

[54] **PHOTOREPRODUCTION APPARATUS WITH AUXILIARY FILM HOLDER**

3,028,786 4/1962 Wanielista et al. .... 355/73

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[21] **Appl. No.: 240,124**

[57] **ABSTRACT**

[52] **U.S. Cl.**..... 355/73, 355/76

[51] **Int. Cl.**..... G03b 27/60

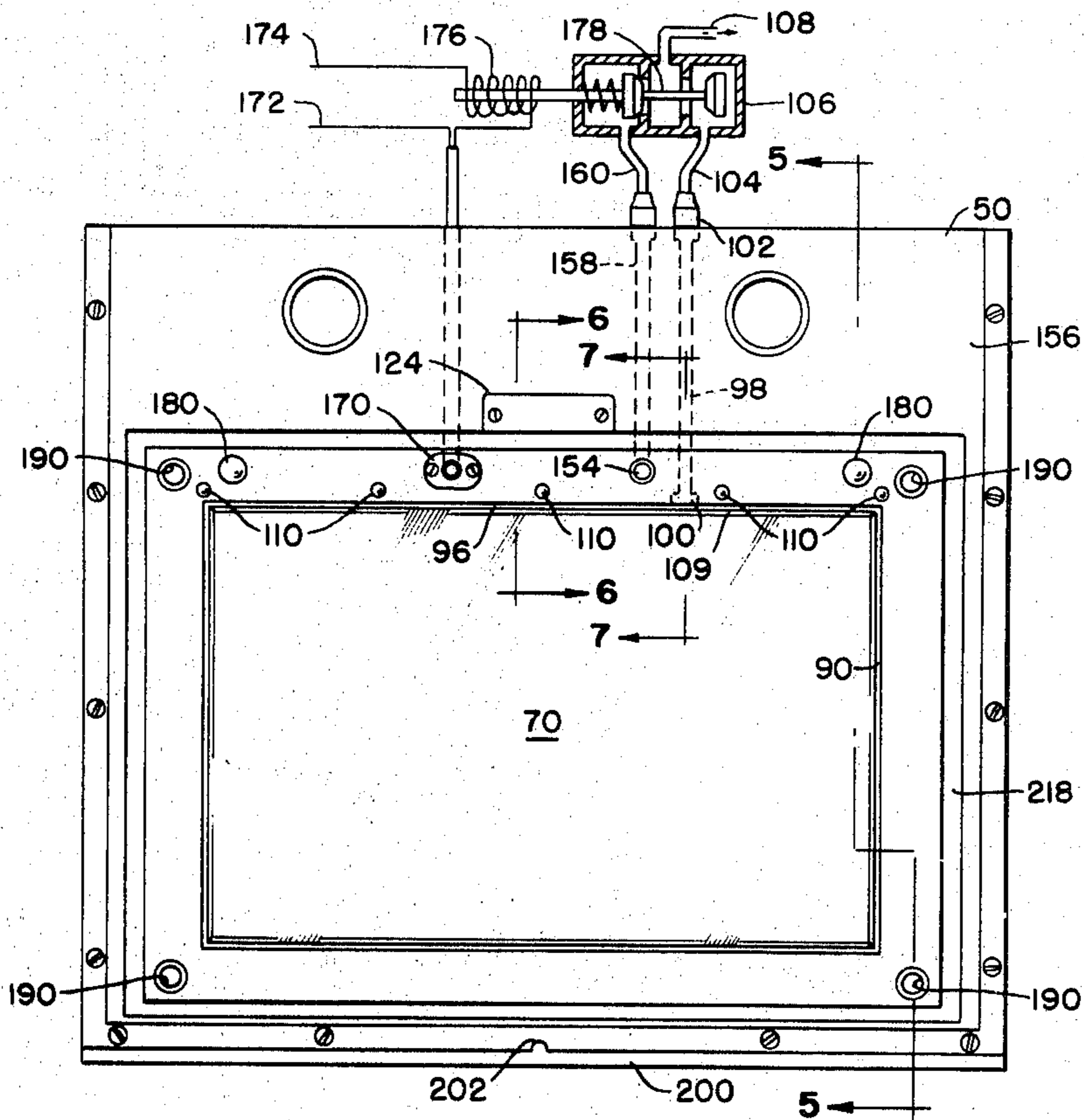
[58] **Field of Search**..... 355/73, 76

