

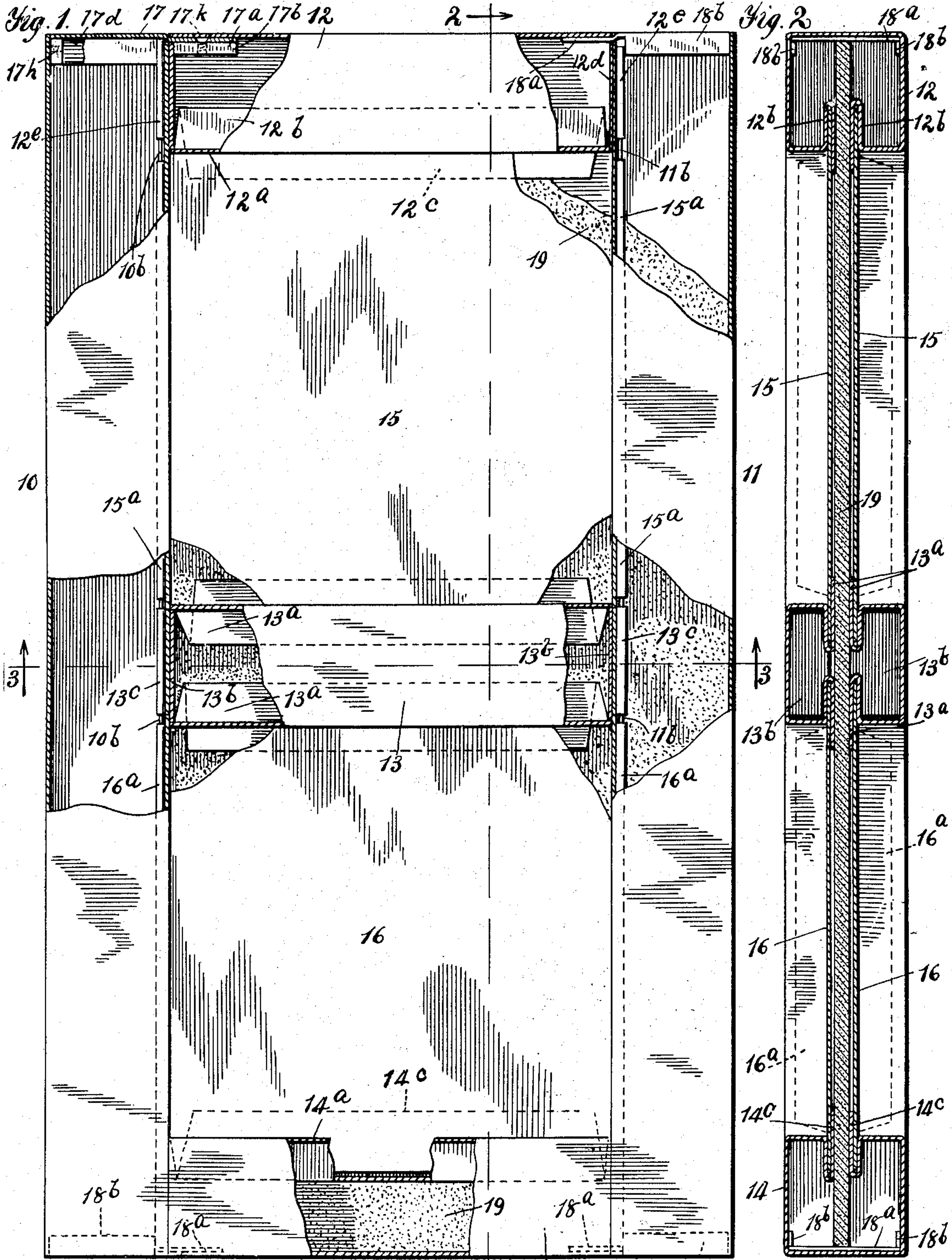
T. P. SHEAN.  
FIREPROOF DOOR.

APPLICATION FILED MAR. 29, 1910.

992,812.

Patented May 23, 1911.

3 SHEETS—SHEET 1.



Witnesses:

