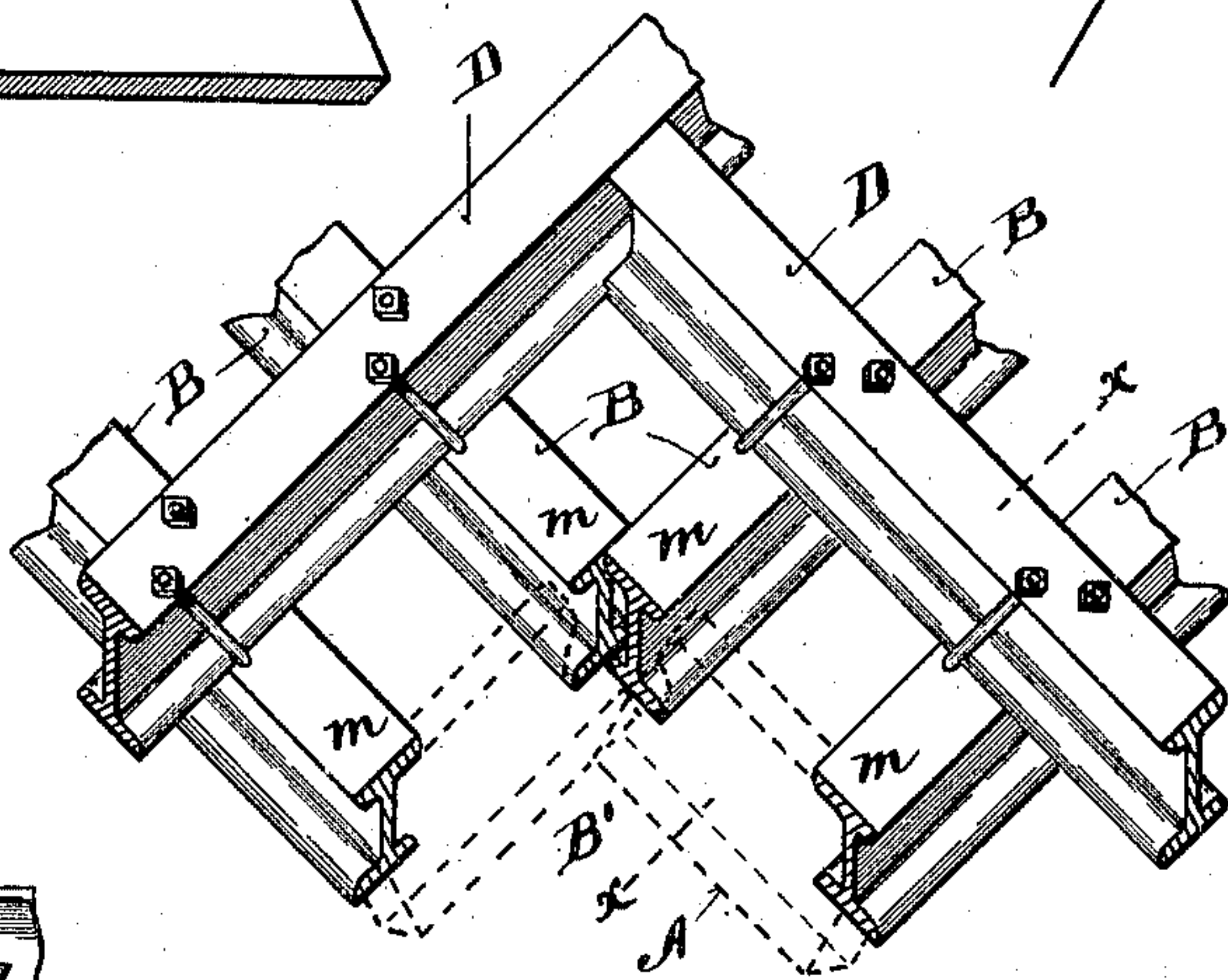
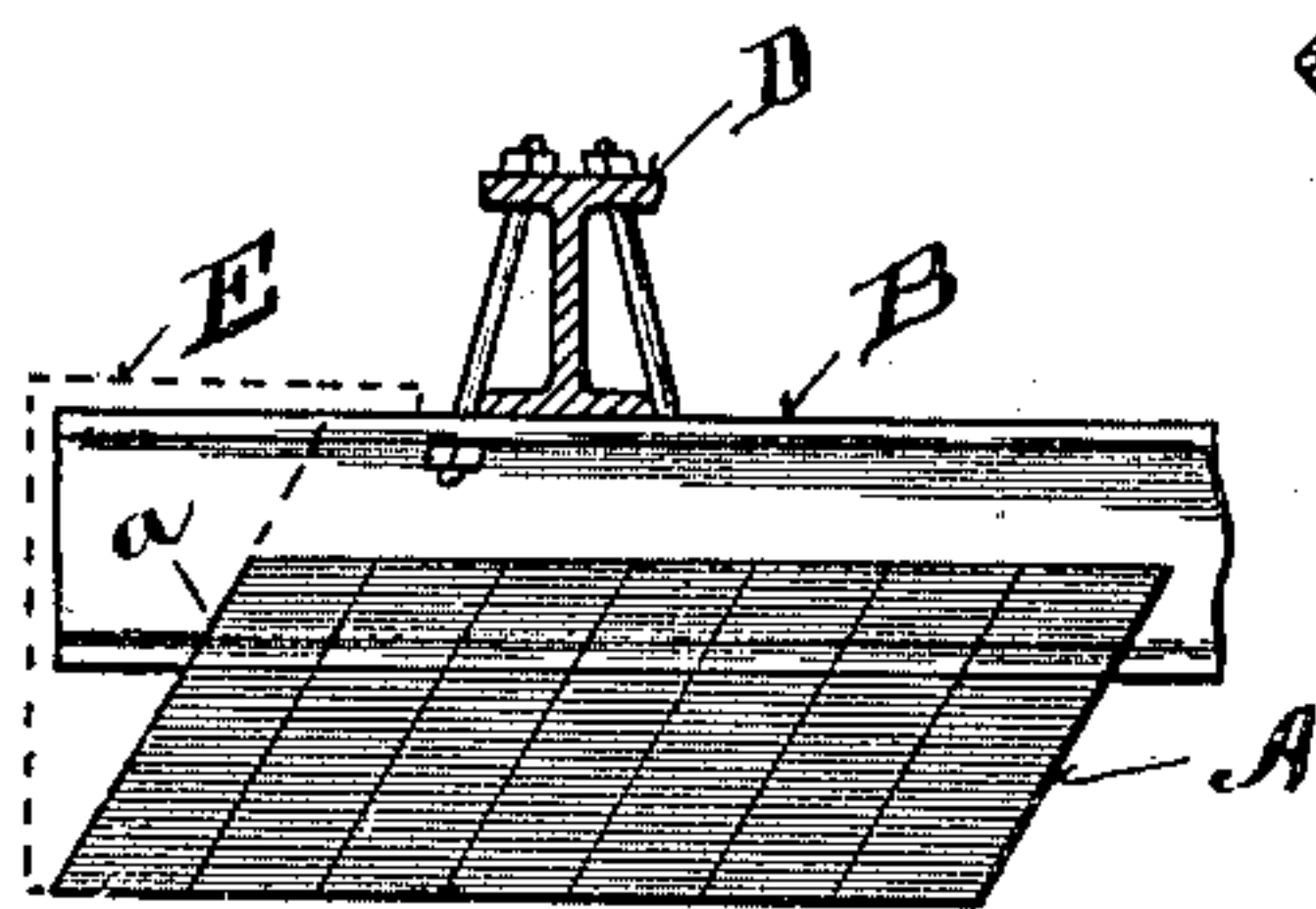