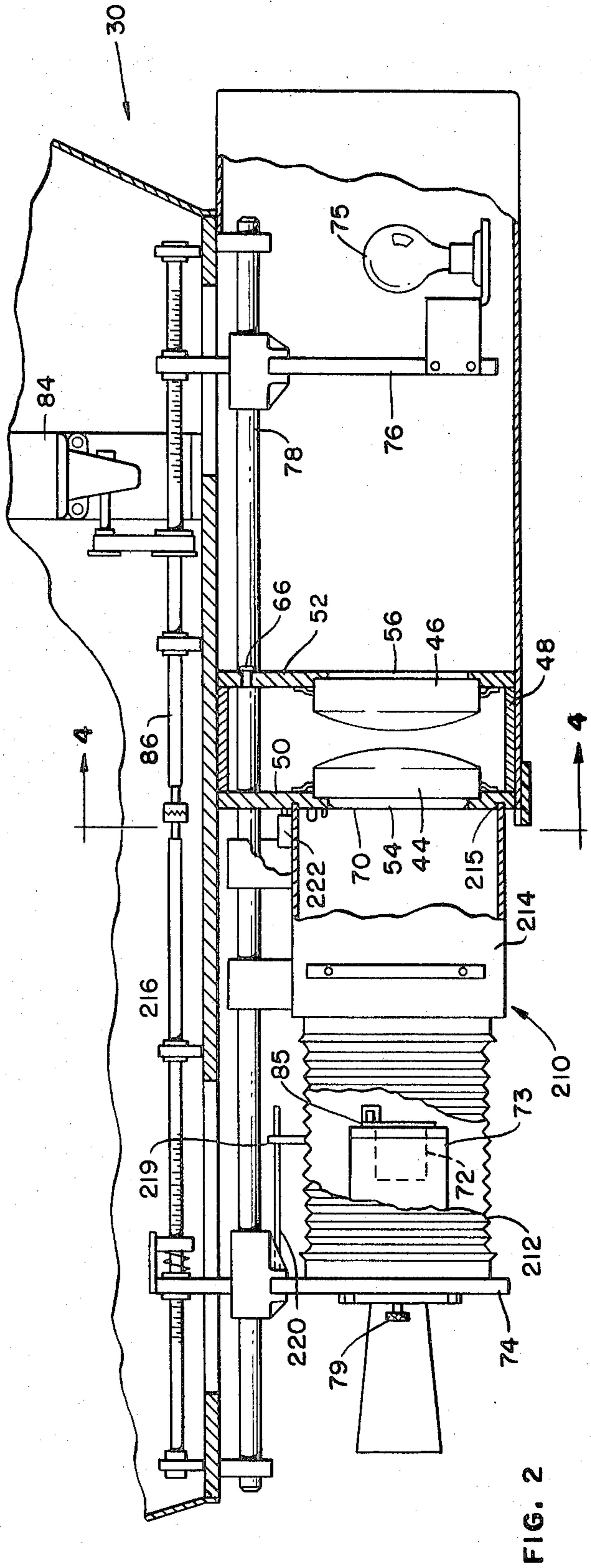
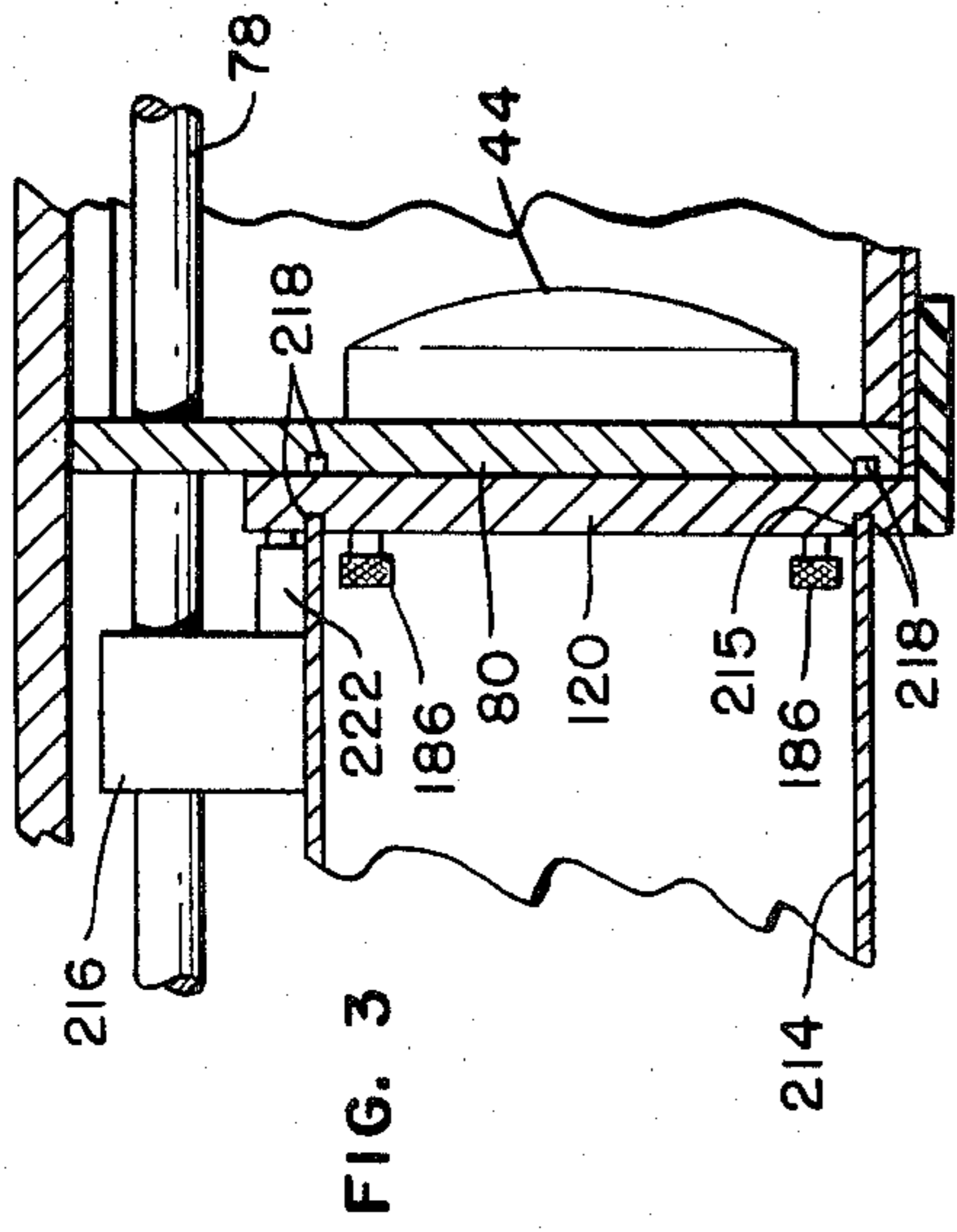
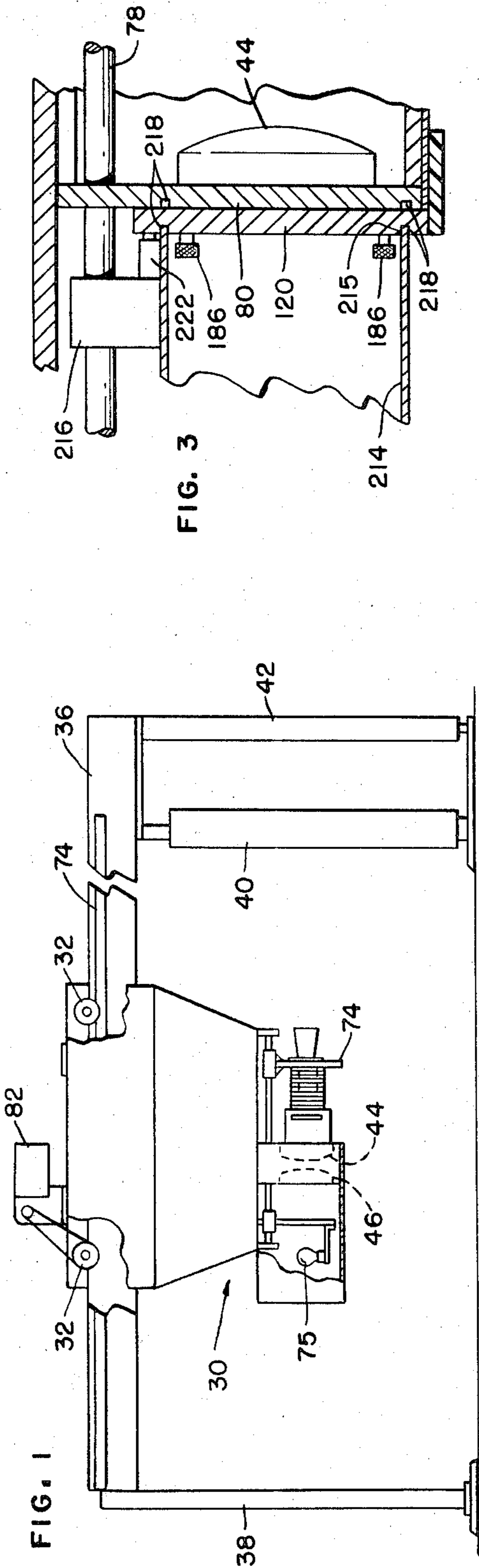
Photoreproduction apparatus having a principal vacuum film platen and one or more auxiliary vacuum film platens which may be removably mounted thereover.