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M. A. Milord

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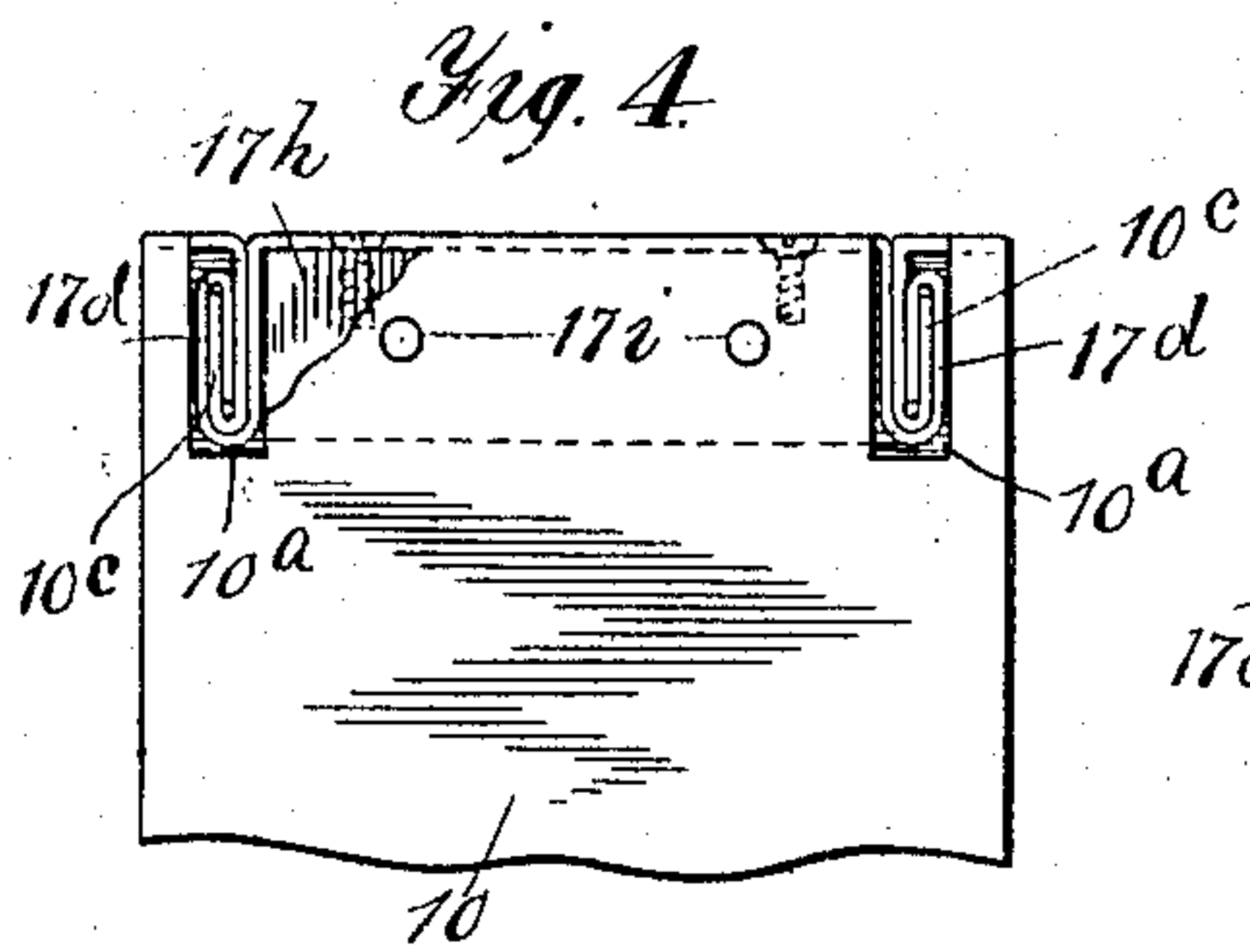
