

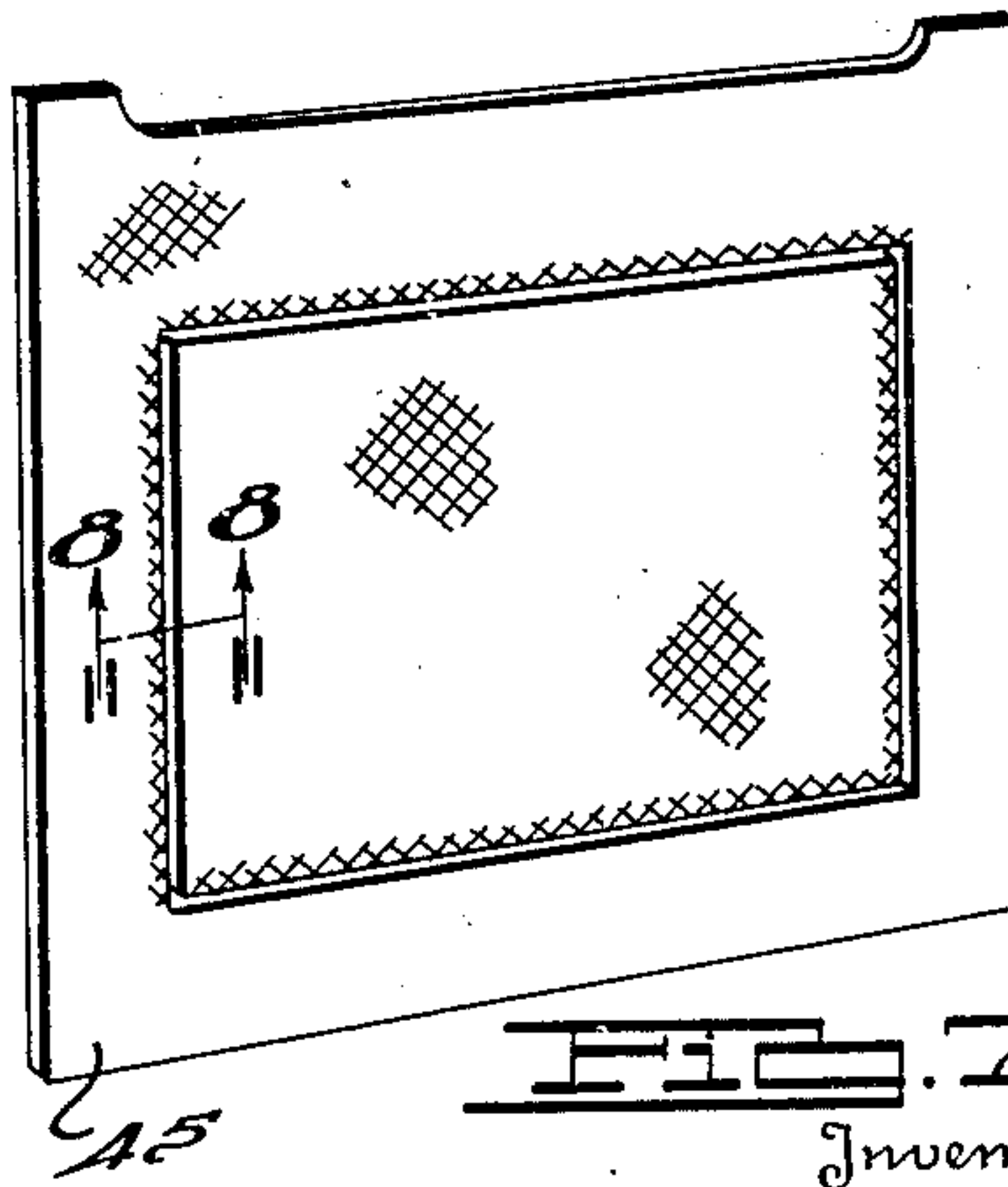
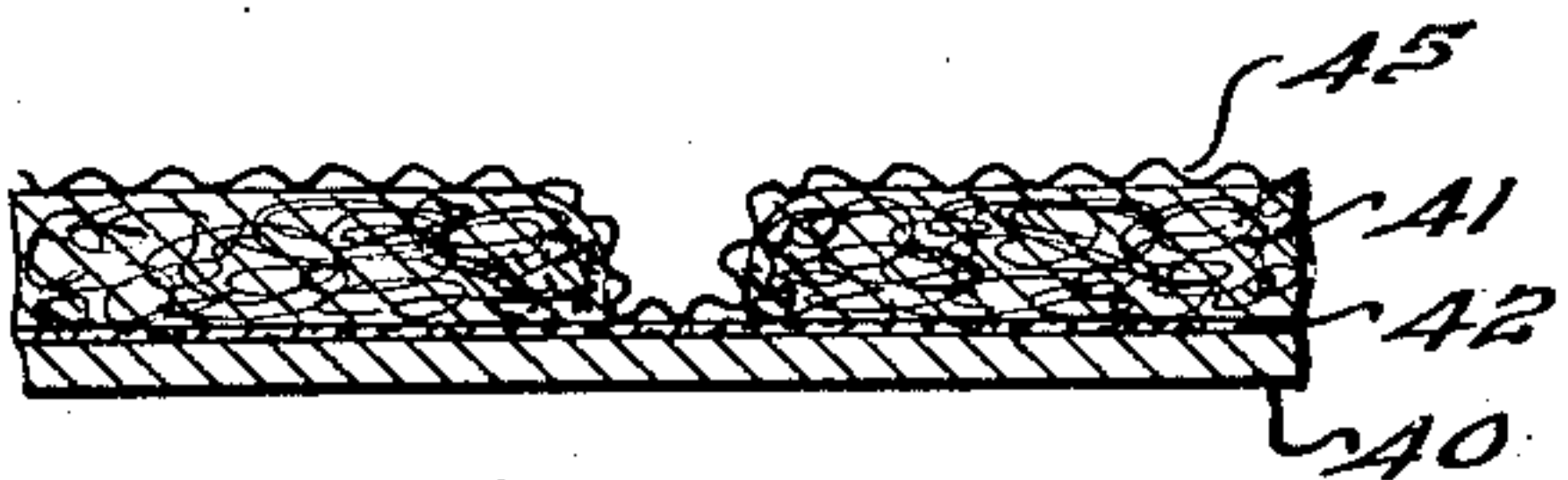
