

**Aug. 20, 1935.**

**R. L. HOHL**

**2,012,070**

BUILDING CONSTRUCTION

Filed Dec. 6, 1932

3 Sheets-Sheet 1

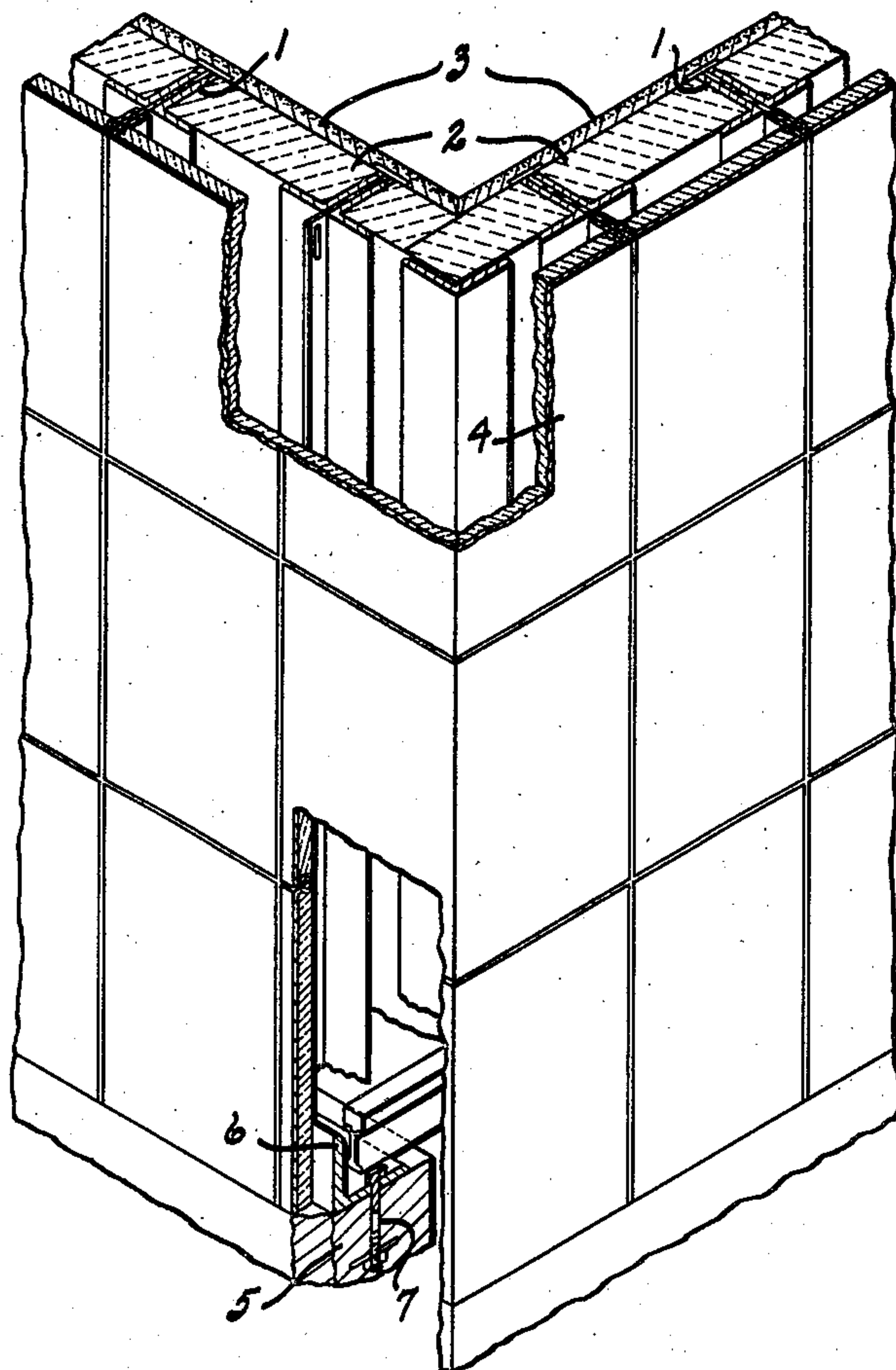
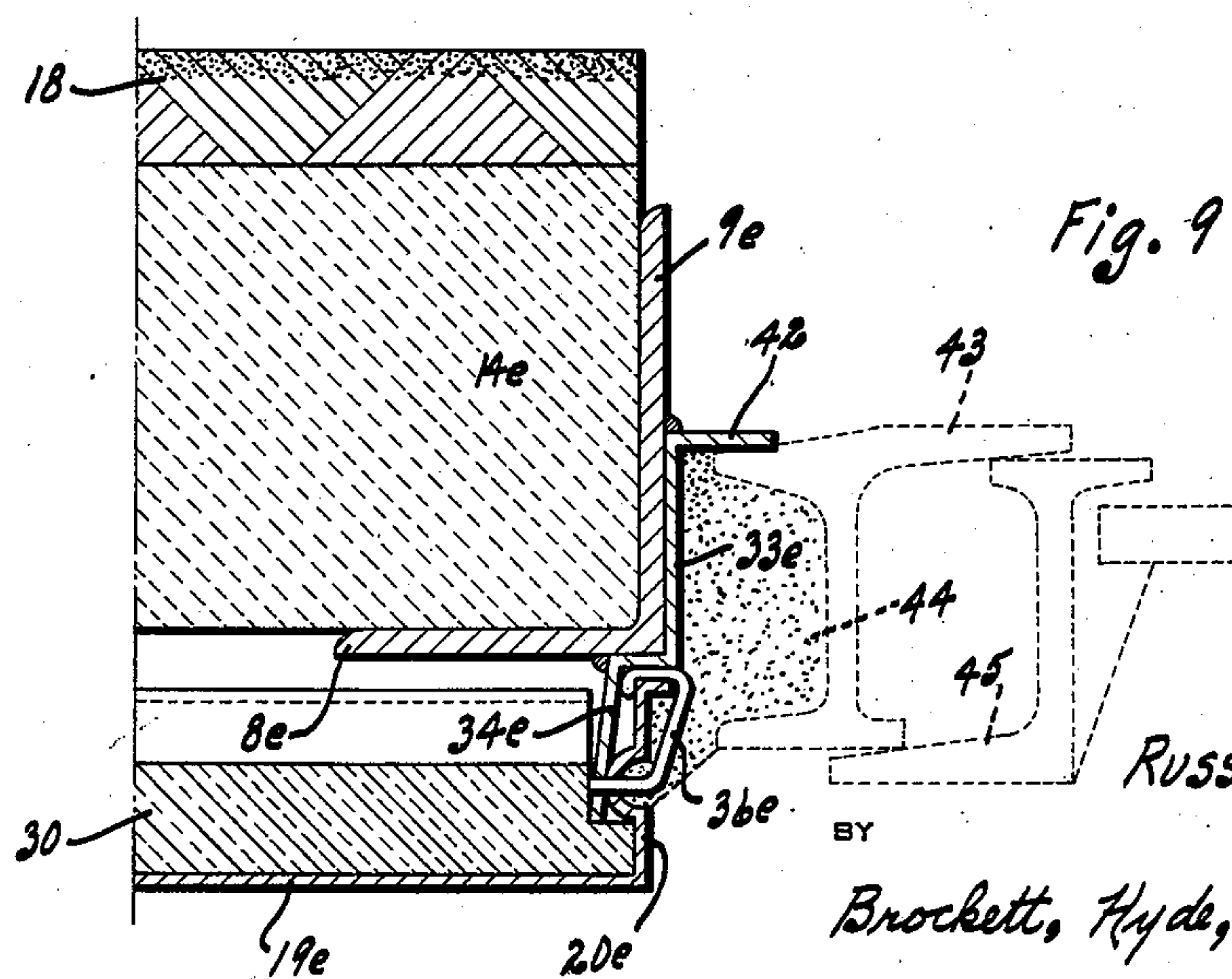


