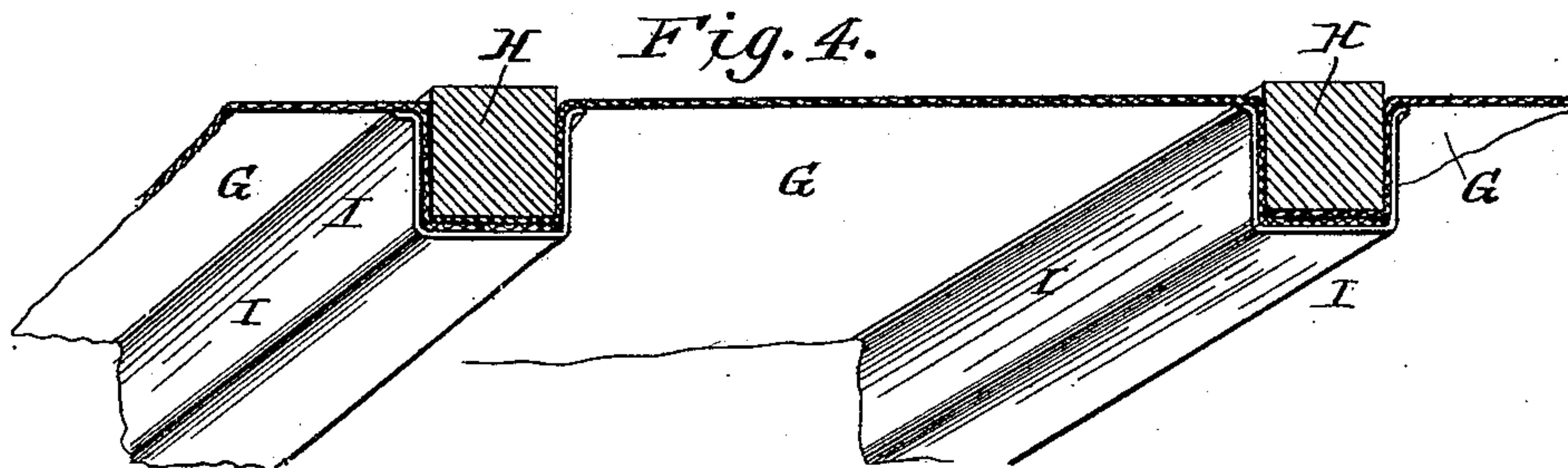