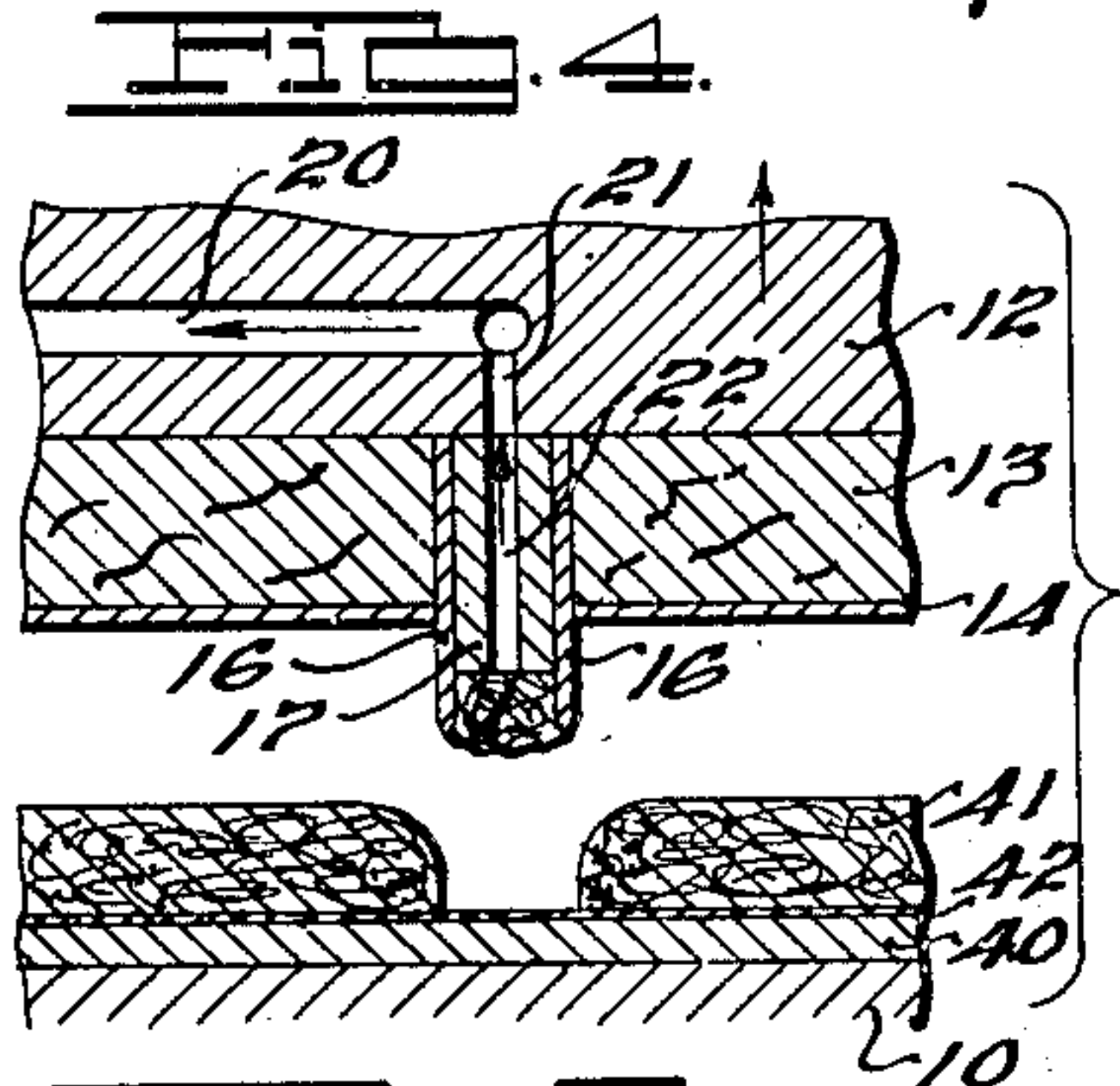
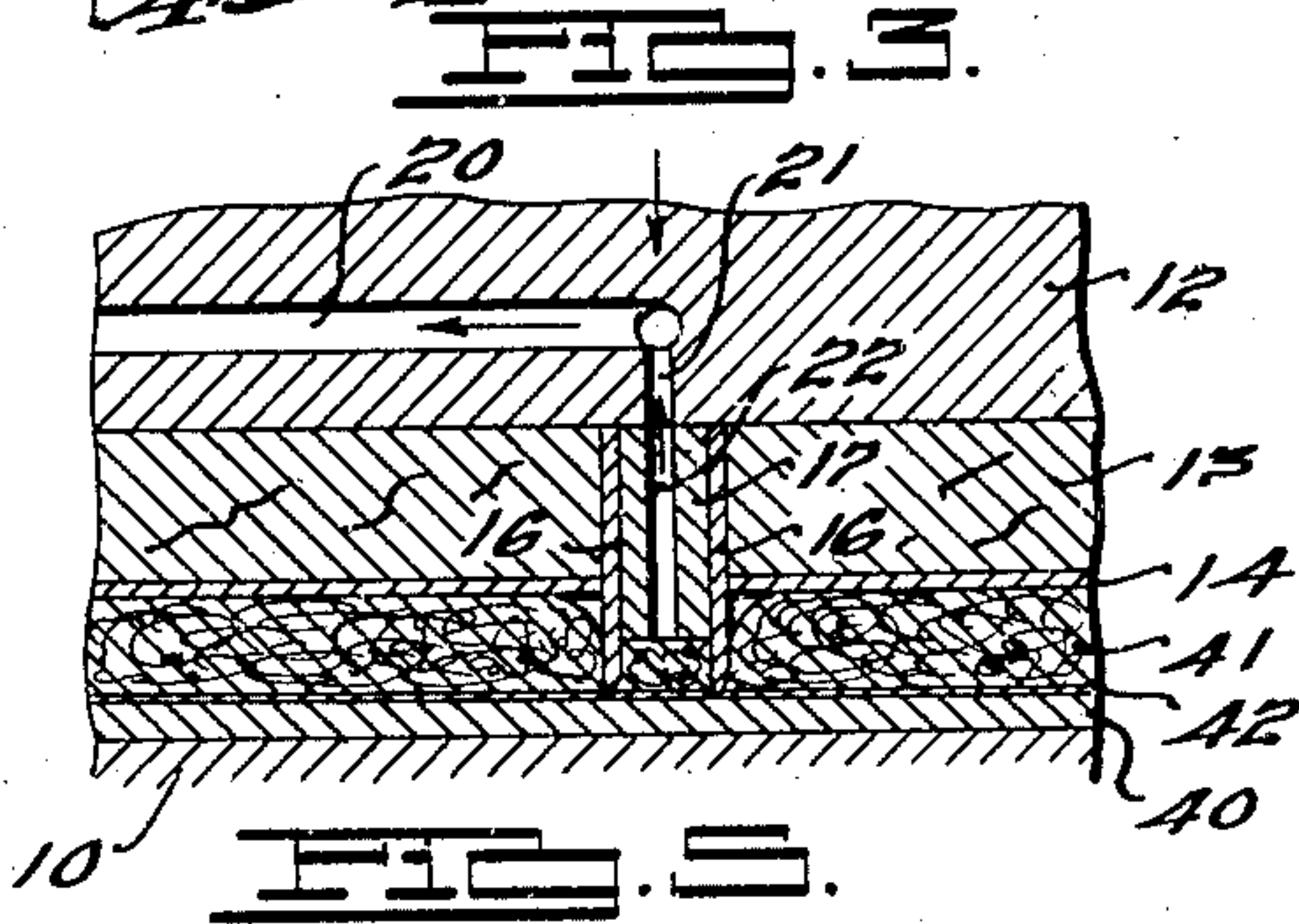