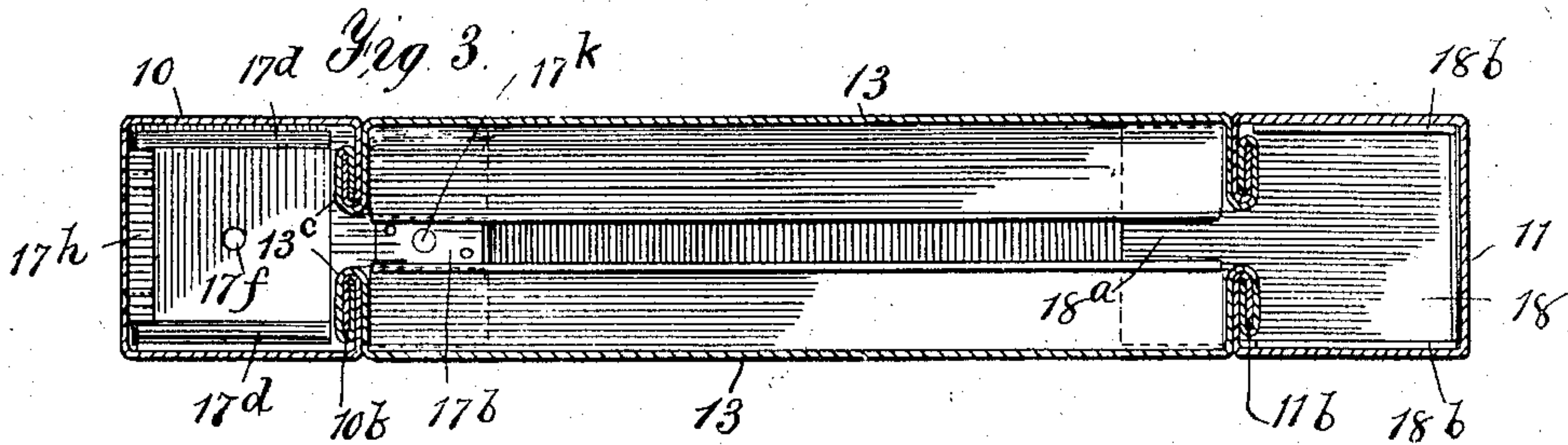
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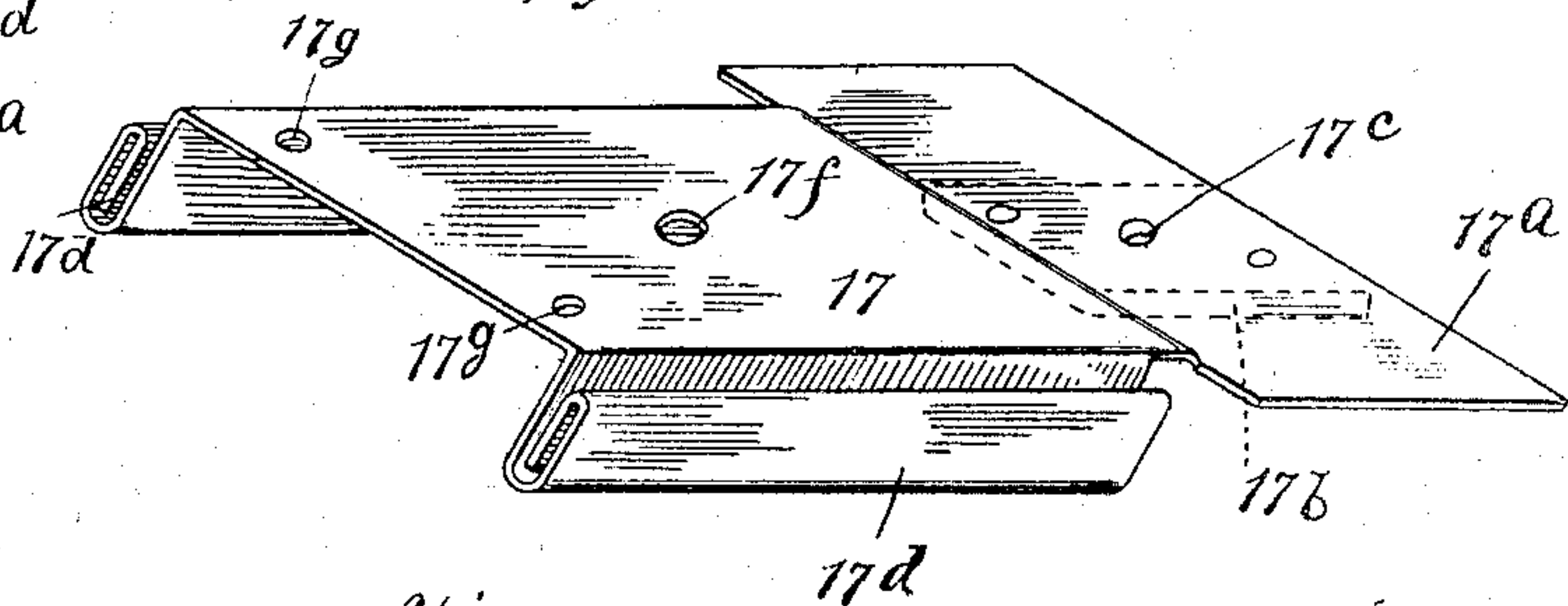
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