Fig. 5.

Witnesses

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FURNACE.

SPECIFICATION forming part of Letters Patent No. 653,118, dated July 3, 1900.

Application filed February 15, 1900. Serial No. 5,397. (No model.)

To all whom it may concern:

Be it known that I, JOHN N. QUINN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates to the construction of furnaces.

One object of my invention is to employ flanged tie-beams with a tile filling interlocked with and supported by the flanges of the tie-beams, whereby a strong horizontal roof is obtained, avoiding the use of an arch.

A second object of my invention is to construct the side walls of a furnace of similar flanged truss or tie beams with interlocking tiles, whereby the walls are sustained against lateral strains by the inclined principle of the interlocking members.

The general object of my invention is to increase the strength and durability of the walls and roof of a furnace, as well as lessening the cost of the same.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a central vertical section of a furnace embodying my invention. Fig. 2 is a broken sectional elevation showing the relation of the tie and supporting beams. Fig. 3 is a section on line $\alpha\alpha$, Fig. 5, showing the tile in elevation. Fig. 4 is a perspective view of a partition-wall. Fig. 5 is a perspective view showing the arrangement of parts to form a flue-opening. Fig. 6 is a perspective view of the cap.

A represents a tile made of fire-brick composition provided at each side with notches a of the width requisite to receive the flange of a tie-beam, which, as shown in the drawings, is the ordinary I-beam of commerce. These notches are so disposed that the tiles hang in the truss-support preferably at an angle of from fifteen to thirty degrees to the vertical line, the object of which will hereinafter be explained.