[56] **References Cited**  
**UNITED STATES PATENTS**

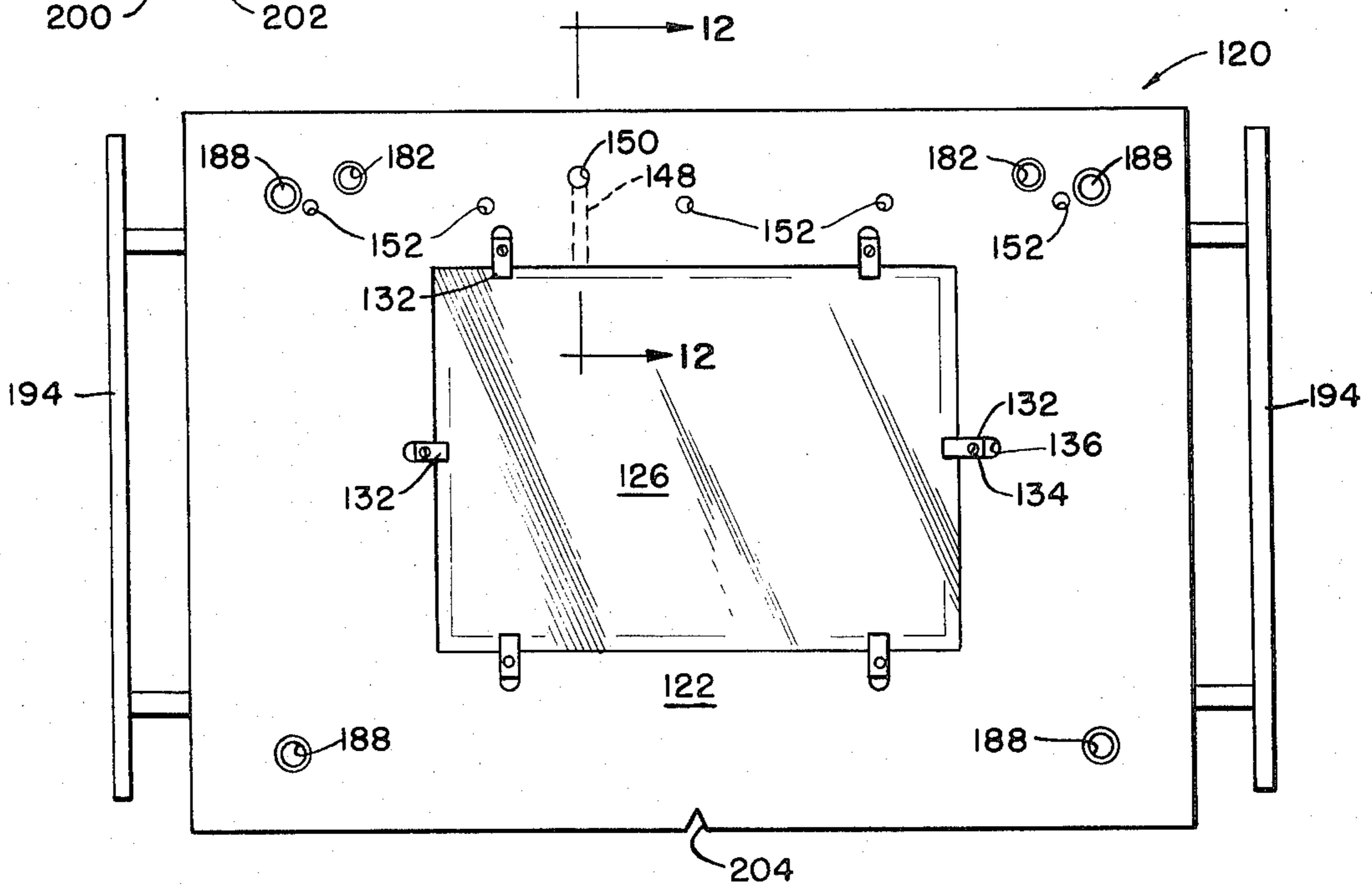