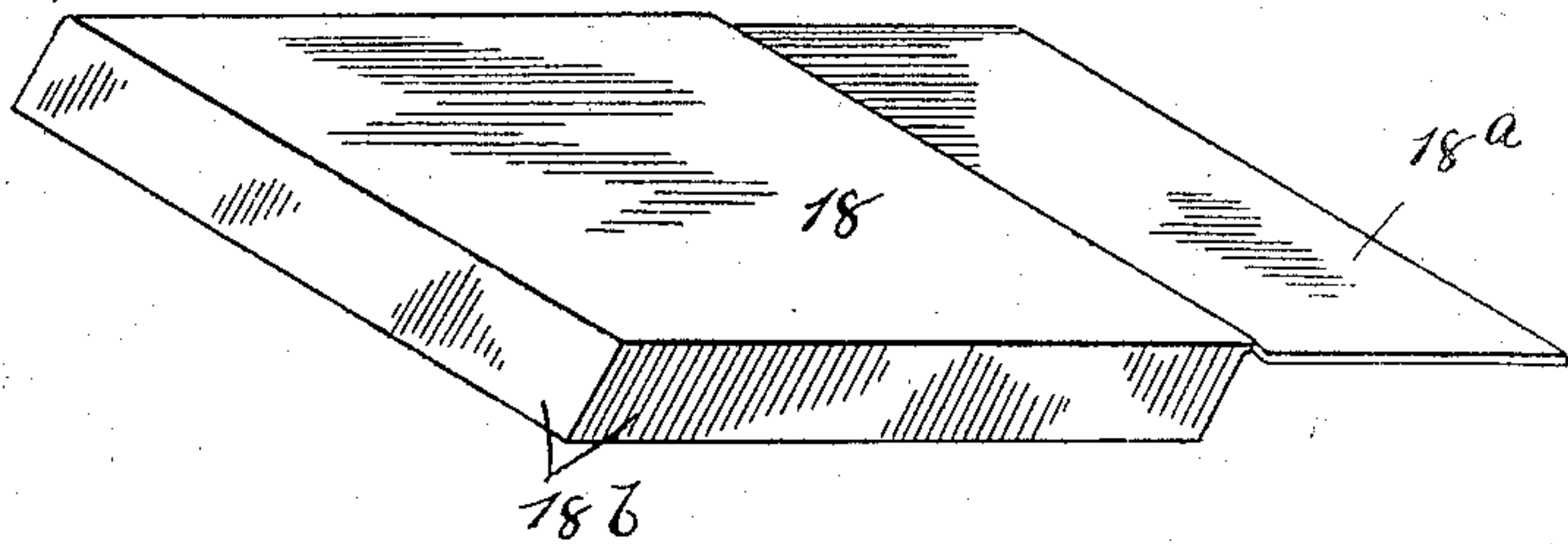
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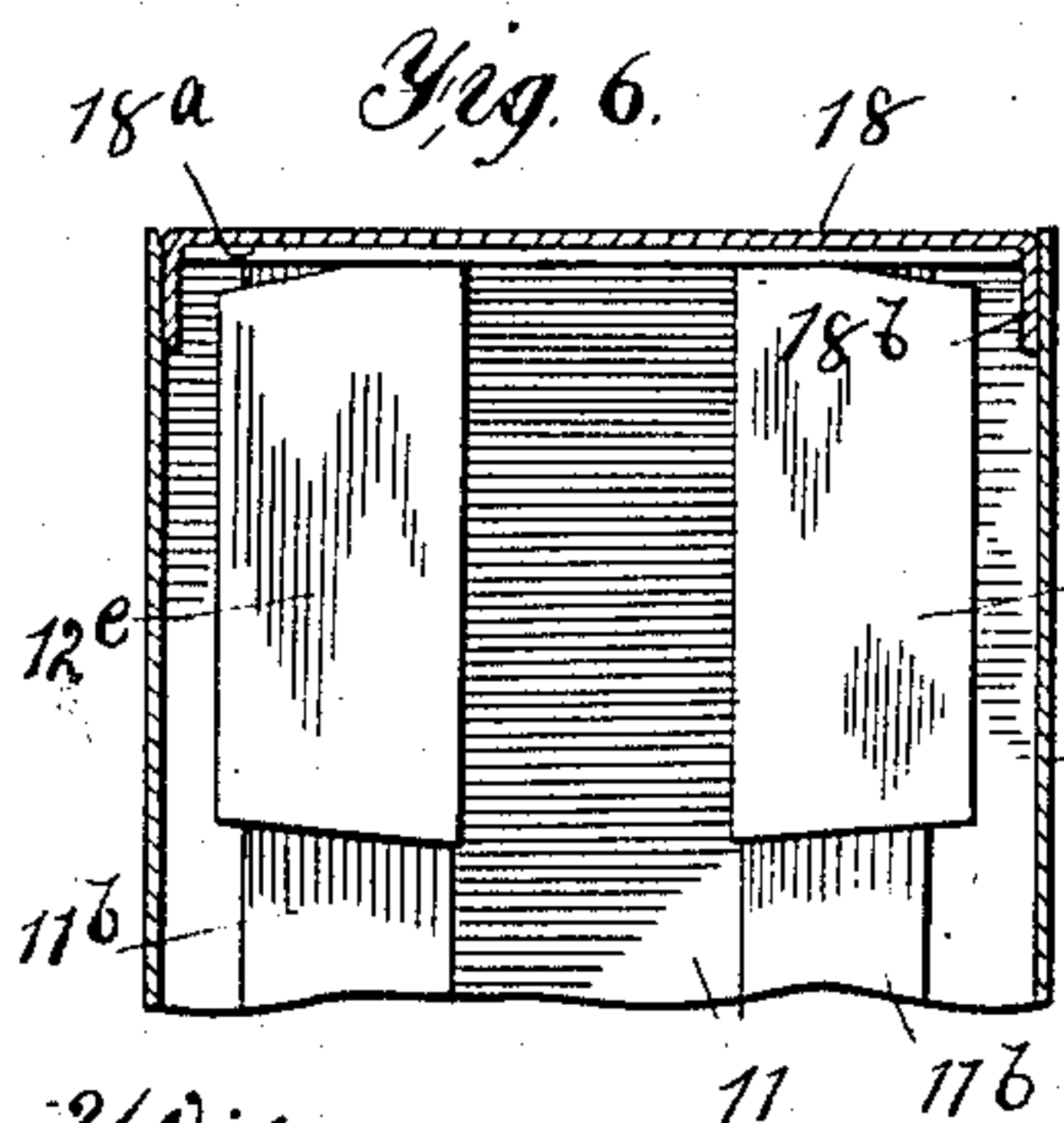
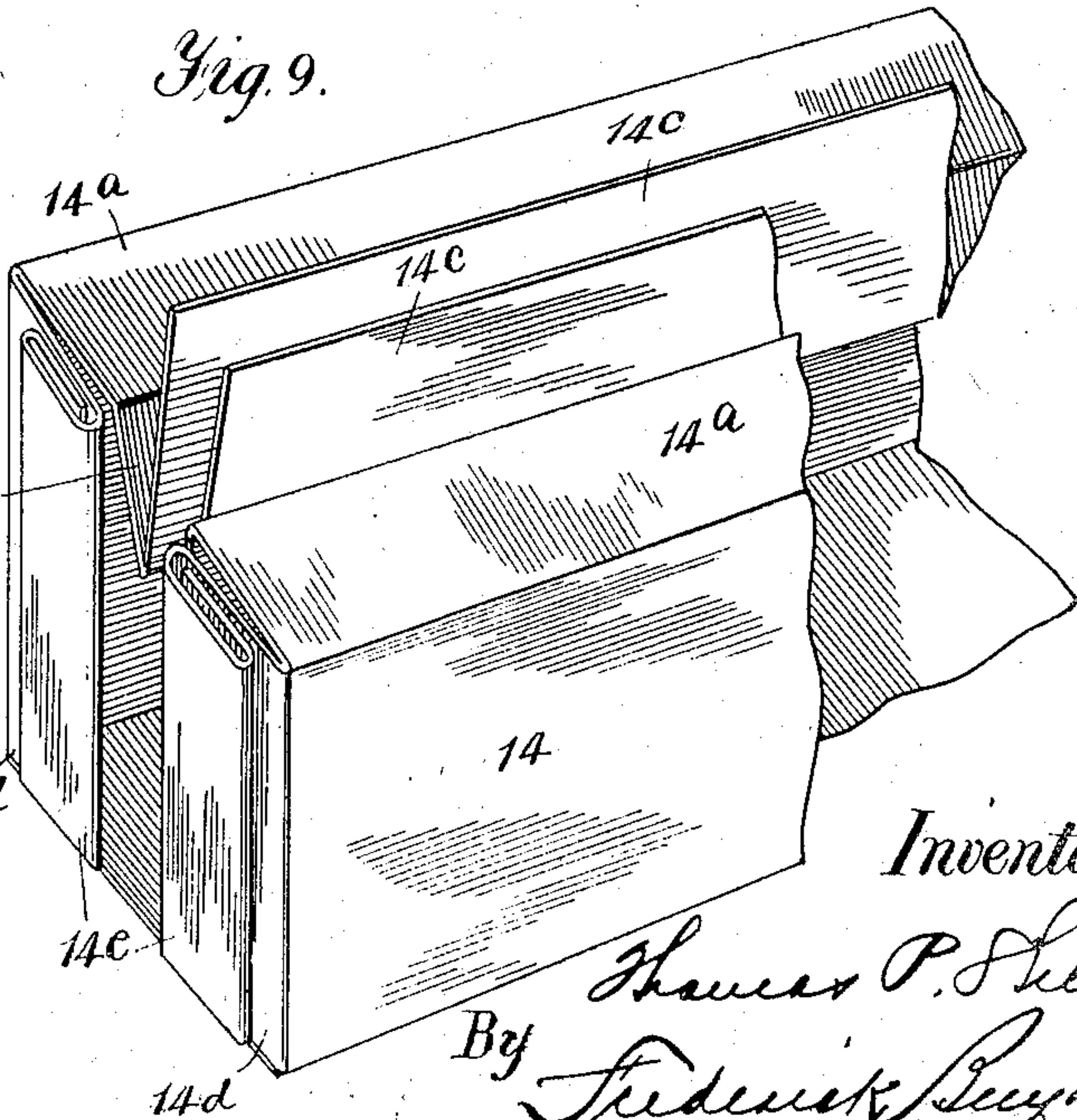
*Fig. 7.*