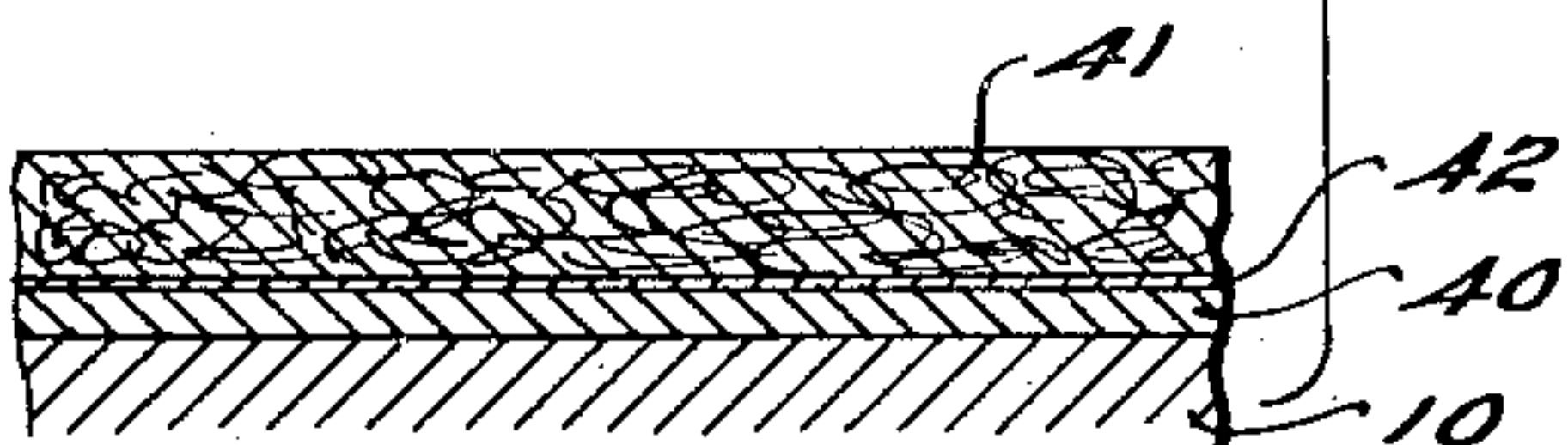
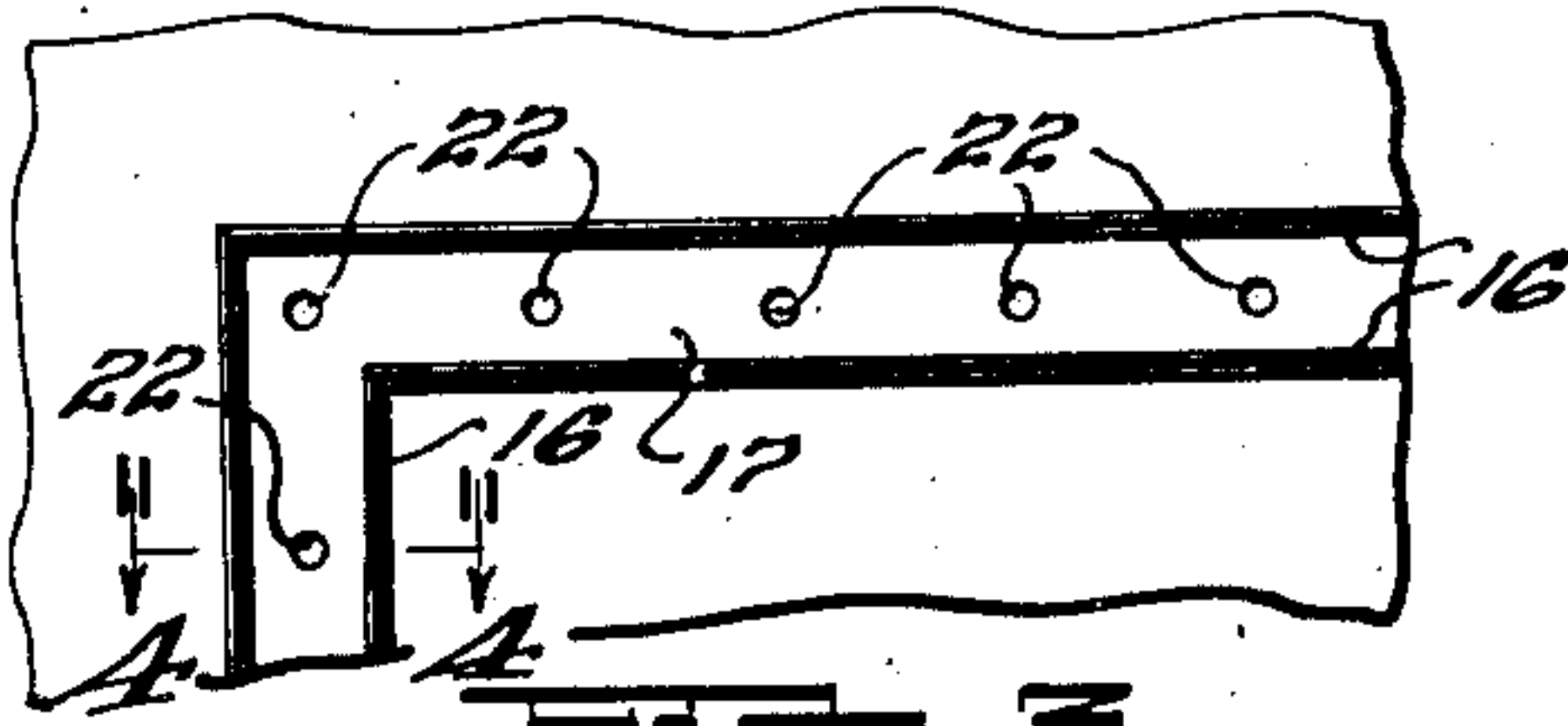