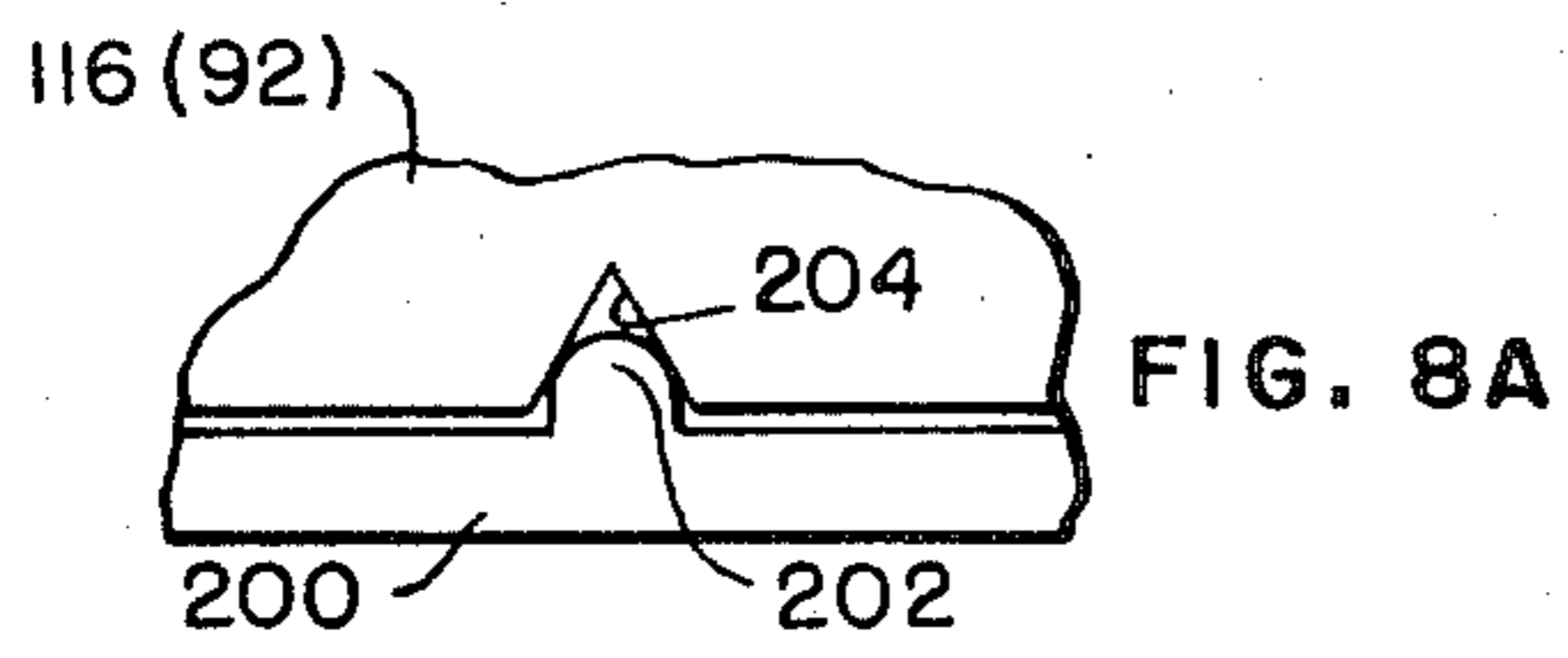
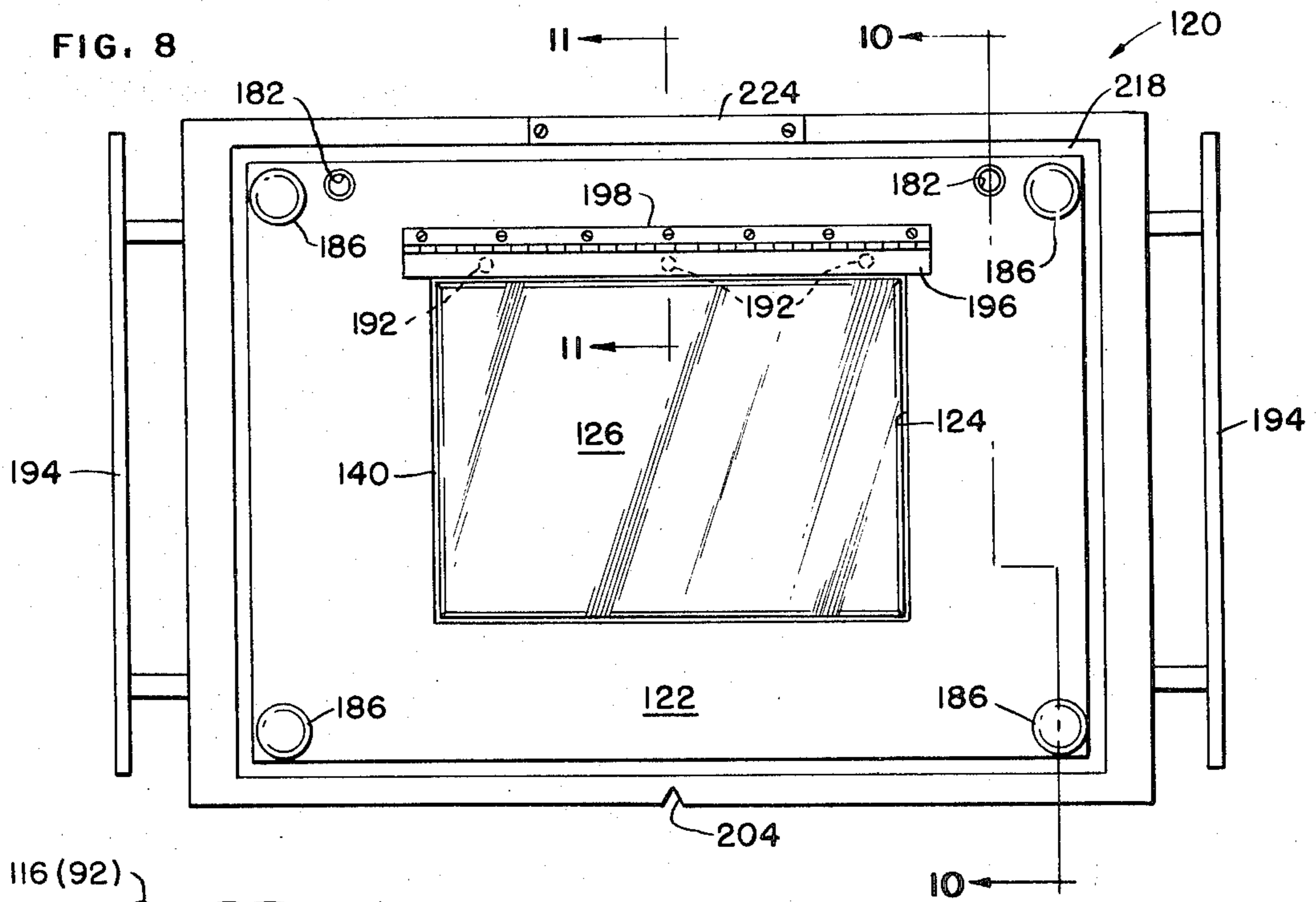
**41 Claims, 25 Drawing Figures**