*Fig. 8.*



*Fig. 9.*



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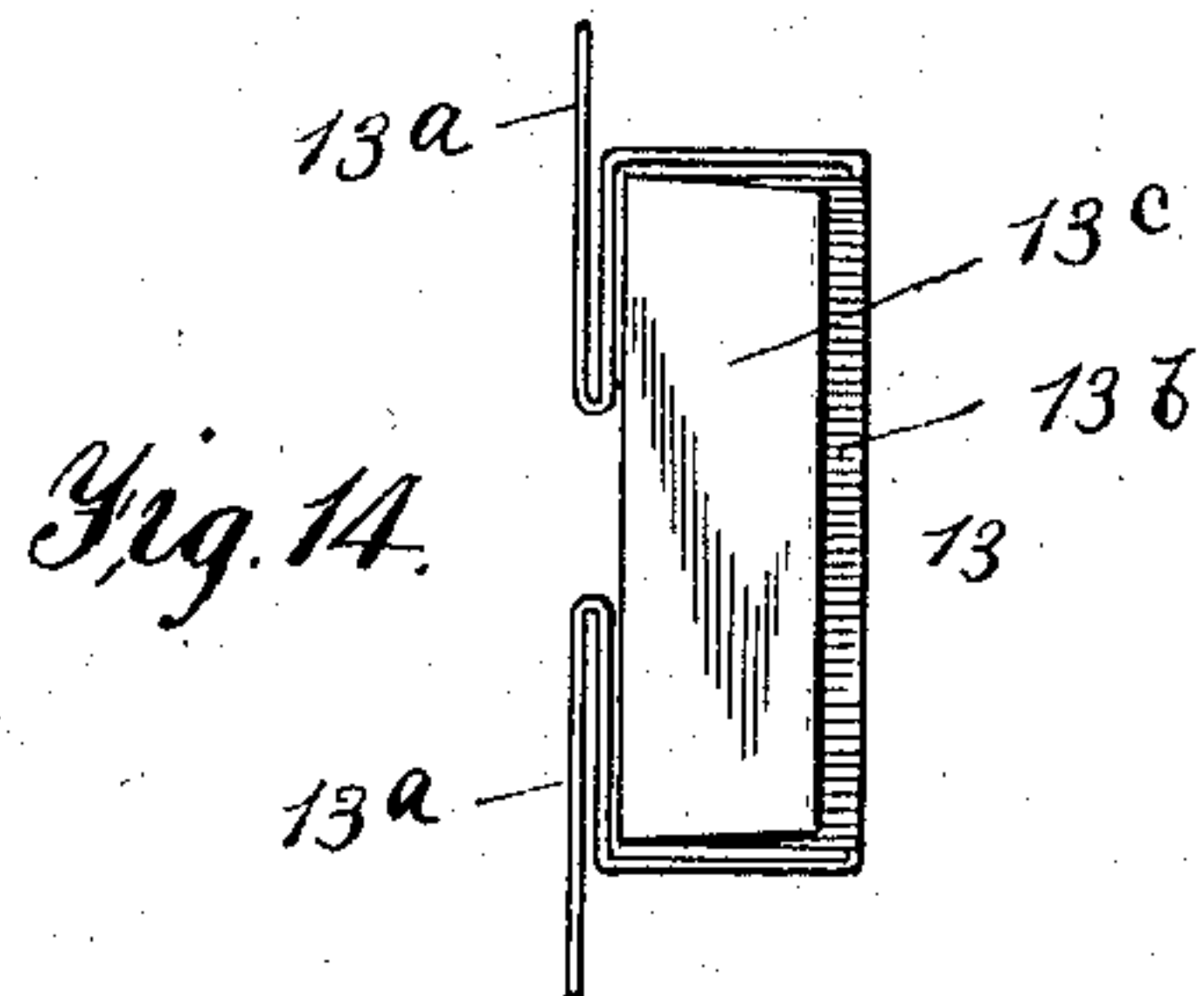
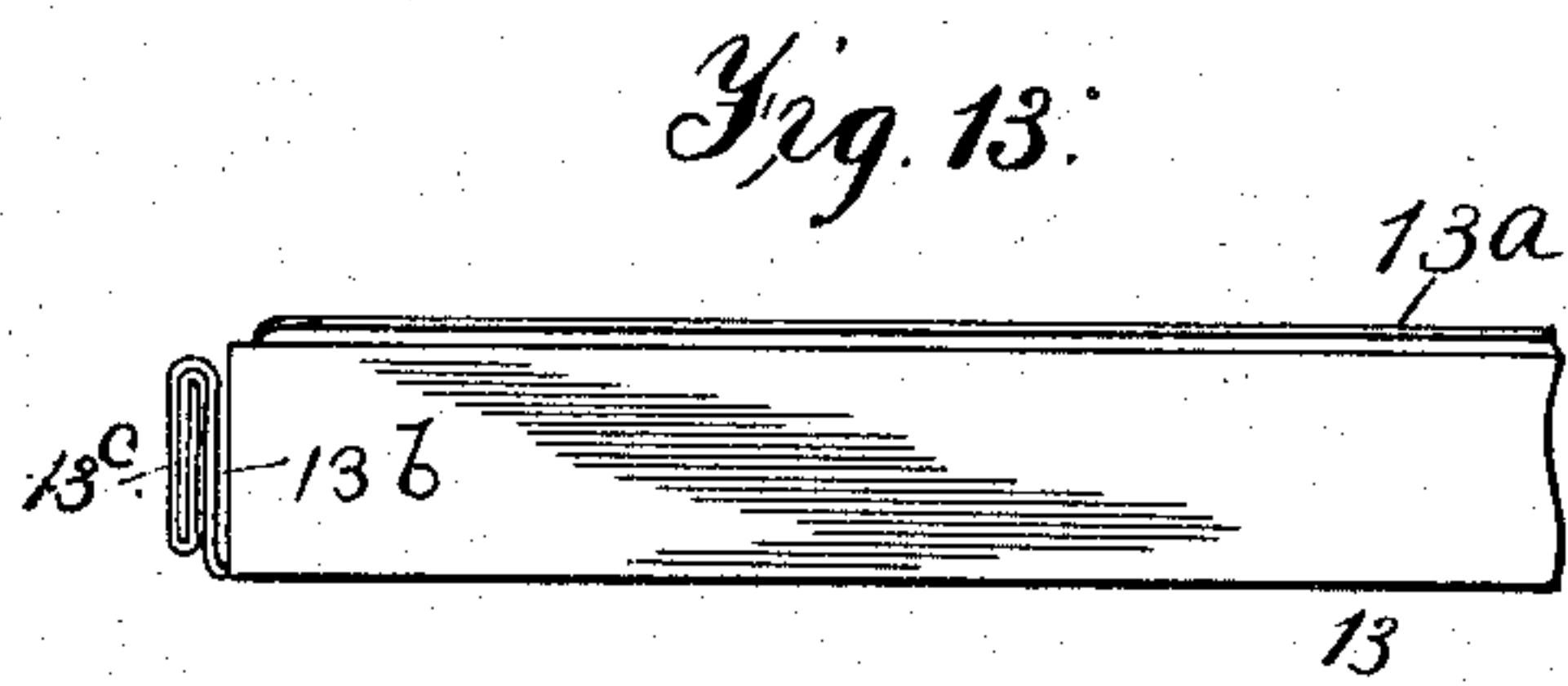