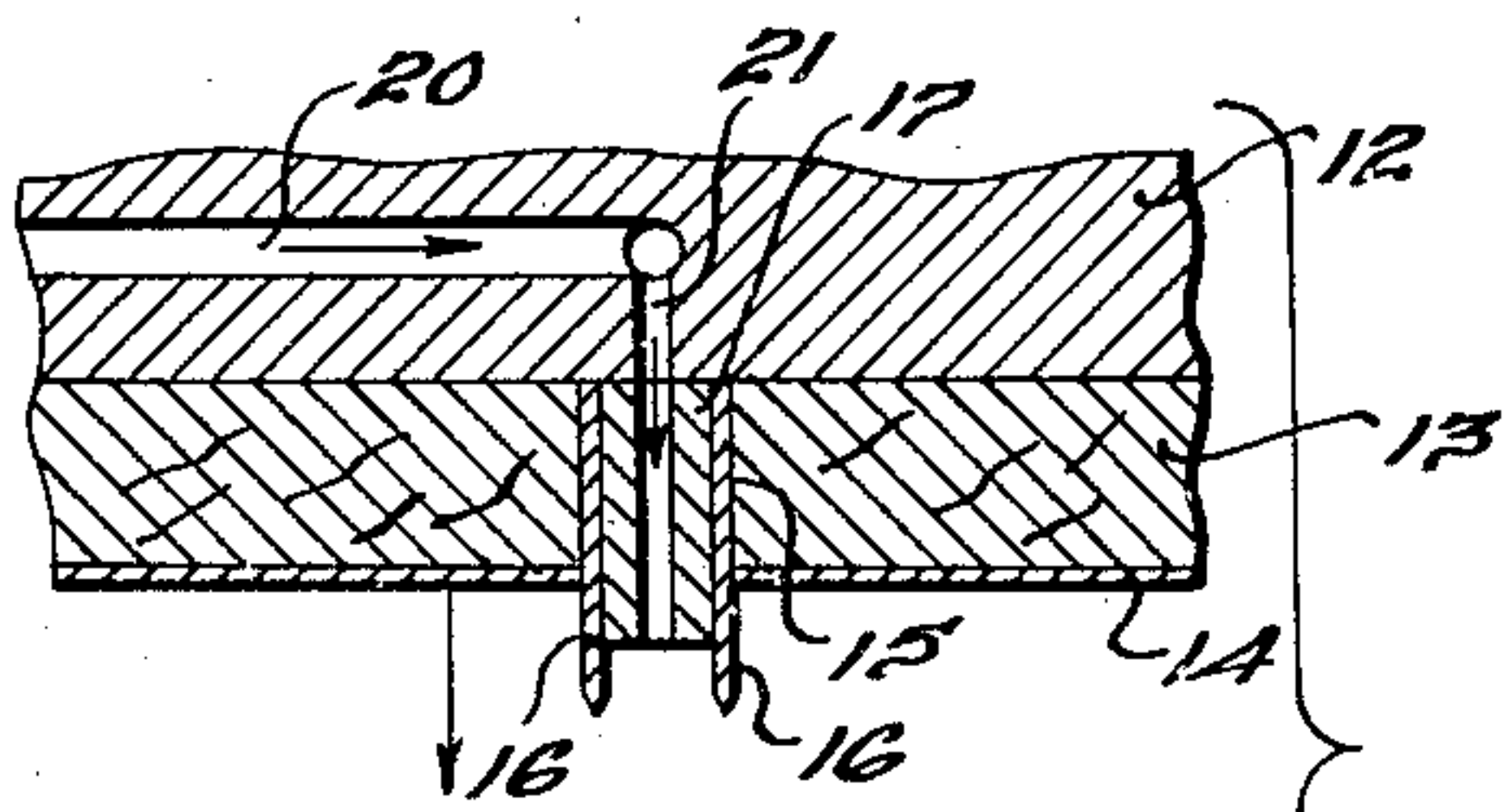
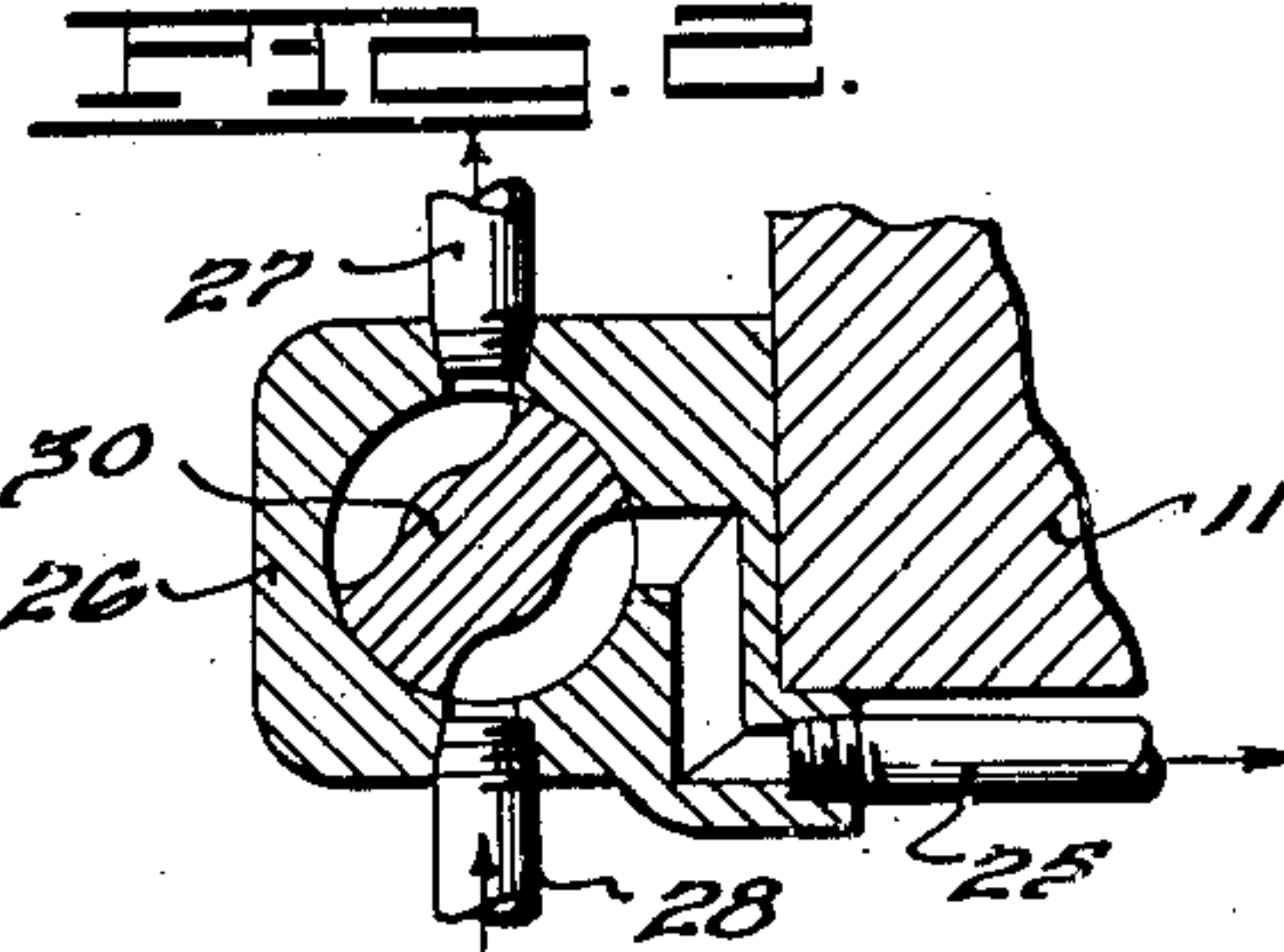