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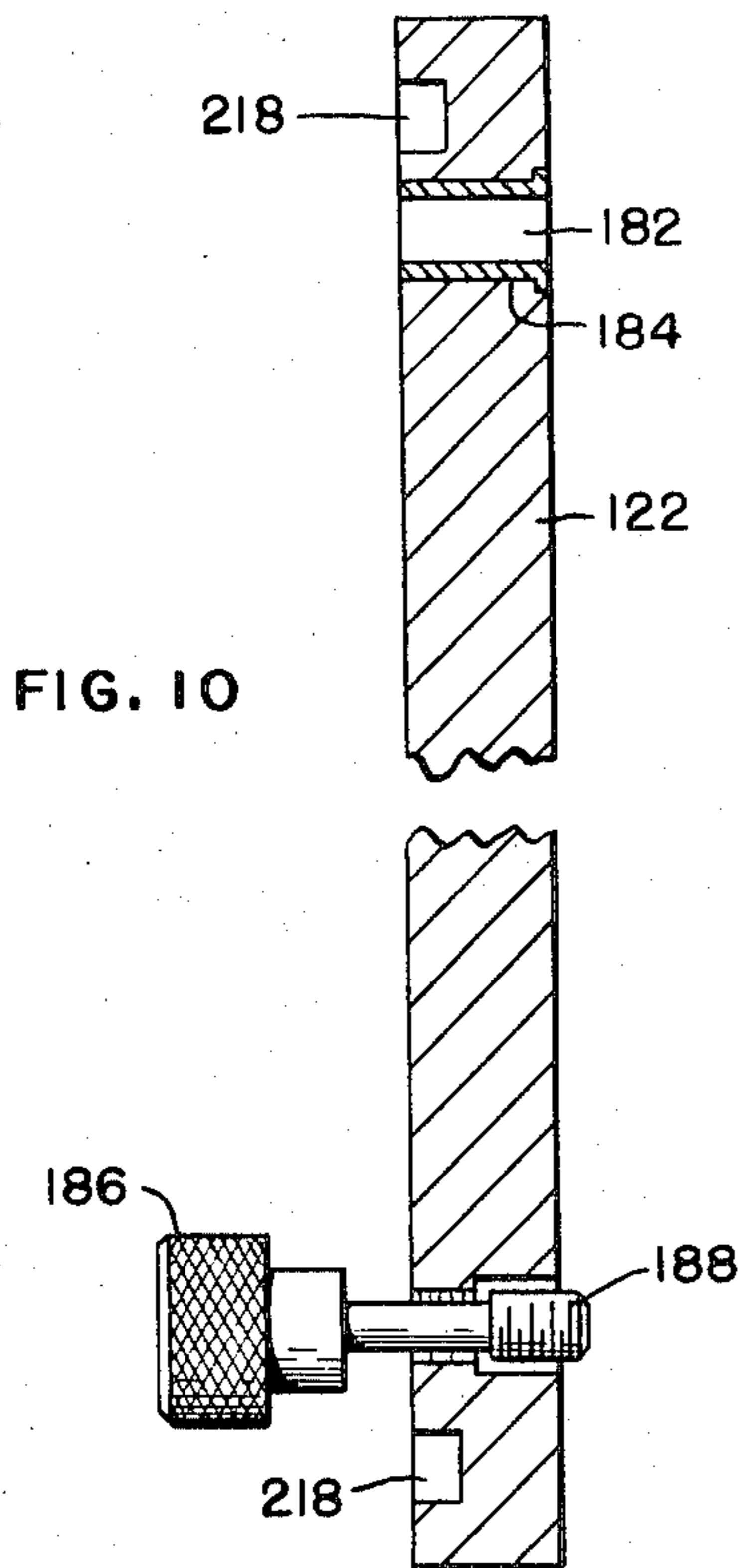