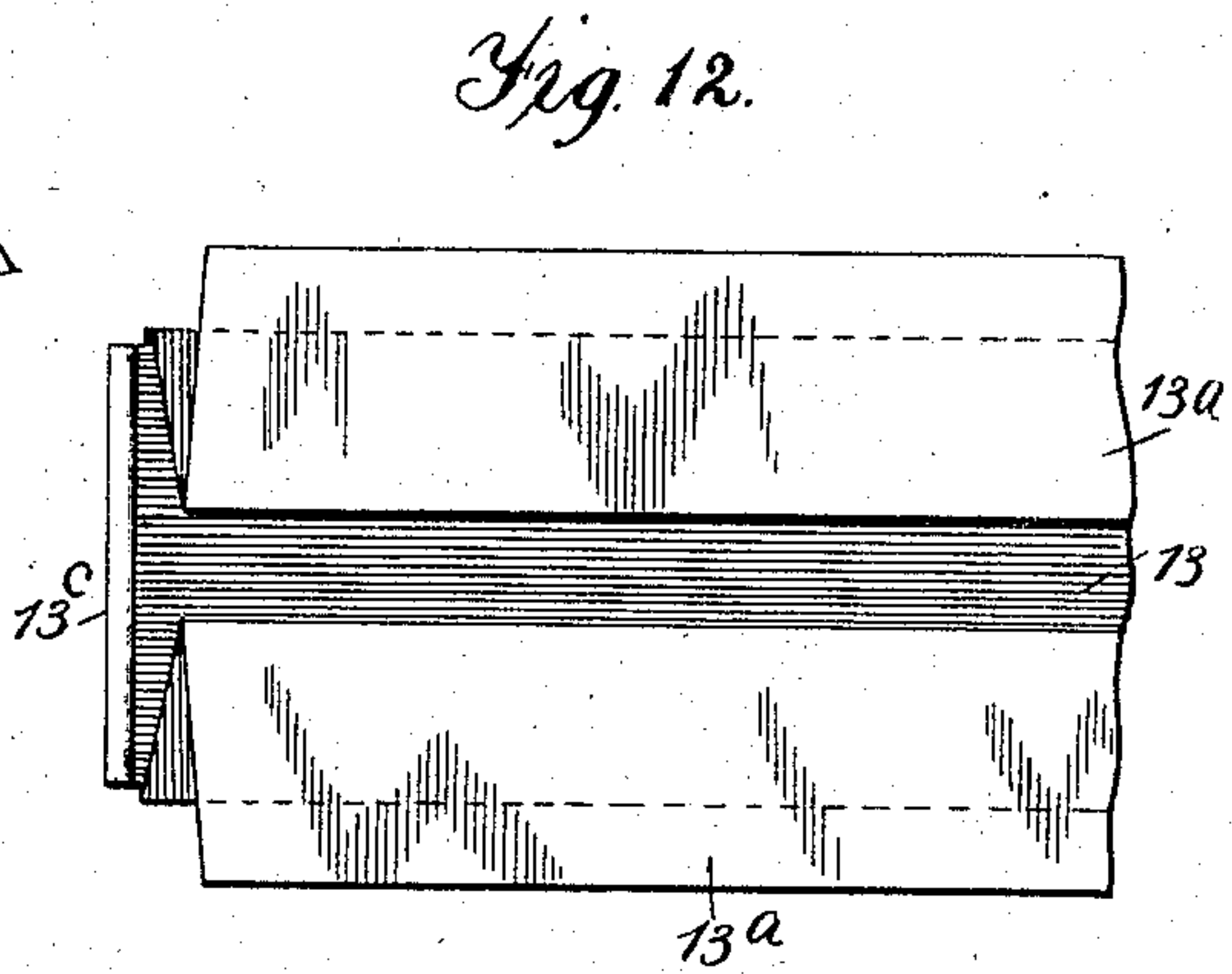
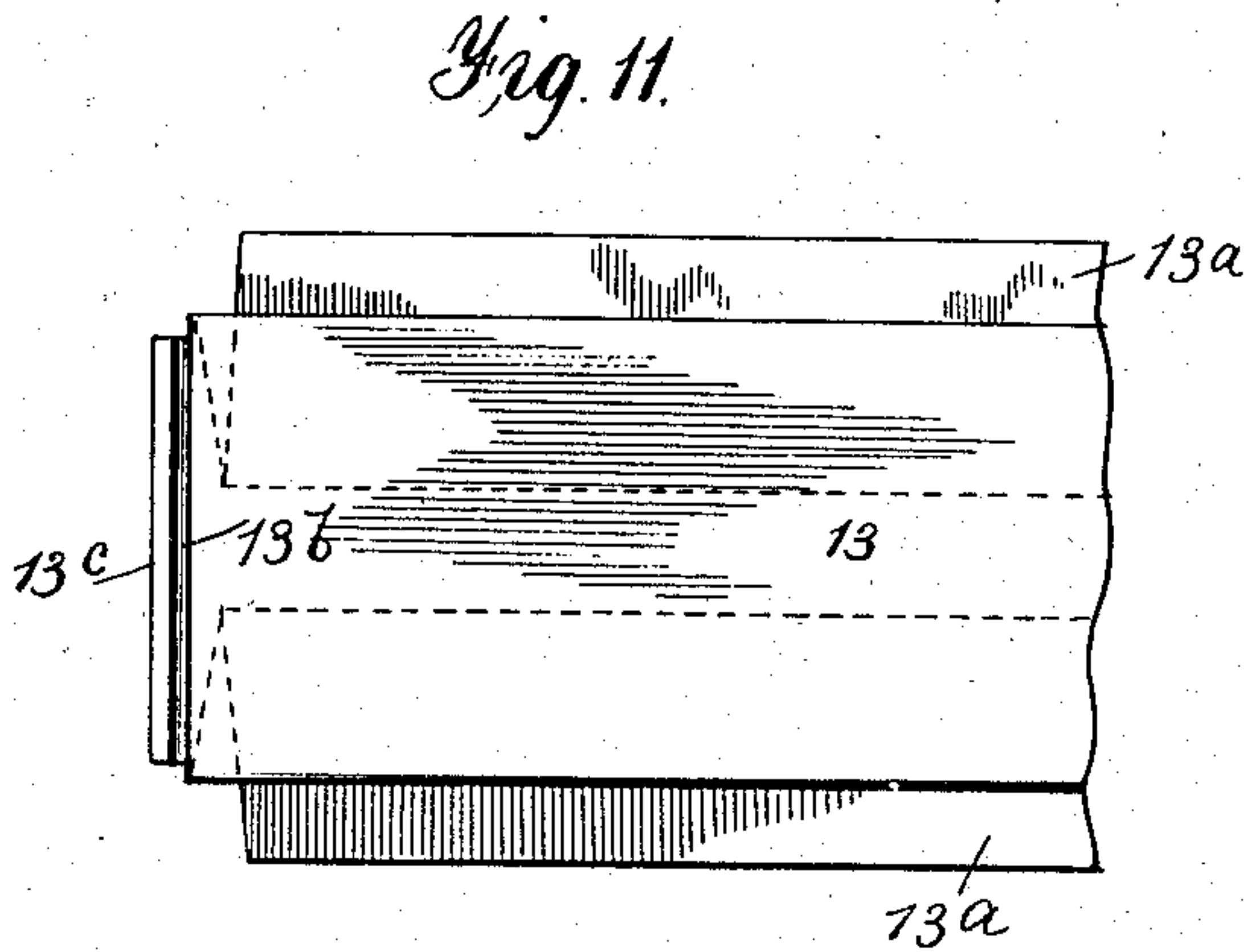
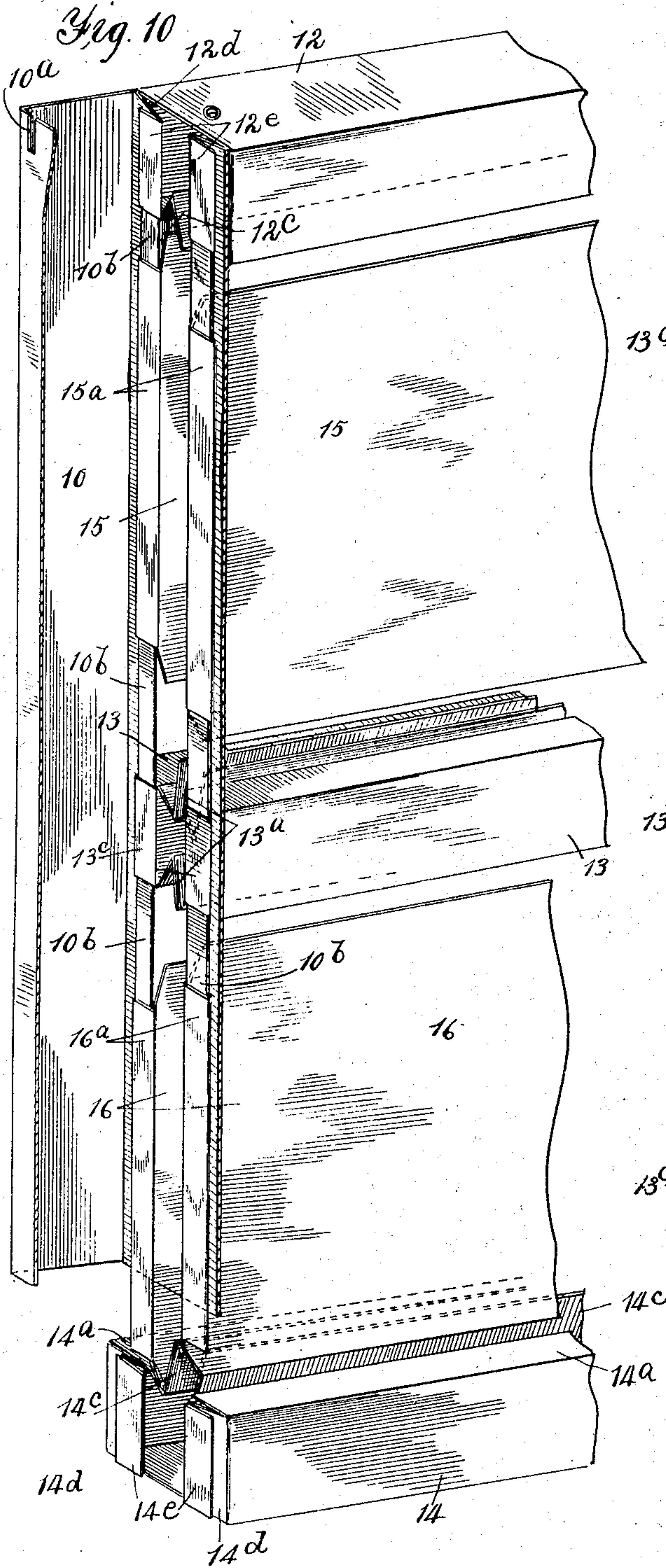
By