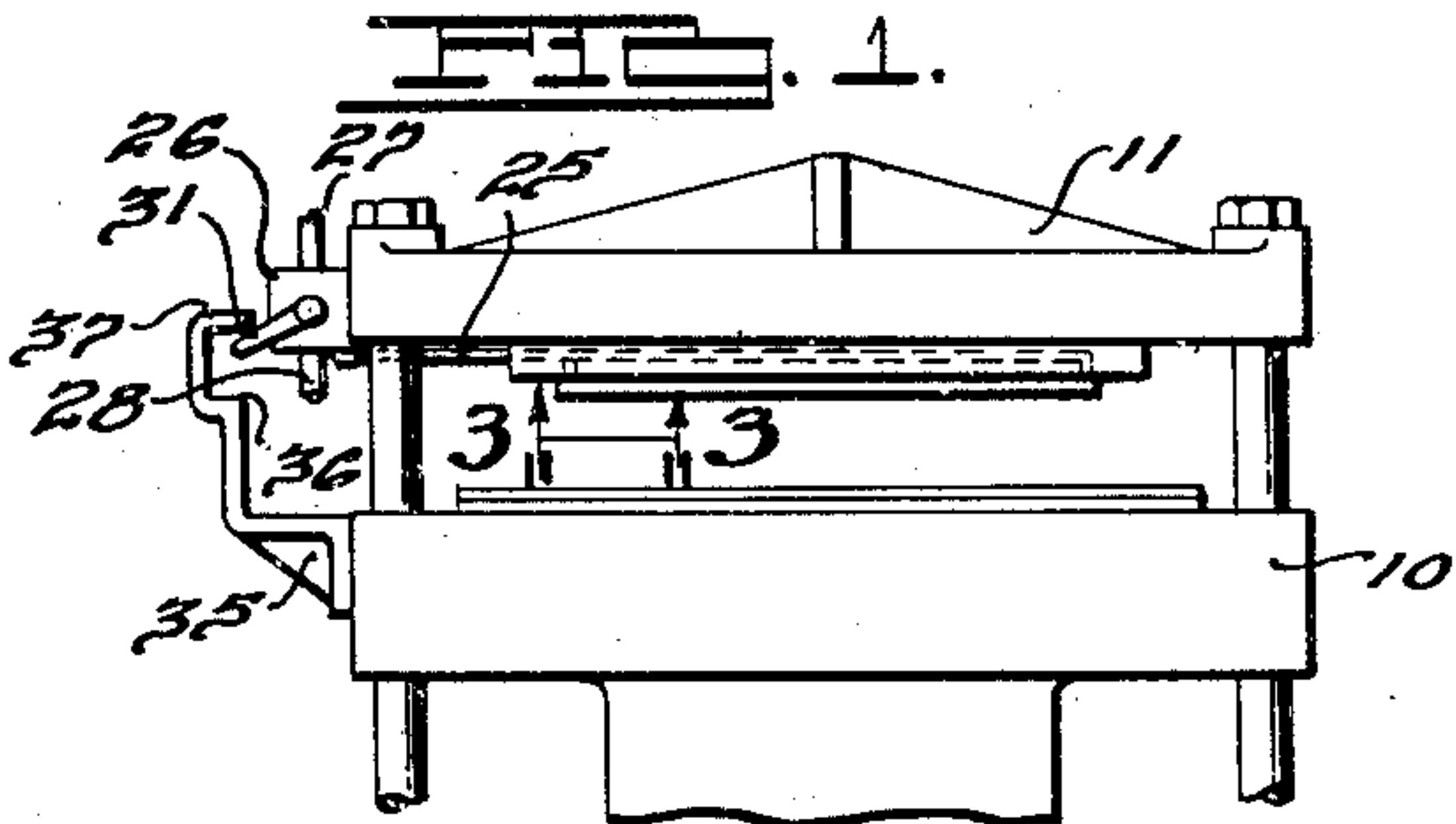
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2,125,480