FIG. 10

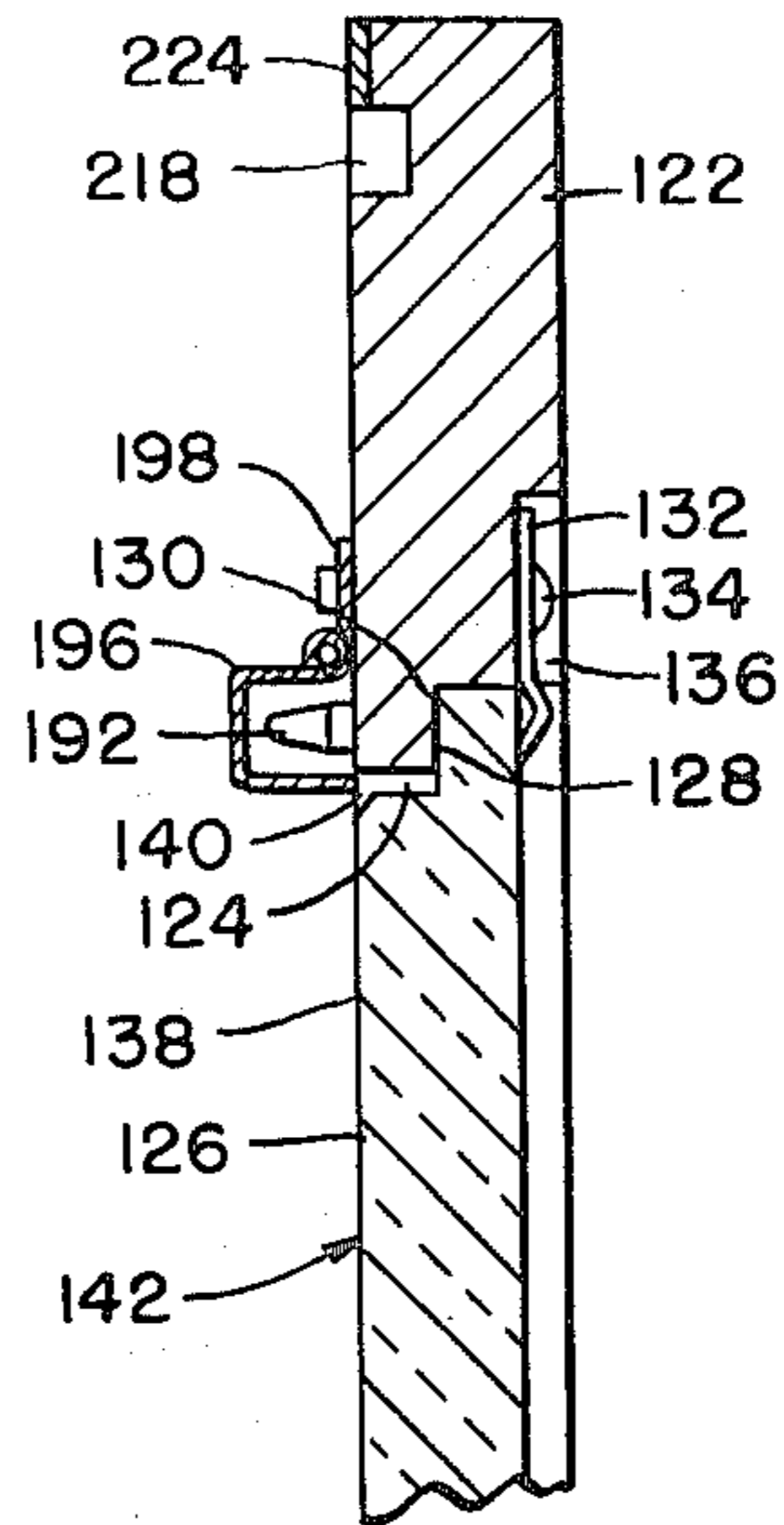