Frederick Benjamin  
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3 SHEETS—SHEET 3.



Witnesses

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# UNITED STATES PATENT OFFICE.

THOMAS P. SHEAN, OF CHICAGO, ILLINOIS.

## FIREPROOF DOOR.

992,812.

Specification of Letters Patent. Patented May 23, 1911.

Application filed March 29, 1910. Serial No. 552,201.

*To all whom it may concern:*

Be it known that I, THOMAS P. SHEAN, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fireproof Doors, of which the following is a specification.

This invention relates to improvements in fire-proof doors having spaced or hollow walls constructed from sheet-metal with a filler of asbestos between the walls.

The paramount objects of the particular improvements which form the subject matter of this application, are as follows:—To provide a sheet metal door composed of hollow stiles and rails so interlocked that retaining bolts rivets or screws are not required to maintain them in their assembled relation; to so construct or form and arrange the members composing the door that they can be quickly assembled by sliding together the complete units without requiring special assembling tools or holding devices; to provide means by which quick and easy access can be had to the lock-stile for the purpose of inserting, removing or repairing locking devices arranged in said stile; to provide forms of interlocking flanges whereby the stiles and rails will be effectively held against separation from expansion due to excessive heat; to provide a construction whereby nearly all edges of the metal pieces forming the various members, shall be within the walls of said members; to provide a rigid and strong construction without lateral openings for the passage of heat or flames, in which the joints may be concealed by welding and pointing, and in which the surfaces of the stiles, rails and panels may remain plane or be embellished by moldings as may be desired.

Having the foregoing and other objects in view, I have invented the door herein-after described in detail, and illustrated in the accompanying drawings forming a part of this application, and in which:—

Figure 1 is an elevational view of a door constructed according to my invention with portions broken away to more clearly disclose the construction and arrangement of various members; Fig. 2 is a vertical cross-section on the line 2—2 of Fig. 1; Fig. 3 is a horizontal cross-section on the line 3—3 of Fig. 1; Fig. 4 is a fragmentary detail in front elevation at the upper end of the lock-

stile; Fig. 5 is a vertical cross-section through the upper part of the lock-stile showing a removable closure-plate in position; Fig. 6 is a vertical cross-section of the upper part of the hinge-stile with a fixed closure-plate in place; Fig. 7 is a perspective view of the removable closure plate; Fig. 8 is a perspective view of the fixed closure plate; Fig. 9 is a fragmentary perspective view of the bottom rail; Fig. 10 is a perspective view of the lock stile showing portions of the interlocking members in partially assembled relation; Figs. 11 and 12 are fragmentary views showing the outer and inner sides, respectively, of a portion of a lock rail, and Figs. 13 and 14 are, a side and end view, respectively, of the rail shown in Figs. 11 and 12. Figs. 4 to 9 and 11 to 14, inclusive, are drawn on a scale somewhat larger than the remaining figures.

Referring to the details of the drawing, 10 represents the lock-stile, 11 the hinge-stile, 12 the top-rail, 13 the lock-rail, 14 the bottom rail, 15 the upper panels, and 16 the lower panels which constitute the main members forming, when properly assembled, my improved door.

17 represents the removable stile-end closure and 18 the fixed stile-end closure, which with the members above named complete the door structure.

The lock-stile 10 is formed from a single piece of sheet metal bent to the rectangular, in cross-section, form shown, and of such size and proportions that it extends the full height of the door and represents the maximum thickness thereof. The longitudinal marginal portions of this stile are bent inwardly and rebent upon themselves to form hook-shaped, in cross-section, flanges 10<sup>b</sup>. The upper ends of the sides of the stile are cut to extend beyond the ends of the meeting face and flanges, and are bent inwardly and rebent to form double flanges 10<sup>c</sup>, shown in Figs. 4 and 5. In the meeting face of the stile; at its upper end, are cut slots 10<sup>a</sup>, for a purpose to be disclosed. The lower end of the stile is cut off square all around and is without flanges or slots.

The hinge-stile 11 is formed from a single sheet of metal bent to the same form and proportions as the stile 10 and has inturned longitudinal flanges 11<sup>b</sup> corresponding to the flanges 10<sup>b</sup> of the stile 10, but is without flanges at the upper or lower end, and has no slots or other openings cut in its



sides. The top-rail 12 is also formed from a single piece of metal bent to substantially the same rectangular cross-sectional area and shape as the stiles. The portions forming the lower faces 12<sup>a</sup> of this rail are bent upwardly as at 12<sup>b</sup> and then rebent upon themselves to form flanges 12<sup>c</sup> which lie parallel to the upturned portions 12<sup>b</sup> and are slightly spaced therefrom to provide a slideway for the upper margins of the panels 15. The side portions of the top-rail are cut to extend beyond the ends and are bent inwardly as at 12<sup>d</sup> and then rebent to form hook-shaped flanges 12<sup>e</sup> which interlock with the longitudinal flanges 10<sup>b</sup>, 11<sup>b</sup>, of the lock and hinge stiles respectively.

The lock rail is formed in two sections 13, of identical construction, arranged upon opposite sides of the door. Each section is constructed from a single piece of metal bent into parallelogram form, in cross-section. The inner side of each section is open along the middle line, forming a longitudinal slot the margins of which are bent to lie parallel with said inner side and spaced therefrom to form a hooked flange 13<sup>a</sup> which receives the corresponding margins of the panels 15, 16. The end portions 13<sup>b</sup> of each section are bent inwardly and then rebent outwardly to form hook shaped flanges 13<sup>c</sup> which lie parallel to the portions 13<sup>b</sup>, and at a slight distance therefrom to provide a slide-way and interlock for the flanges 10<sup>b</sup> and 11<sup>b</sup> of the lock and hinge stiles.

The bottom rail 14 is identical in form and construction with the top-rail 12, the only difference being that its position is reversed. The said rail 14 has inwardly extending portions 14<sup>a</sup> forming its upper faces and these portions are bent downwardly and then rebent upon themselves to form the spaced flanges 14<sup>b</sup>, 14<sup>c</sup>, to provide a slideway for the lower margins of the panels 16. The side portions of this rail, as in the case of the upper rail previously mentioned, are cut to extend beyond the ends and are bent inwardly, as at 14<sup>d</sup> and then rebent to form inwardly turned hook-shaped flanges 14<sup>e</sup> which interlock with the longitudinal flanges 10<sup>b</sup>, 11<sup>b</sup>, of the lock and hinge stiles, respectively.

The upper open end of the lock stile 10 is closed by a plate 17 having its rear portion 17<sup>a</sup> extending beyond the stile and into the cavity of the top rail, where it lies in apposition with the under face of the upper side of said rail, as shown in Figs. 1 and 2. The plate 17 (see Fig. 7) has its lateral margins bent downward and then rebent upon itself, the extreme edge being again bent downward between the other portions, forming a double hooked flange 17<sup>d</sup>, which interlocks with the flange 10<sup>c</sup> of the lock stile, as clearly shown in Figs. 4 and 5.