Fig. 1



*Fig. 9*

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3 Sheets-Sheet 2

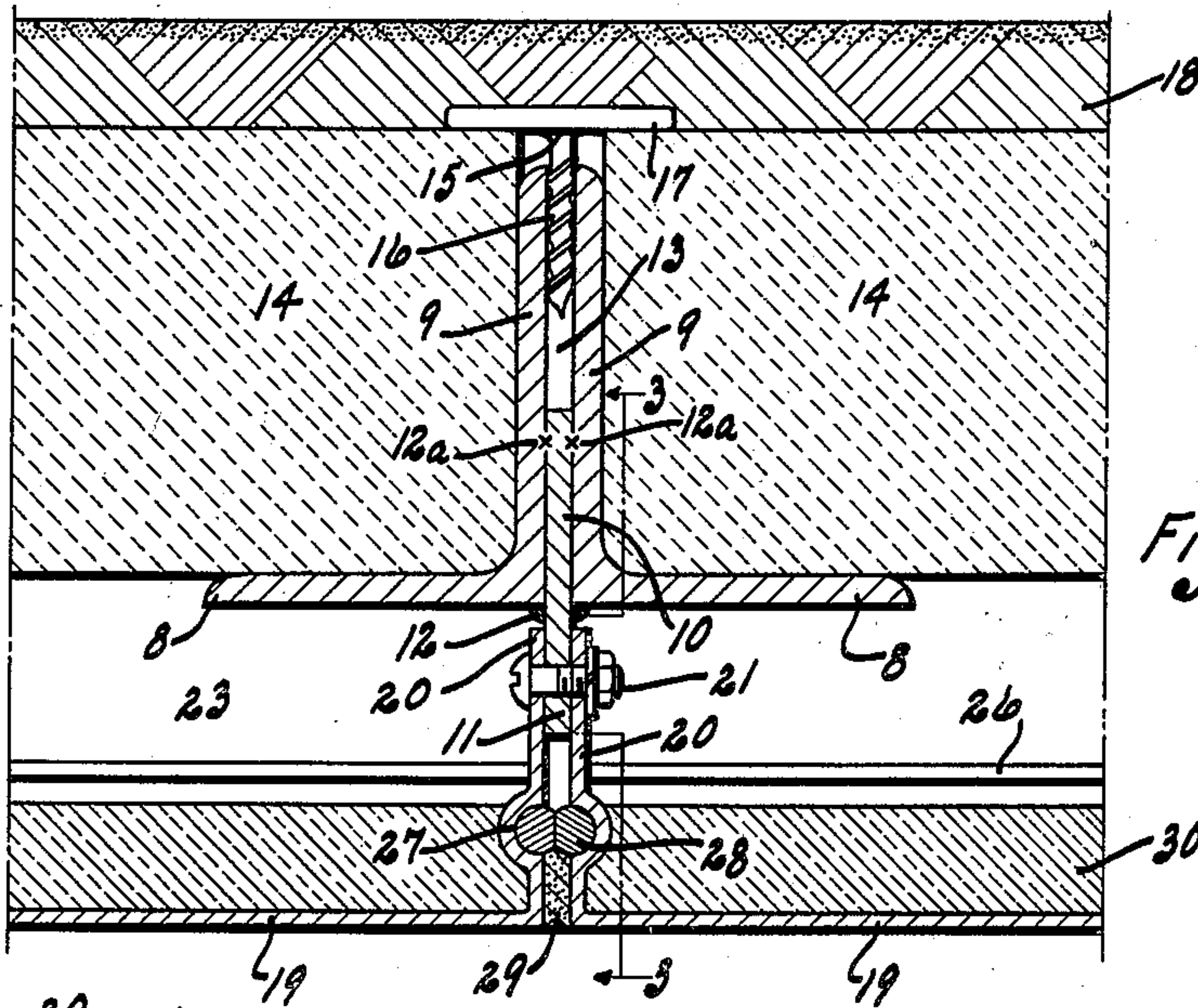