The side walls of a furnace are constructed in the following manner: A series of upright tie-beams B are vertically supported upon a suitable foundation. C represents a corner-

brick or an inclined foundation. A A represent the notched tiles, engaging the adjacent flanges of two I-beams on one side of the furnace-wall. A similar tier of tile is employed to engage the opposite flanges of said I or tie beams and formed, preferably, with an air-space w between the two tiers of tile, as shown in Fig. 4. This forms a central fire or partition wall and thoroughly protects the tie-beams from direct contact with the heat. When the fire is to be only on one side, as in the outside walls of a furnace, as shown in Fig. 1, the inner tier alone may be used; but I prefer a sheet-iron or other proper outside covering of the tie-beams.

The top wall of the furnace is constructed in the following manner: The tie-beams are supported by the side walls or upright tie-beams, and the inclined notched tiles engage over the flanges and are inclined to the horizontal plane, as shown in Fig. 1. The corners or space left at each end is filled by suitably-shaped fire-brick filling-pieces of tile-cap E.

When it is desired to make an opening B', supplemental flanged truss-beams D are laid upon the top of the beams B and running transversely thereto, and they are connected together by bolts passing through the flanges of the upper rail on each side of the I-beam and passing through flanges of the lower beam B, as shown in Figs. 2 and 3. This effectually supports the free end of the beams, as at m , where a flue-opening is left, as shown in Fig. 5. I prefer, however, to put these transverse supporting-beams on the top or covering of all furnaces, as they form a very firm support against all lateral strain due to the heating and cooling of the walls.

In order to protect the ends of the beams from direct contact with the heat, as in flue-openings, I provide a filling-piece or tile-cap E of the general form shown in Fig. 6. This is furnished with an inclined face d , which is of the same angle and abuts against the inclined tiles A. e represents an extension projecting over the top of the beams. fg represent notches to receive the end of each of the adjacent beams by which this cap is suspended.

The interstices between the faces of the tiles are filled with grout or flushing formed of fire-

clay material, such as used in ordinary brick-furnaces for mortar filling.

It will be observed that in the form of tile shown in Fig. 2 the width of the tile above the notches *a* on the lines *s t* is less than the width on the lines *u v* below the notches, the lesser length being equal to the thickness of the beam, so that the edges of the adjacent tier of tile below the beams will abut each other.

I obtain several advantages by suspending the tile in an inclined position, as shown. Each tile forms a bracing or arch-like abutment for the adjacent tile. Again, in case one of the tiles should accidentally crack it is held in place by the inclination of the tiles forming the tier. The interlocking of the tile with the flanges causes the tie-beams to sustain the weight and strains of the tile.

Another advantage obtained by the use of the inclined notched tile is that the flushing or grouting is not so liable to become loosened or unattached as when the interstices run in horizontal planes, and the metal beams are consequently effectually protected from direct heat-contact with the furnace-fire.

Furnaces constructed as herein shown and described have proven very durable and strong, first, because the truss or bracing members *B D* run the entire length of the walls and each edge of each tile and each tier of tile are supported thereby, and there is not the vertical strain across the face of the respective tile as in the case of brick walls where the overlapping of the brick to break joints superimposes upon the brick the weight of the wall above, and when the same is exposed to high heat and subsequent cooling the expansion and contraction due to the superimposed weight cause the brick to crack and break, whereas in my walls the weight is sustained mostly by the beams longitudinally throughout the entire length of the wall. Again, the roof of my furnace is sustained by the side walls vertically instead of in diagonal or lateral direction, as in the case of an arch supported upon side walls, the thrust of which tends to spread the wall apart at the top.

In my furnace I avoid the use of hog-bars or hog-chains which are usually employed to tie both side and top walls together of ordinary heating-furnaces. Such tying means embrace only that portion of the brick wall which they abut, leaving the surface of the wall each side thereof unbraced, except such as is due to the superimposed weight, whereas in my structure each individual tier of tile is effectually tied in position throughout its whole length by the truss members.

In order to provide for the expansion and contraction for each tier of tile, I leave a little space at the end of the tier where they abut the adjacent wall, so as to allow the expansion of a tier of tile, but this is only required in long or large furnaces.

Having described my invention, what I claim is—

1. In a furnace, in combination with flanged supporting-beams, a tile having notches in its edges abutting the beams, adapted to fit the flanges thereof, the faces of the tile transverse to the beams, being inclined to the cross-section thereof, substantially as specified.

2. In a furnace, in combination with supporting flanged beams, a tile having notches in its edges, abutting the beams, and adapted to fit the flanges thereof, the faces of the tile transverse to the beams, being in parallel planes at an angle to the cross-section of said beams, substantially as specified.

3. In a furnace, the combination of a series of horizontal flanged beams, a series of tiles each having the two of its opposite faces abutting the beams, provided with grooves adapted to fit the flanges, the abutting faces of the tiles overlapping each other vertically and the interior faces of said tiles being shaped to conjointly produce the lining-facings of the furnace, substantially as specified.

In testimony whereof I have hereunto set my hand.

JOHN N. QUINN.

Witnesses:

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