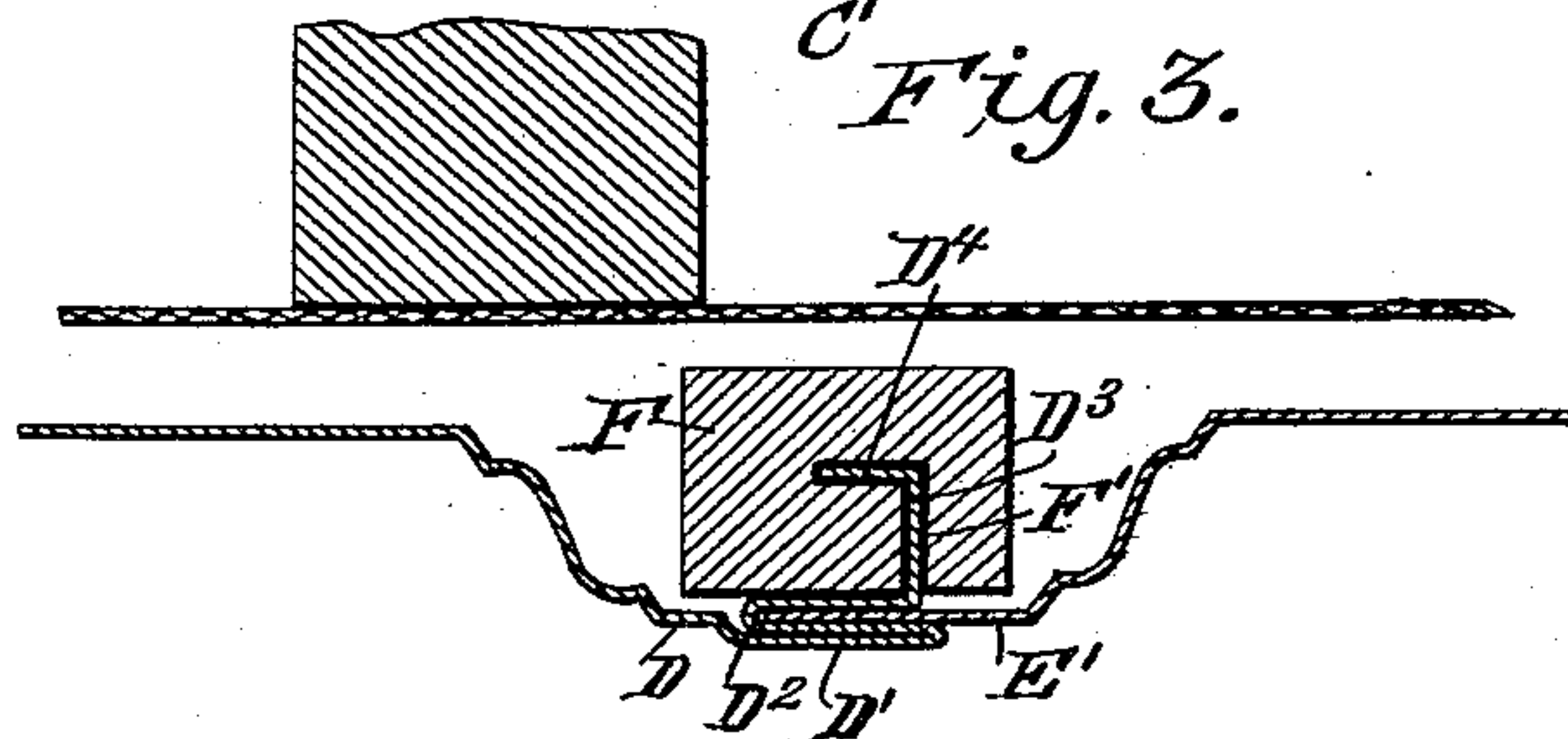
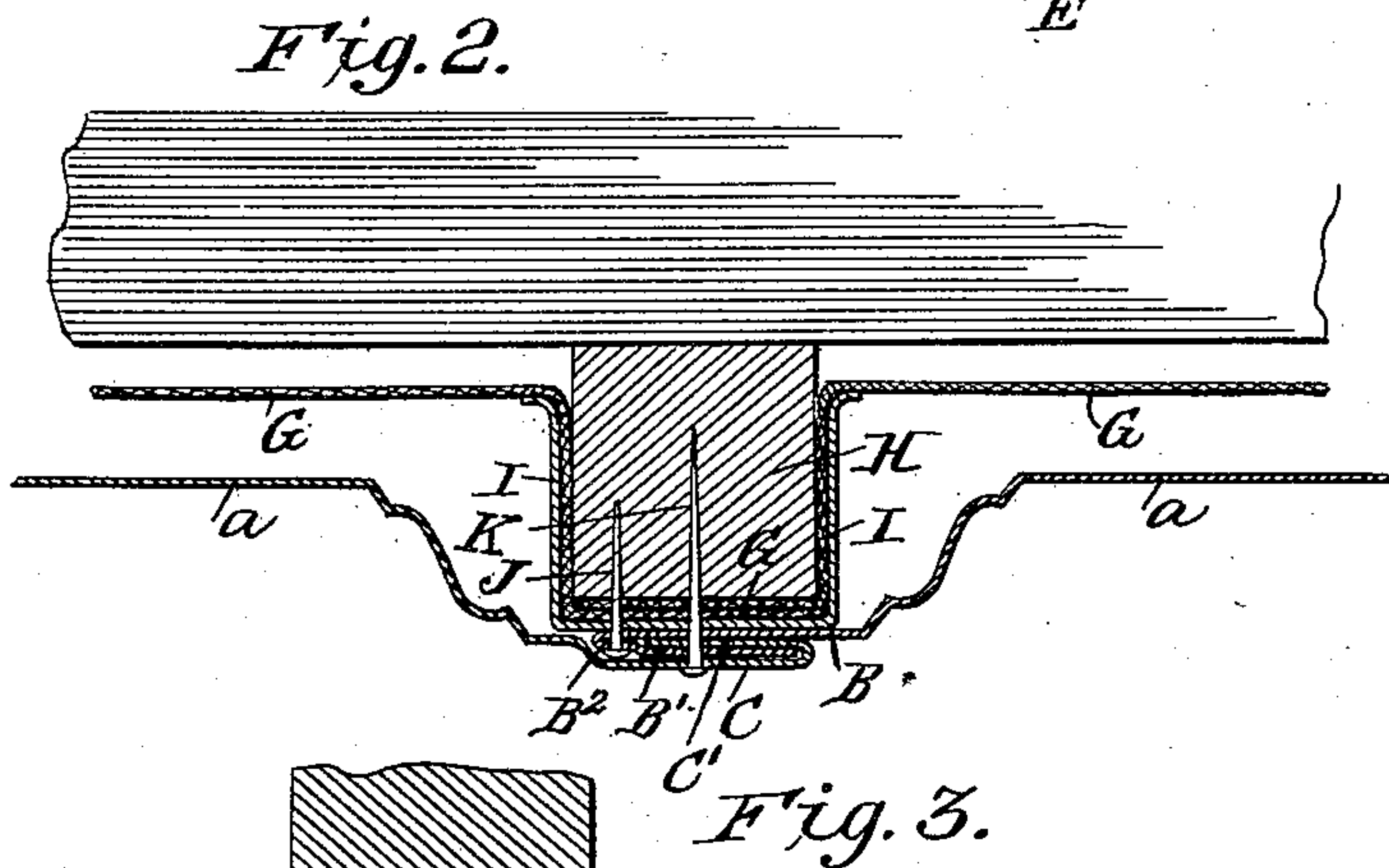