APPARATUS FOR PREPARING TRIM PANELS

Filed Jan. 14, 1937



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## UNITED STATES PATENT OFFICE

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## APPARATUS FOR PREPARING TRIM PANELS

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8 Claims. (Cl. 164—33)

This invention relates to an improved form of apparatus primarily designed for utilization in connection with the preparation of padded inner trim panels for automotive vehicles.

5 Inner trim panels as now commercially utilized for the purpose of covering portions of the interior of automotive vehicle bodies, generally comprise a relatively heavy or stiff backing sheet formed of card-board or other suitable similar material, to which is adhesively secured a layer of padding material, such for example, as loosely 10 felted non-woven jute fibers, to provide a relatively soft surface. Over this padded backing sheet is stretched a section of woven fabric finish material to provide an attractive finish surface for the trim panel as a whole. In order to secure the padding material in position and also to improve the ornamental appearance of the surface of the completed trim panel it is desirable to cut 15 through the padding material along predetermined lines or in predetermined areas or zones and secure the fabric finish material directly to the backing sheet along these lines or in these zones, thus creating an embossed effect upon the surface of the completed trim panel and at the same time providing additional zones of securement for the fabric finish material. Such constructions have been found particularly advantageous, particularly in connection with trim 20 panels where the padding material used is of a relatively soft nature because the fabric finish material serves to support and confine the padding material in relatively localized areas, thus insuring that this padding material will be properly 25 retained in place at all times.

The apparatus of the present invention is primarily designed for the purpose of simply and conveniently forming the recesses or zones in the padding material after the same has been secured 30 to the card-board backing sheet in order to provide areas or lines for securing the fabric finish material directly to the backing sheet of the panel.