Fig. 2

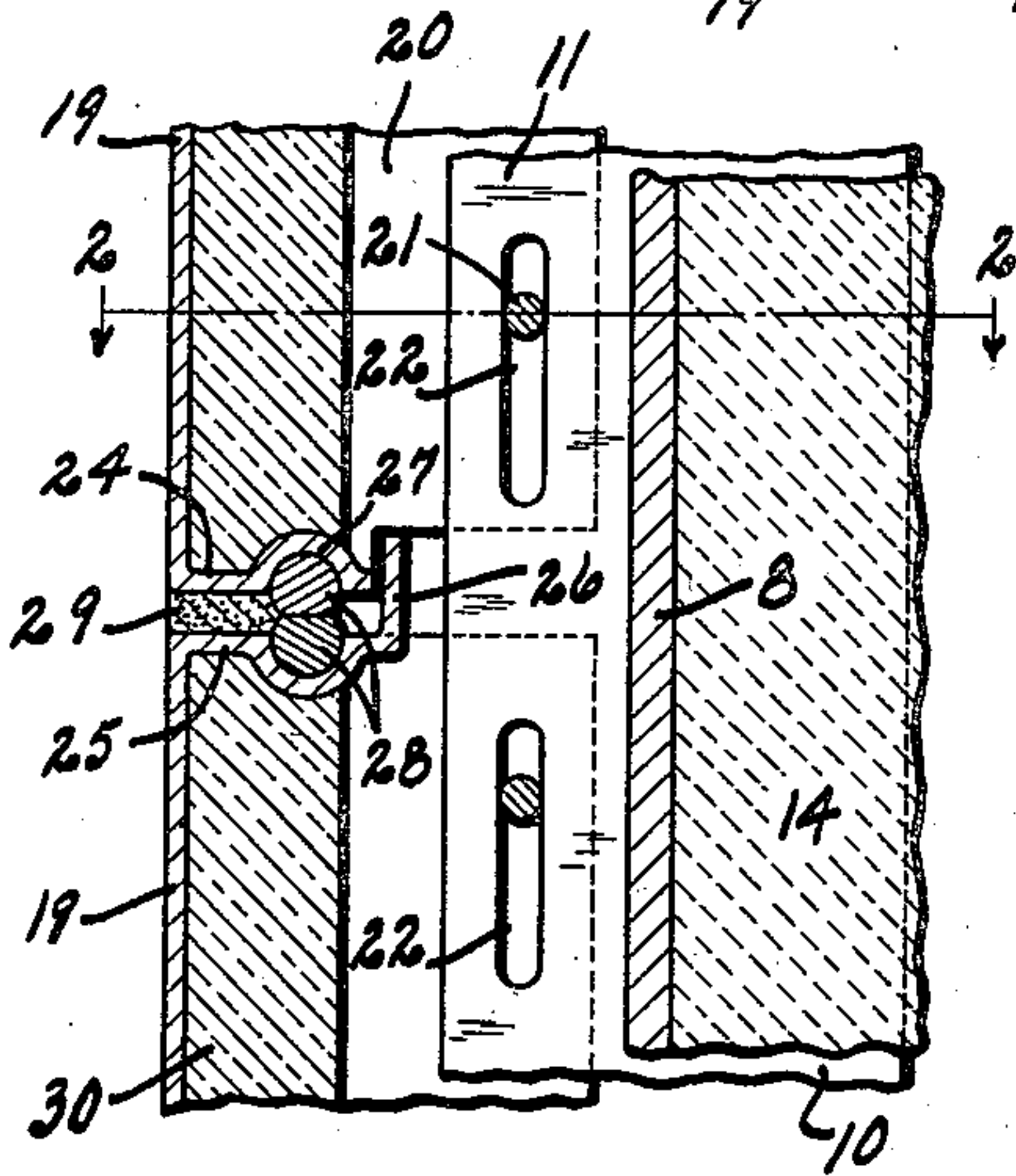


Fig. 3

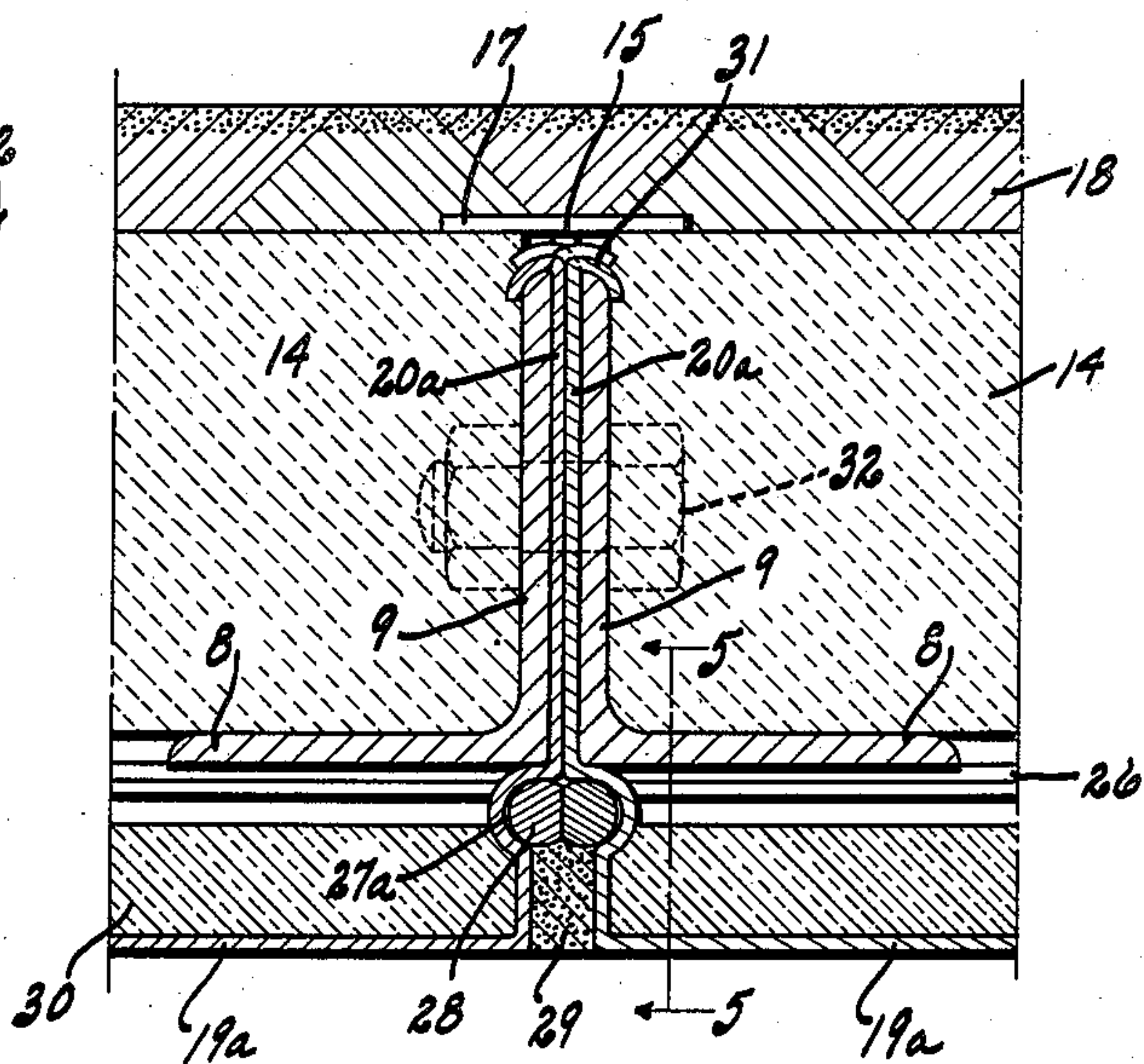