The plate 17 is secured in position by screws

which pass through holes 17<sup>e</sup> in said plate and engage threaded holes in a block 17<sup>b</sup> secured by rivets 17<sup>i</sup> to the inside of the lock-stile at the top. In the center of the plate 17 is a hole 17<sup>f</sup> for the insertion of a hook or other tool to facilitate the removal of the plate. The extension portion 17<sup>a</sup> has riveted to the underside, a reinforcing block 17<sup>b</sup> provided with a central screw hole 17<sup>c</sup> the purpose of this block being to provide a sufficient hold for the screw 17<sup>k</sup>. The lower ends of the lock-stile and both ends of the hinge-stile are closed by plates 18, each having an extension 18<sup>a</sup> projecting into the adjacent end of the corresponding rail, in the same manner as the extension 17<sup>a</sup> of the plate 17. The plate 18 has on three sides, flanges 18<sup>b</sup> which fit within the stile ends. These plates are secured in place when assembled by soldering or welding along the joints between them and the top and bottom edges of the stile and thus form permanent closures for the stile ends, in contradistinction to the plate 17 which is removable for the purpose of giving access to the interior of the lock-stile 10 whenever desired.

The panels 15, 16, are alike upon opposite sides of the door and differ from each other in respect to their longitudinal dimensions only. Each of said panels consists of a single plate, having its lateral margins provided with flanges the extreme edges of which are rebent upon themselves to form hook shaped members 16<sup>a</sup> which interlock with the flanges 10<sup>b</sup>, 11<sup>b</sup>, of the lock and hinge stiles respectively, and their upper and lower margins are received in the slideways previously described as being formed by the rebent margins of the members 12, 13, and 14.

The manner of assembling the units comprising the completed door, is illustrated in Fig. 10, which shows the lock-stile and top rail in assembled relation, the flange 10<sup>b</sup> of the stile being interlocked with the hook flange 12<sup>e</sup> of the rail. Immediately below the said rail but separated therefrom are the two spaced apart upper panels 15, having their hook shaped flanges 15<sup>a</sup> interlocking with the flanges 10<sup>b</sup> of the lock-stile. This interlocking engagement is produced by sliding the said panel flange over the lower end of the stile flange, and moving the panel longitudinally on the stile until its upper margin enters its seat between the flanges 12<sup>c</sup>, 12<sup>d</sup>, of the top-rail. Below the upper panels are seen the sections of the lock-rail with their hooked end flanges 13<sup>b</sup>, 13<sup>c</sup>, engaging the stile flanges 10<sup>b</sup>, the assembling being done by sliding the rail-flange upon the lower end of the said stile flanges 10<sup>b</sup>, as in the case of the panel, and the hooked flanges of the remaining panels and the bottom rail are in like manner slid upon



the said flanges 10<sup>b</sup>. It will be understood that the members intermediate the top and bottom rails may be assembled upon the stiles before the said rails are placed in position, so long as the said members are arranged in proper relation, with each other, and the top and bottom rails may then be assembled.

After the parts are interlocked, as above described, it will be necessary to secure them against displacement. This is accomplished by the plates 17, 18, and their attachments. The plates 18 are placed in position as shown in the drawing, and the margins soldered or welded to the adjacent members. As previously stated, there are three of the closures 18, placed at the bottom of each stile and at the top of the hinge stile. The open end of the lock stile is closed by applying the plate 17, and the screws inserted in the holes 17<sup>s</sup> and 17<sup>c</sup>. These screws are depended upon to secure the plate in position, no welding or soldering being used in connection with this plate. This closure may thus be removed at any time by taking out the screws and withdrawing the plate by means of a hook inserted in the hole 17<sup>t</sup>, the slots 10<sup>a</sup> permitting the passage of the flanges 17<sup>d</sup>. After the door has been put together in the aforesaid manner, any moldings suited to the requirements may be applied and the entire structure then coated with paint in the usual manner.

It will be obvious that the plates 17 may be used at all corners of the door in which case, the result will be a "knock-down" structure. When so made the door can be shipped in a "knocked-down" condition and then readily put together and secured by the screws, or the plates may be soldered in place as described for the plates 18, and the door then painted, thus producing a complete door, finished and secured in as desirable a manner as if assembled in the factory, and this procedure may be accomplished by any one having ordinary mechanical skill, since the soldering may be done by a tinner using ordinary tools found in all tin shops.

It will be noted that the stiles and rails are open along the median line toward the interior of the door and through these openings the interior of these members all communicate with the space between the panels upon the opposite sides. To increase the heat resisting power of the structure this entire space is occupied by a sheet of fire-proof material 19, asbestos board being preferred for this purpose.

Having thus described my invention, what I claim is:—

1. In a fire-proof structure including a hollow metal stile and a hollow metal rail connected therewith, said stile being open at its

end, a closure for said stile and means for detachably connecting said closure with said rail and with said stile.

2. In a fireproof structure including a hollow metal stile and a hollow metal rail, said stile and rail having interengaging marginal flanges and said stile being open at one end, a closure for said stile, said closure comprising a metal plate having a portion projecting into and detachably secured within the rail and another portion fitting said stile opening and detachably secured therein.

3. A door comprising hollow metal stiles provided with openings, hollow metal rails interlocking with said stiles, panels interlocking with the stiles, and removable closures fitting said stile openings and engaging said rails.

4. In a door, the combination of hollow metal stiles, having open ends, hollow metal rails interlocking with the stiles, metal panels interlocking with the stiles and engaging the rails, the panels upon opposite sides of the door being spaced apart, a filling of fire-proof material arranged between said panels and the walls of said stiles and rails, fixed closures for some of the stile ends and a removable closure for one of the stile ends.

5. In a door, the combination of hollow metal stiles having open ends, hollow metal rails adapted to slidably engage the stiles and interlocking therewith, panels slidably engaging the stiles and rails and interlocking with the stiles, a removable closure slidably engaging the end of one of the stiles, and fixed closures for the other ends of the stiles.

6. In a metal door, a hollow lock-stile, a hollow hinge-stile and hollow rails connecting said stiles, each of said stiles and rails formed from a single piece of metal bent to provide interlocking flanges whereby the edges of said flanges and the openings between the opposed flanges of each member will be within the walls of said stiles.

7. In a sheet metal closure, hollow-stiles, each formed from a single piece of metal having inwardly extending side flanges, hollow rails, each formed from a single piece of metal having end flanges adapted to inter-slide and interlock with the side flanges of the stiles within the latter, and means for retaining said stiles and rails in their assembled relation.

8. In a sheet-metal closure, hollow stiles, having inwardly extending side flanges, hollow rails having outwardly extending end flanges adapted to slidably engage and interlock with the flanges of the stiles within the stiles and readily detachable means for retaining said stiles and rails in their assembled relation.

9. A sheet metal structure comprising hollow side members having inturned double flanges along their longitudinal edges, hollow



cross-members having outwardly turned  
double flanges at their ends adapted to in-  
terlock with the said flanges of the side  
members, and having inwardly turned  
5 double flanges along their longitudinal  
edges, panels having their side edges inter-  
locking with said flanges of the side mem-  
bers and clamped by the longitudinal  
flanges of the cross members, and means for

holding said members in their assembled re- 10  
lation.

In testimony whereof I affix my signature  
in the presence of two witnesses.

THOMAS P. SHEAN.

Witnesses:

H. DELOS HIGMAN,  
F. BENJAMIN.