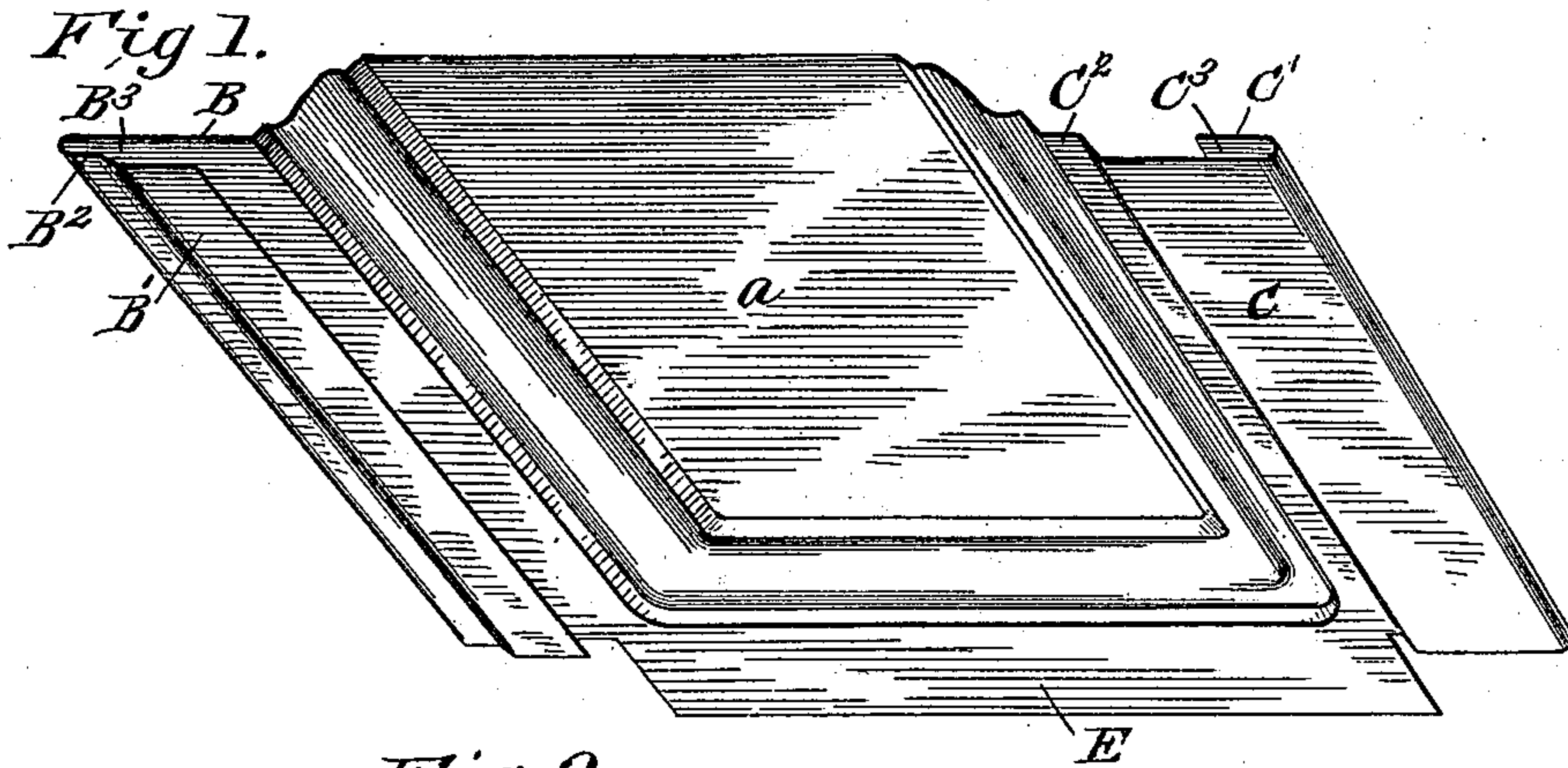