Fig. 4

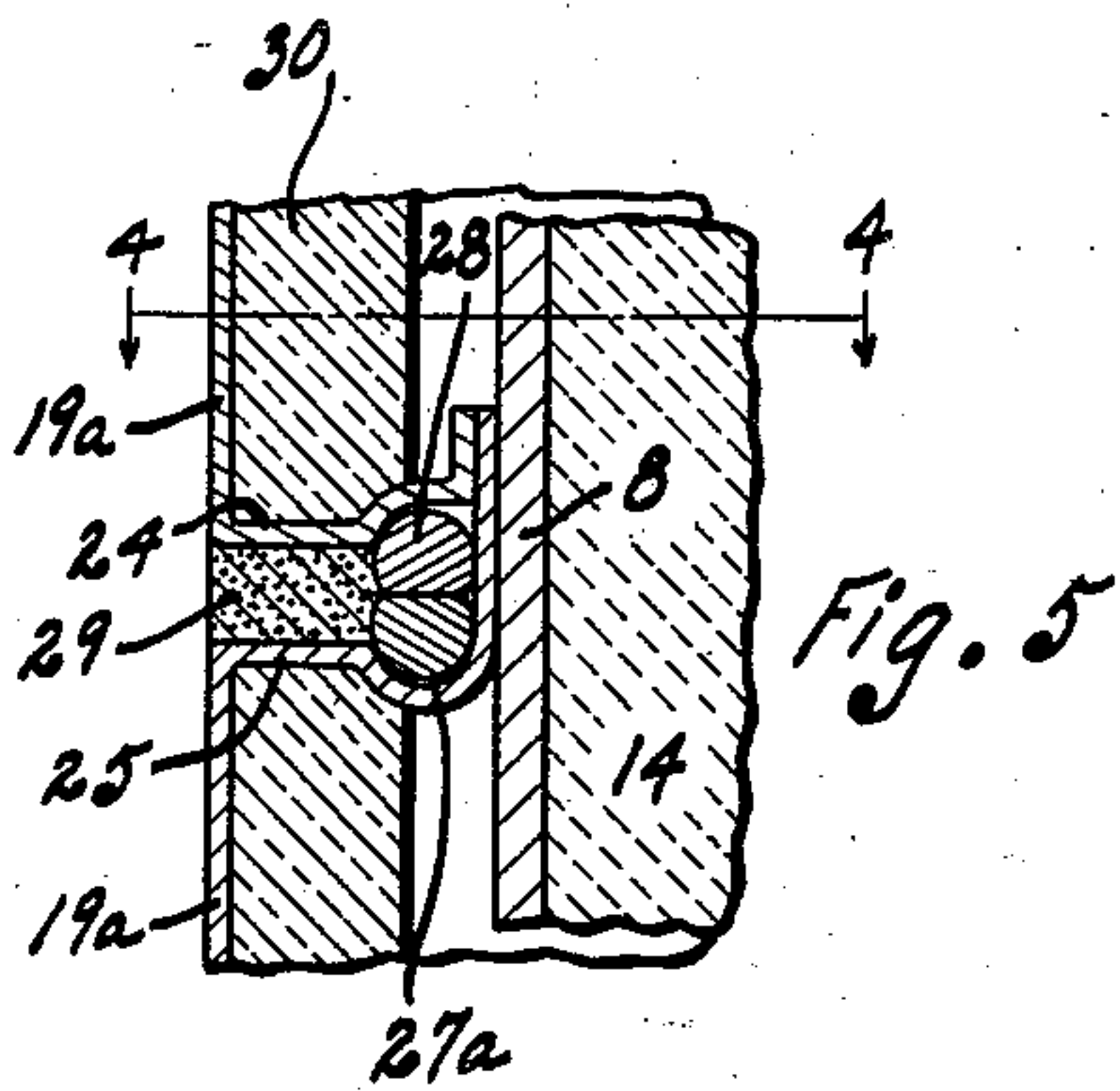


Fig. 5

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