It is an object of the present invention to provide a die which serves to cut through the padding material after the same has been secured to the backing sheet and to provide in combination with such die means for removing portions of the padding material from the backing sheet to 35 which it has been adhesively secured without disturbing the remaining portions of the padding on the backing sheet.

It is a still further object of the present invention to provide an improved die structure of 40 this general character, which includes in combination with the cutting means, means for removing the padding material and automatic means for ejecting the removed padding material from the die at the completion of the cutting operation.

Still further, the present invention contemplates the provision of pneumatic means which serve to supply suction between the cutting blades of the improved die in order that this suction will positively remove the padding material cut 45 from the trim panel and after removal air pressure may be substituted for the suction in aiding to eject the removed padding material.

Many other and further objects, advantages and features of the present invention will become 50 clearly apparent from the following specification when considered in connection with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a fragmentary side elevational view 20 of a blanking press having one form of the improved die embodied therein.

Fig. 2 is an enlarged fragmentary sectional view taken through the control valve shown on the left hand side of Fig. 1 illustrating in detail 25 the internal construction thereof.

Fig. 3 is an enlarged fragmentary plan view, taken substantially on the line 3—3 of Fig. 1, of one form of the improved die of the present invention illustrating in detail the disposition of 30 the cutting knives and the suction ports.

Fig. 4 is a fragmentary sectional view taken substantially on the line 4—4 of Fig. 3, illustrating in detail the cross sectional configuration of the improved die and a trim panel upon which it 35 is adapted to operate.

Fig. 5 is a fragmentary sectional view similar to Fig. 4, illustrating the manner in which the improved die of the present invention has cut 40 through the padding material at the completion of the downward stroke of the press in order to cut through the padding material.

Fig. 6 is a fragmentary sectional view, similar to Figs. 4 and 5, illustrating in detail the position of the parts during the upward stroke after 45 the completion of the blanking operation illustrating the manner in which the padding material is removed from the padded backing sheet.

Fig. 7 is a perspective view of a completely finished inner trim panel manufactured by the 50 apparatus of the present invention.

Fig. 8 is an enlarged fragmentary sectional view taken substantially on the line 8—8 of Fig. 7, illustrating in detail the cross sectional configuration of the completed inner trim panel. 55



With more particular reference to the specific embodiments of the invention illustrated in the drawing it will be readily appreciated that the general principles and generic spirit of the inventive concept presented in this application are susceptible of practicable application in many and various installations and that the specific construction disclosed in the drawing is merely illustrative of one embodiment of the invention defined in the subjoined claims.

In the apparatus shown in Fig. 1 the improved die structure has been embodied in a blank press, comprising a bed 10 and a ram 11 movable with respect to the bed and in the particular type of press shown the construction is of the type where the bed is moved vertically by hydraulic means, whereas the ram is locked in stationary position with respect to the base of the apparatus. Securely mounted in position upon the ram 11 of the press is a die of composite construction which includes a backing plate 12 which serves to support a ply-wood die member 13 which is preferably faced with a thin sheet metal plate 14. This die member 13 and plate 14 are recessed in the face thereof to provide a channel 15 which in the specific construction disclosed in the drawing is substantially rectangular in form. Adjacent each of the opposite walls of the channel 15 are mounted blades 16 which have their rear sides abutting against the backing plate 12 and their cutting edges lying in spaced parallel relation and projecting a substantial distance from the surface of the plate 14. These blades may be firmly locked in position by means of a strip 17 of metal, fiber or suitable similar material which serves to securely wedge the blades 16 against the wall of the channel 15 in which they are mounted. The exposed surface of the strip 17 may lie in a plane slightly spaced from the plane of the sheet metal plate 14 in order that the padding material cut will be slightly compacted during the cutting operation as is hereinafter brought out in greater detail.

The backing plate 12 is drilled to provide ducts or passage ways 20 with which communicate a plurality of bores 21, which bores open through the surface of the backing plate 12 in substantially the central portion of the base of the channel 15. The strip 17 is provided with a plurality of bores 22 through which each register with one of the bores 21. The bores 20 in the backing plate all communicate with a single opening to which is secured a pipe or conduit 25 which serves to establish communication between this network of ducts and a valve 26. The valve 26 may be of the conventional two-way construction, having a pipe 27 connected through to form a suitable source of suction or low pressure and a second pipe 28 which may be connected with a supply of compressed air or other suitable source of high pressure.

The valve includes a rotary central portion 30 which is controlled by a lever 31 and it will be seen from Fig. 2 that as lever 31 is swung to various positions both the source of compressed air and suction may be completely shut off or either one or the other may be selectively placed in communication with the ducts in the die member with which the valve is associated.

A bracket 35 is preferably rigidly secured to the side of the bed 10 of the press and this bracket provides a shoulder 36 and a shoulder 37, each of which are adapted to engage the lever 31 serving to control the valve, consequently shifting the lever 31 to various positions in ac-

cordance with movements of the press. The trim panel to be operated upon in the form illustrated includes a relatively hard stiff backing sheet 40 to which a relatively soft and thick layer of padding 41 is adhesively secured by means of a layer of adhesive 42. The padding material as described above is preferably composed of loosely felted non-woven jute fibers, cut linters, or other suitable fibrous material which has been somewhat compacted to provide a unitary matted layer of padding.

The blanking operation is performed by the moving die structure which is preferably preformed prior to the time the adhesive which serves to secure the padding material to the backing sheet has had a complete opportunity to set. The advantages of this will be more easily understood from the following description.