(No Model.)

W. R. KINNEAR.
METALLIC CEILING.

No. 464,694.

Patented Dec. 8, 1891.



WITNESSES:

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METALLIC CEILING.

SPECIFICATION forming part of Letters Patent No. 464,694, dated December 8, 1891.

Application filed June 15, 1891. Serial No. 396,227. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. KINNEAR, a citizen of the United States, and a resident of Columbus, in the county of Franklin and State of Ohio, have invented an Improvement in Metallic Ceilings, of which the following is a specification.

This invention relates to improvements in metallic ceilings; and it consists in the construction and arrangement of the parts hereinafter described and claimed.

As at present constructed, these ceilings make no adequate provision for maintaining their conformation or retaining their position on the structure to which they have been applied in the event of fire. As a consequence of this lack of provision, the plates of which the ceiling is composed are warped and twisted in the event of fire in such manner as to draw the joints asunder, and thereby permit the flames to pass through and ignite the frame-work above. It is to obviate this difficulty which is the object of the present invention.

In the drawings, Figure 1 is a perspective view of a ceiling-panel constructed in accordance with this invention. Fig. 2 is a cross-section of a rail formed by two abutting panels, and showing the position of the asbestos covering. Fig. 3 is a cross-section of the cross-rails, showing the manner of forming the same and the disposition of the asbestos covering. Fig. 4 is a detail view in perspective showing the manner of suspending the asbestos covering.

The panels of which these ceilings are constructed are metal, which will prevent the passage of the flames of any ordinary fire through itself, but will, under the heat generated thereby, warp and twist in such way as to open the joints between the separate plates of which the ceilings are composed, and thereby permit the flames to pass to the wood-work of the structure above. It is to overcome this effort on the part of the metal that we here provide the joints shown in Figs. 2 and 3, which are peculiarly adapted to the positions they occupy in the construction.

The under side of the floor-joists to which this ceiling is to be applied is provided with paneled furring-strips H, so placed as to receive the margins B and C of the panels A.

These margins are provided with the interlocking joints shown at Fig. 2 of drawings, which, when rigidly secured in position, will counteract to prevent the separation of the joints above spoken of. As will be seen, the margin B is provided with the returned metal B', which, when in position, forms a groove opening toward the center or body of the panel of which it is a part, forming thereby a hook to catch when drawn in the direction of the center of the panel, which would be the effect when the panel is inclined to warp. This margin B is that which is first secured in position on the furring-strips H, and for this purpose the edge B² is formed thereon by pressing the metal forming the groove B³ together at that point. Through this edge the fastenings K, either nails or screws, are driven into the furring-strips H. In this position the construction is ready to receive the margin C of the adjoining panel. This is accomplished by inserting the returned metal C' on the margin C of the succeeding panel into the groove B³. This margin C is provided with the raised hook formation C³, formed by the returned metal C' and the margin B', to co-operate with the said margin B to prevent the separation of the joints by either drawing toward the centers of the panels or thrusting from the same. This is here accomplished by the interlocking of the returned edges B' and C' and the shoulder C². The interlocked edgings will while they are held flat resist any strain exerted upon them to draw the panels apart, but will not offer any resistance to the thrusting strain above referred to. It is for this purpose that the shoulder C² is provided, which, being formed to rest directly in front of and against the edge B² of the margin B, prevents the separation of the interlocked returned edges by intercepting any movement on the part of the margins away from each other. When the returned edge C' has been inserted in the groove B³, the panel is adjusted in position on the furring-strips H and the margin C is secured as described above. In this adjustment the shoulder C², it will be seen, rests on the strip in front of the edge B². The joined margins are further secured by driving a fastening J through all the layers of metal forming the interlocked joint, as seen in Fig. 2 of drawings. This fastening

now drives the parts solidly together and maintains them in that position, while at the same time adding a resisting element to any independent movement on the part of the separate margins.