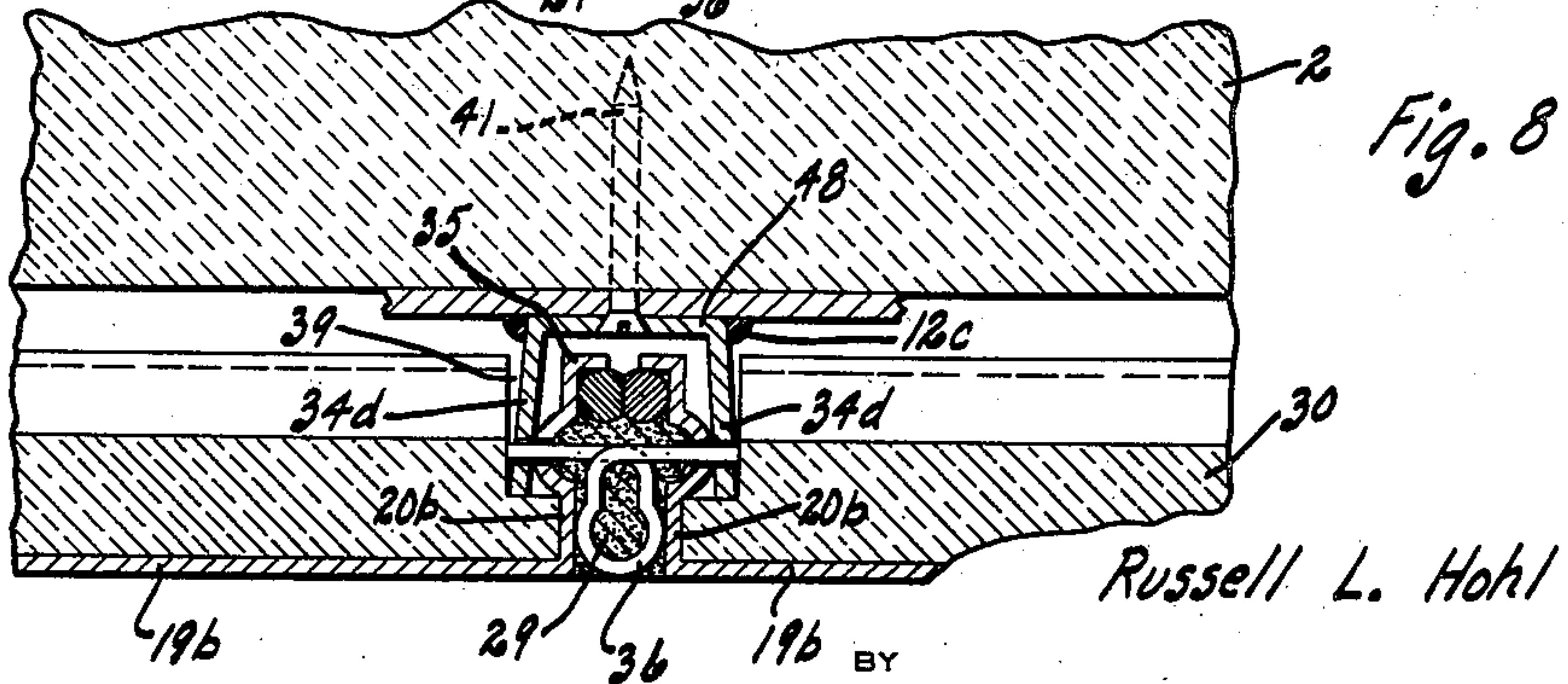
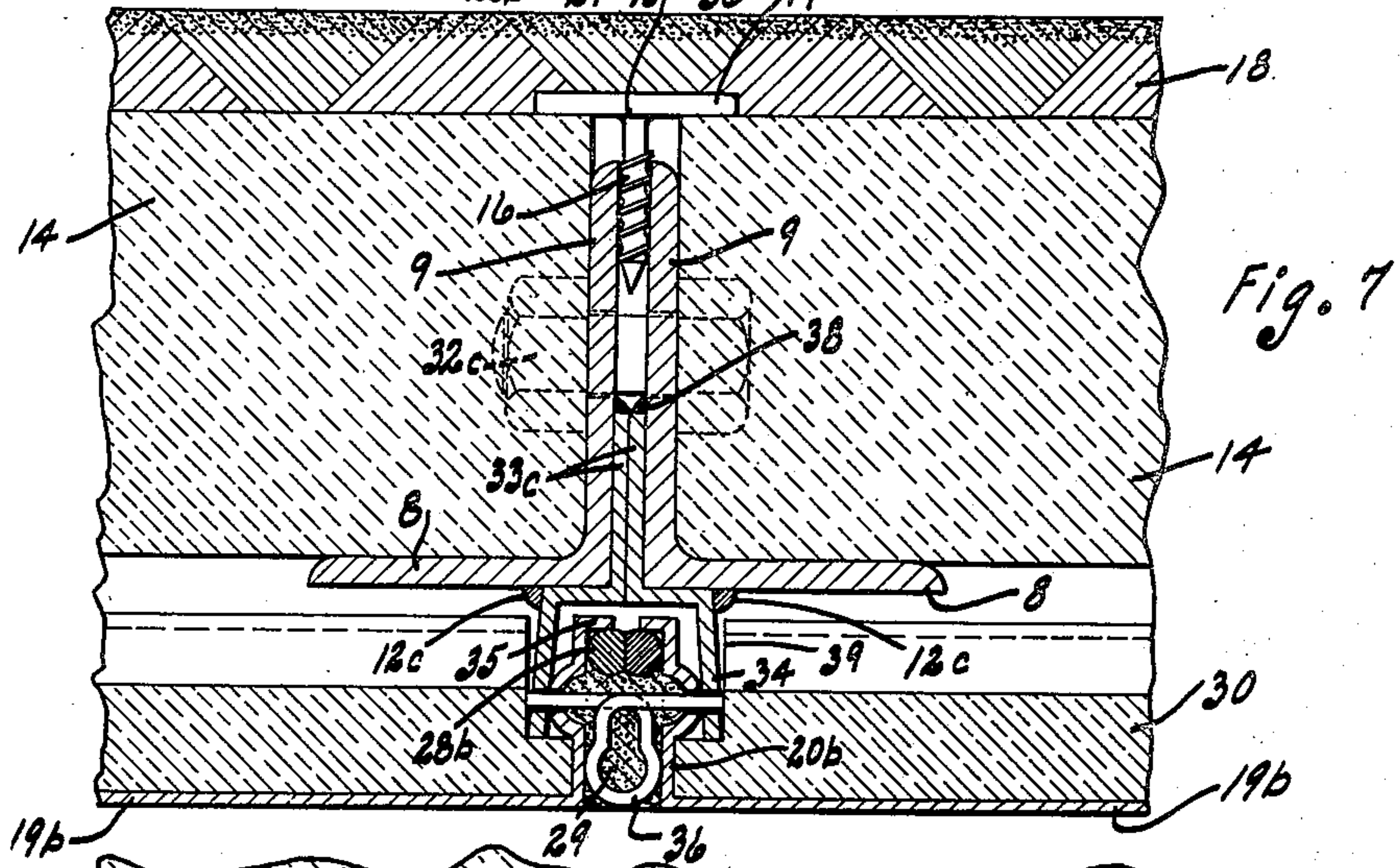
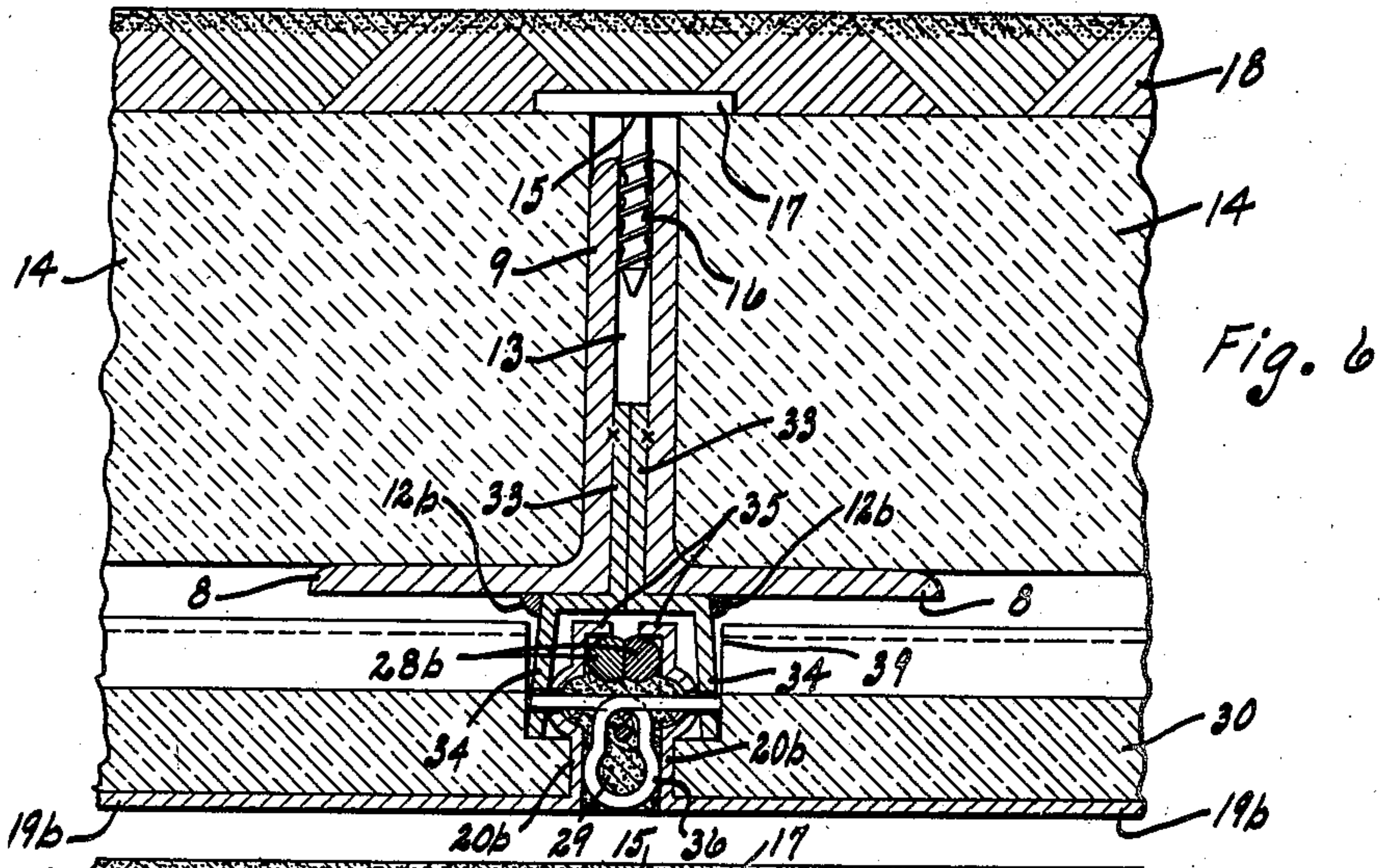
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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,012,070