The operation of the apparatus is substantially as follows. The backing sheet 40 with the layer of padding material 41 adhesively secured thereto is placed upon the bed 10 of the press, preferably while the adhesive material 42 is still damp. The bed of the press is then caused to rise bringing the knives 16 into engagement with the padding material. The length of travel of the stroke of the bed of the press is sufficiently long so that the knives 16 cut through the padding material but do not materially cut the backing sheet 40 upon which this padding material is secured. The position and arrangement of the parts at the completion of the cutting stroke is clearly seen in Fig. 5 of the drawing.

It will be noted that due to the fact that adhesive layer 42 is still somewhat damp during the cutting operation the ends of the cut fibers will be urged downwardly by means of the knives 16 and will to some extent be bonded to the adjacent fibers and to the backing sheet by means of the adhesive material which, as has been explained above, has not completely set. During the cutting stroke of the press the shoulder 36 will engage the valve lever 31 shifting the valve to a position such that the source of suction will be in communication with the ducts in the valve body and consequently will cause the flow of air upwardly through the ducts 22. The bed of the press 10 is then caused to move downwardly and the suction set up in the ducts 22 will serve to pick up the portion of the padding material disposed between the knives 16 which padding material has been cut from the remainder of the padding during the cutting operation. Due to the fact that the surface of the strip 17 extends somewhat above the surface of the die member 13 it will be seen that the padding material located between the cutting knives will be compacted to some substantial extent during the cutting operation, consequently facilitating the removal thereof.

The trim panel with the portions cut therefrom is removed during the downward movement of the bed of the press and it will be seen that as the bed 10 of the press approaches the downward limit of its stroke the impediment 37 will contact the lever 31 shifting the valve to substantially the position shown in the sectional view Fig. 2, thus establishing communication between the source of compressed air and the ports 22. This blast of compressed air will serve to eject the waste padding material from between the cutting blades on to the bed of the press from whence it may be removed upon the insertion of a second padded backing sheet for a subsequent cycle of operation.



While the remaining steps required to complete the formation of the inner trim panel form no part of the present invention it will be readily understood that the prepared backing sheet  
 5 may be covered with a suitable decorative section of fabric trim material 45 which may be stretched tightly over the surface of the padded backing sheet and have its marginal edges adhesively secured to the reverse side thereof.  
 10 Prior to the application of the fabric finish material to the padded backing sheet adhesive material may be sprayed into the zones of the backing sheet from which the padding material has been removed and the fabric covered backing  
 15 sheet may then be subjected to the action of the die which serves to urge the fabric finish material into the bases of the grooves or channels formed in the padding material. This operation serves to tension the fabric finish material and  
 20 conform the same to the configuration of the padding material, thus producing an extremely attractive finished article.

It will be readily understood from the foregoing that the above described embodiment of  
 25 the invention is merely illustrative of the generic and inventive concept presented in this application, that the particular arrangement and disposition of the cutting knives may be varied in accordance with the particular pattern it is  
 30 desired to produce upon the completed article. Many other and further modifications of the invention, falling within the scope thereof as defined in the subjoined claims, will become clearly apparent to those skilled in the art.

35 What I claim is:

1. Apparatus for preparing padded inner trim panels, including in combination a die member, spaced cutting knives projecting from the surface of said die member, ducts opening between  
 40 said cutting knives, means for establishing communication between said ducts and a source of suction, and means for selectively establishing communication between said ducts and a source of suction or high pressure.

45 2. A die for preparing inner trim panels including a pair of cutting knives, a filler strip disposed between said cutting knives to maintain the same in predetermined position with respect to each other, ports in said filler strip and  
 50 means for establishing communication between said ports and a source of suction.

3. A die for preparing inner trim panels including a pair of cutting knives, a filler strip disposed between said cutting knives to maintain  
 55 the same in predetermined position with re-

spect to each other, ports in said filler strip, means for establishing communication between said ports and a source of suction, and means for selectively establishing communication between  
 5 said ducts and a source of suction or high pressure.

4. A die press for preparing inner trim panels including in combination a bed and a ram, a die member carried by said ram, said die member including spaced cutting knives adapted to  
 10 sever isolated sections of padding from a padded backing sheet, ports in said die member disposed between said knives, a conduit for supplying suction to said ports and means responsive to the movement of said ram relative to the bed  
 15 of said press for controlling communication between said ports and said source of suction.

5. A die press for preparing inner trim panels including in combination a bed and a ram, a die member carried by said ram, said die member including spaced cutting knives adapted to  
 20 sever isolated sections of padding from a padded backing sheet, ports in said die member disposed between said knives, a conduit for supplying fluid pressure to said ports and means responsive to  
 25 relative movement between said ram and bed for controlling the supply of such fluid pressure to said ports.

6. A die member for preparing padded inner trim panels, including a pair of cutting knives  
 30 adapted to cut through the padding of an inner trim panel, ports in said die member opening between said knives and means for selectively applying either suction or fluid pressure to said ports to act upon the padding material severed  
 35 by said knives.

7. A die member for operating upon padded backing sheets including cutting knives arranged to sever portions of the padding from the remainder of the padding on such backing sheet,  
 40 suction means associated with said die member for stripping the severed portions of padding from said backing sheet, and fluid pressure means serving to eject the padding material thus stripped from between said knives.

8. Apparatus for preparing inner trim panels including in combination a die member, spaced cutting knives projected from the surface of said die member, ducts in said die member opening into the space between said cutting knives, a  
 50 source of fluid pressure and a source of suction adapted for communication with said ducts and a valve for selectively supplying either suction or pressure to said ducts.

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