The above-described joint secures the edges of the panels that rest on the furring-strips, but would not answer for the cross-joints where there is no furring-strip provided. The joint used in this part of the construction is that shown in Fig. 3 of drawings. This construction consists in forming on the margin D of one of the abutting panels the groove D² and providing the same with the strengthening-flange D³. In this condition the rail or combined margins are held from sagging by the said flange, which while maintaining its vertical position is amply sufficient to support the weight of the joined panels, but which in the event of being twisted out of line by the action of the heat above referred to would allow the ends thus joined to sag and pull apart. It is to prevent this action that I have provided the terra-cotta block F and the additional bend of the edge D⁴ of the strengthening-edge at an angle to itself, the block to maintain the shape of the strengthening-flange and the edge to hold the block from dislodgment by vibration or other cause. Lengthwise through the said block extends a groove to correspond in shape to the strengthening flange and edge, and as the panels are placed in position this block is slipped on. When raised with the panel, it is projected between the furring-strips and prevented by them from lengthwise dislodgment. These cross-rail margins are joined in the manner shown in drawings by providing a groove on the one and a straight margin on the other and inserting the straight margin in the groove. With all the abutting margins of the panels thus joined it will be seen that resistance against the action above referred to is provided for, and the ceiling remains impenetrable by the flames. While, however, this ceiling thus effectually prevents the passage of the flames to the wood-work above it, it offers but little obstruction to the passage of the heat. It is to shield the wood-work from the heat that so passes the ceiling that I place on the furring-strips above the panels the non-combustible sheathing G, which in the preferred form shown in drawings is constructed of asbestos. This sheathing is constructed in sheets, which are secured to the furring-strips II by means of the metallic channels I. These sheets, as will be seen in Fig. 4 of drawings, are lapped on the furring-strips and form between the same long channels of asbestos, into which the bodies of the panels extend. In suspending this

sheathing the sheets are laid on in succession, the edges being secured on the furring-strips by the metallic channels I, which are slightly sprung and are provided with side arms to lift the body of the sheathing far enough to allow for an air-space between it and the said panels. It is after the sheathing is thus secured in place that the panels are put on. The fastenings of the margins of the panels that rest on the furring-strips pass through the lapped edges of the sheathing and thereby secure it in position. It will now be seen that this construction by preventing the admission to the wood-work either of the flames or heat of a fire forms a ceiling which is fire-proof, while being at the same time light in construction.

Having thus described this invention, what I claim is—

1. In a metallic ceiling such as described, the combination of two or more panels provided with margins adapted to lap the one on the other and provided with returned edgings to form grooves, and the said edgings adapted to enter the groove formed on the abutting panel, and fastenings adapted to pass through the lapped margins and the returned edgings and bind the whole together, substantially as described.
2. In a metallic ceiling such as described, the combination of two or more panels provided with margins, the one provided with a groove and the other with a flat extension adapted to enter said groove, a strengthening-flange secured to one of the joined margins, and a non-combustible block provided with a groove to receive said strengthening-flange to maintain the same in position, substantially as described.
3. In a metallic ceiling such as described, the combination of two or more quadrilateral panels having on two opposite sides margins adapted to lap those of adjoining panels and provided with returned edgings to form grooves, and said edgings adapted to enter the grooves formed on the abutting panels, fastenings adapted to pass through the lapped margins and returned edgings and bind the whole together, and on the remaining two sides being the one provided with a groove and the other with an extension adapted to enter the said groove of an adjoining panel, a strengthening-flange attached to the said margin provided with a groove, and a non-combustible retaining-block to receive the said strengthening-flange, substantially as described.

WILLIAM R. KINNEAR.

Witnesses:

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J. F. ANTHONY.