## BUILDING CONSTRUCTION

Russell L. Hohl, Shaker Heights, Ohio

Application December 6, 1932, Serial No. 645,958

8 Claims. (Cl. 72—16)

This invention relates to exterior wall structures for buildings. It is particularly adaptable to private dwelling houses and like buildings and contemplates the employment of metal.

5 The object of the invention is to employ metal in so far as is practicable and to the best advantage, so that considerable of the assembly may be made before erection and all of the assembly may be made expeditiously. Another object of the invention is to provide for an exterior surfacing of metal in panels which may be easily applied and which will serve in the structure to the best advantage.

10 The exact nature of this invention together with further objects and advantages thereof will be apparent from the following description taken in connection with the accompanying drawings, in which Fig. 1 is a perspective view of the corner part of a building structure illustrative of the invention, parts being broken away to show details; Fig. 2 is an enlarged detail in horizontal section taken as at one of the frame members illustrated in Fig. 1; Fig. 3 is a detail as in the plane of line 3—3, Fig. 2, the plane of Fig. 2 being indicated by the line 2—2, Fig. 3; Fig. 4 is a view corresponding to Fig. 2 but illustrating a modification; Fig. 5 is a detail as in the plane of line 5—5, Fig. 4, the plane of Fig. 4 being indicated by the line 4—4, Fig. 5; Figs. 6, 7 and 8 are views similar to Figs. 2 and 4 but illustrating further modifications; and Fig. 9 is a detail in horizontal section at a window opening.

With reference now to the drawings, and particularly to Fig. 1, the general arrangement of the wall structure includes a frame-work of spaced vertically extending frame elements, each generally designated at 1, of rolled structural steel sections, upon which are supported the other wall parts. These parts include filler means indicated at 2 disposed between the frame elements, interior finish means 3 overlaid upon the filler means on the inside of the wall, and exterior surfacing means 4 on the outside of the wall and preferably spaced from the filler means.

45 The frame elements 1 as indicated rise from a foundation 5, to which they are secured as by welding or bolting to the angle irons 6 running therealong and keyed to the foundation by bolts 7.

50 With reference now to Figs. 2 and 3, the frame element is built up of a number of parts. The principal of these parts are a pair of angle irons disposed to form a section generally of T-form, with a pair of arms 8 lying with the wall, that is, in the general plane of the wall, and a pair

of leg members 9 disposed in closely adjacent but spaced relation and together forming the leg of the T-section. As indicated in Fig. 2 the spacing of these angle irons may be determined by a plate member 10 extending partly therebetween with a rib part 11 extending therebeyond opposite the legs 9 to form a central projecting flange, the three parts being permanently secured together as by the welding indicated at 12 and 12a. It will be observed that the deep crevice or opening 13 between the legs 9 opens inwardly of the wall and runs therealong, with the frame member. Its opening may be bridged at intervals by means such as welds connecting the free ends of the legs 9, to give rigidity to the frame element, but nevertheless is substantially uninterrupted for the purpose to be described.

The filler means 2 are in the form of blocks and may be of gypsum, tile, brick or the like. Their relation with the frame elements is such that their end parts 14 will extend into or seat within the angles of the T-sections, preferably with each block extending between a pair of T's each end of the block seating in one of the angles of each T. The blocks are of thickness to extend slightly beyond the legs 9 of the T's as indicated Fig. 2.

The blocks are secured so positioned by screws 15 having hardened shank parts 16 and enlarged head parts 17. The screw shanks 16 are adapted to cut their own threads in the opposed faces of the frame members 9 as they are driven into the opening 13, so that they will be retained in their assembled relation. Their heads 17 are large enough to overhang the members 9 and thus bear against the adjacent block ends 14. Since the opening 13 runs substantially entirely along the frame element, screws 15 may be driven thereinto wherever desired, as many as necessary dependent upon the size and nature of the filler blocks.

45 An interior finish coat 18 of plaster or the like may be overlaid upon the blocks and the screw heads 17, so that the wall has a finished interior face.

The exterior surfacing means is in the form of rectangular panels 19, each panel proper being peripherally flanged and thus generally in the form of a pan. The vertically extending flanges 20 of the panels are deep as indicated Fig. 2, and perforated to receive bolts 21. The rib parts 11 of the frame elements 1 are vertically slotted at intervals as indicated at 22 to receive the bolts 21. Thus if the horizontal dimensions of the panels 19 correspond with the horizontal



spacing of the frame elements, each pair of frame elements will be bridged by a vertically extending row of panel members, and the filler blocks between the frame elements completely overlaid with the exterior surface panels. The side flanges 20 of the panels being deep as indicated, the panel members will be offset from the filler blocks with a substantial space 23 therebetween.

Each surfacing panel 19 has a short flange 24 running along its lower extremity and a flange 25 along its upper extremity and terminating in an upwardly turned lip 26 adapted to back the inner extremity of the bottom flange 24 of the next above panel; all as indicated Fig. 3.

For each panel 19 all of its four flanges are deformed to provide a groove 27 of curved conformation running peripherally about the panel. These grooves receive gaskets 28, one for each panel and extending thereabout. Thus for each pair of adjacent panel edges there will be two gaskets 28 seated in opposite recesses 27 and bearing against each other as indicated Figs. 2 and 3. These gaskets act as sealing means against moisture, but in addition elastic cement 29 is inserted into the groove between panel members and bottomed by the gaskets 28 to insure and improve the seal and to provide a trim.

The panels 19 are preferably of metal, and may be of sheet metal with their flanges integral as indicated. Their outer faces may be finished with vitreous enamel or the like baked on before the assembly, or they may be simply painted. Each surfacing panel 19 may be backed by a liner 30 of sound and heat insulating material retained in position by underlying the surrounding bulges formed by the recesses 27.

It will be apparent that the finished wall has rigidity and supporting strength by its included metal frame elements of structural steel. Commencing with the outer face the wall includes an exterior surfacing of enamelled metal or the like 19, a liner 30 therefor, a dead air space 23, thick filler block means 2, and a surfacing of interior trim 18.

With reference now to the modification of Figs. 4 and 5, the arrangement is the same as before with the exception of the manner of securing the exterior surfacing panels to the frame elements. Here the legs 9 of the frame element 1 are separated by a pair of members 20a which constitute extensions or enlargements of the vertically extending flanges on the sides of the exterior surfacing panels 19a. The deformations 27a of these flanges, in which the gaskets 28 are positioned as before, now bear directly against the arms 8 of the frame element, and the free ends of the flanges 20a are split and bent alternately as indicated at 31 to engage the ends of the legs 9. The legs and flanges are then bolted together as by the bolts 32. The ends 14 of the filler blocks are secured by screws 15 as before, the flanges 20a being cut away at intervals to provide clearances for entry of the screws. A finished coat 18 of plaster or the like may be added as before on the interior wall surface. Fig. 5 shows the arrangement of the top and bottom flanges of the panels 19a, and their sealing means; and this being generally as before requires no detailed explanation.

With reference now to the modification of Fig. 6 another alternate manner of securing the exterior surfacing panels to the frame elements is shown. Here the leg members 9 of the frame element are separated by a pair of members 33

which extend outwardly beyond the arm members 8 and are bent to form a channel having spaced sides 34. The assembly is fixed as by welds 12b and welds across the ends of the legs 9 generally as before. The side flanges 20b of the panels 19b are provided with inwardly turned terminating lips 35 against which the gaskets 28b bear. The flanges 20b are secured with the sides 34 of the channel by wire spring clips 36, the parts being perforated as indicated to receive the ends of the clips. Insertion or removal of the clips is had by twisting the latter. The space between panels in which the clips lie is sealed by elastic cement 29 as before, and the wire 37 may be run along the joint in the eyes of the clips 36, to reinforce the cement.

The arrangement of Fig. 6 is superior to that of Fig. 2 in that the exterior surfacing may be added after completion of the remaining wall assembly, whereas in the arrangement of Fig. 2 the bolts 21 must be manipulated to secure the exterior surfacing before the assembly of the filler blocks 2.

The arrangement of Fig. 6 has another advantage in that it permits a separation of wall sections along the center line of the joint, that is, provided the two edges of the channel are separately welded to the two angle irons, each to its own, as at 38. A wall section including a number of vertical frame elements may be made up as a unit in the shop and subsequently assembled in the field with another such unit as by bolting together the leg parts 9 of the end frame element parts. Such arrangement is indicated in Fig. 7, the bolts being shown at 32c and each half of the channel-forming member 33c being shown as welded to its leg member 9 at 38 as well as at 12c.

In both these forms the top and bottom flanges of the exterior surfacing panels are cut away as at 39 to clear the channel sides 34.

It may be desirable to space the vertical frame element of the wall wider than the unit width of the exterior surfacing panels. Fig. 8 shows how this may be done with panels of the form shown in Figs. 6 and 7. The arrangement comprises simply securing a channel member 48 directly with the filler blocks 2 between a pair of vertical frame elements, as by screw means 41. The surfacing panels are then secured to the side members 34d of the channel member 48 as before; each panel having one side flange secured with a channel running along a vertical frame element and having its other side flange secured with a channel 48 running intermediate a pair of frame elements.

With reference now to Fig. 9, there is shown an arrangement at a window opening or the like. The leg part 9e and arm part 8e of an angle iron is overlaid upon the end 14e of one of the vertical rows of filler blocks of the wall. Secured with the angle iron is a member 33e having a projecting 34e from the arm 8e, and a projecting flange 42 outstanding from the leg 9e. The side flange 20e of the surfacing panel 19e is secured with the leg 34e by a wire clip 36e. The arrangement will be observed as generally similar to one-half of the arrangement of Figs. 6 and 7, split along the center line of the joint. A window frame 43 of special rolled section is placed as indicated, abutting the flange 42 and there secured, with the intermediate space filled with cement or the like as at 44. 45 indicates the movable window sash associated with the window frame 43.



What I claim is:

1. In an exterior wall structure of the character described, a vertical frame element of T-section having its arm members disposed with the wall and its leg member directed inwardly, filler block means having end parts extending into the angles of the T, means associated with said leg member for retaining said filler means positioned in said angles, and means on the opposite side of said frame element and carried thereby for mounting exterior surfacing panels to cover said filler means.

2. In an exterior wall structure of the character described, a vertical frame element of T-section, having its arm members disposed with the wall and its leg member directed inwardly, filler block means having end parts extending into the angles of the T, means associated with said leg member for retaining said filler means positioned in said angles, and means on the opposite side of said frame element and carried thereby for mounting exterior surfacing panels in spaced relation with said filler means.

3. In an exterior wall structure of the character described, spaced vertical frame elements of T-section having their arm members disposed with the wall and their leg members directed inwardly, filler block means having their end parts extending into the near angles of adjacent T's, means associated with the leg members of the elements for retaining said filler means so positioned, and means on the opposite sides of said frame elements and carried thereby for mounting exterior surfacing panels to cover said filler means.

4. In an exterior wall structure of the character described, spaced vertical frame elements of T-section having their arm members disposed with the wall and their leg members directed inwardly and presenting an opening, filler block means having end parts extending into the angles of the T, a thread-cutting screw driven into said opening and having a head overhanging the ends of said filler block means to retain the same in said angles, and means on the opposite side of said frame element and carried thereby for mounting exterior surfacing panels to cover said filler means.

5. In a wall of the class described, means providing an outwardly opening channel, a pair of adjacent exterior surfacing panels having inwardly turned flanges at their adjacent edges, said flanges extending into the recess of said channel, and means securing said flanges therein, said securing means comprising a clip having a body part disposed between said flanges and extending through openings in the channel and flanges respectively, provided for the purpose.

6. In a wall structure of the character described, base means having means providing outwardly opening channels running therealong in parallel spaced relation, rectangular surfacing panels for said base means, each panel having opposite edges inwardly turned to provide flanges, said flanges being disposed in a pair of said channels, and, at each channel, means disposed between the adjacent flanges of the corresponding pair of panels to engage the same, and engaging said channel means to secure the panels in mounted position.

7. In a wall structure of the character described, base means having means providing outwardly opening channels running therealong in parallel spaced relation, rectangular surfacing panels for said base means, each panel having opposite edges inwardly turned to provide flanges, said flanges being disposed in a pair of said channels and being perforate, and, at each channel, means disposed in the perforations of the corresponding pair of panels and extending into the side parts of said channel means to secure the panels in mounted position.

8. In a wall structure of the character described, base means and rectangular surfacing panels therefor, each surfacing panel having its edges inwardly turned to provide peripheral flanges, means mounting said panels upon said base to cover the latter, and including for each said panel means positively connecting its vertically disposed flanges with said wall base, the uppermost horizontally extending flange of each panel having a lip upturned to underlie the lowermost flange of the panel thereabove.

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