FIG. 11

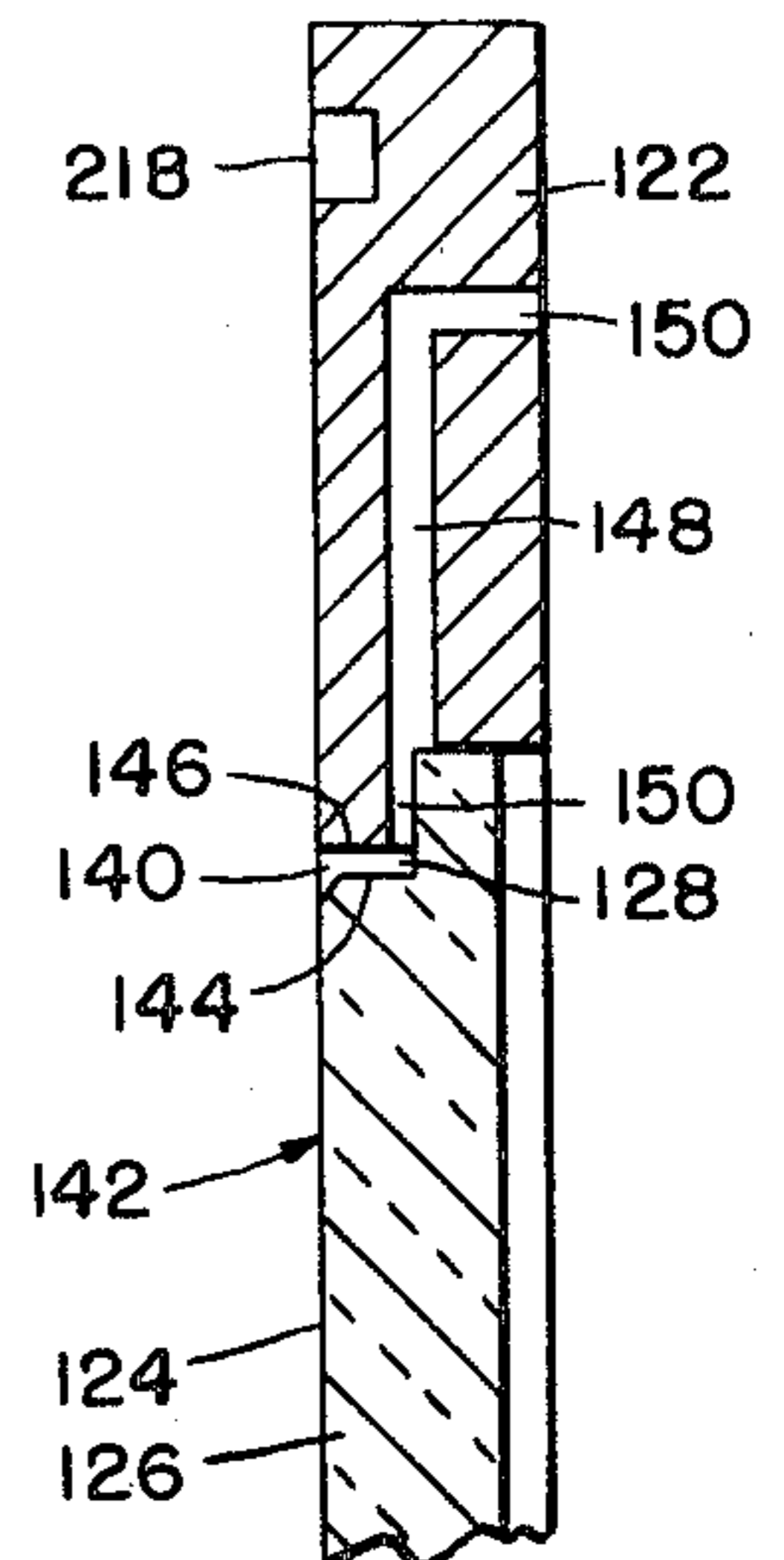


FIG. 12

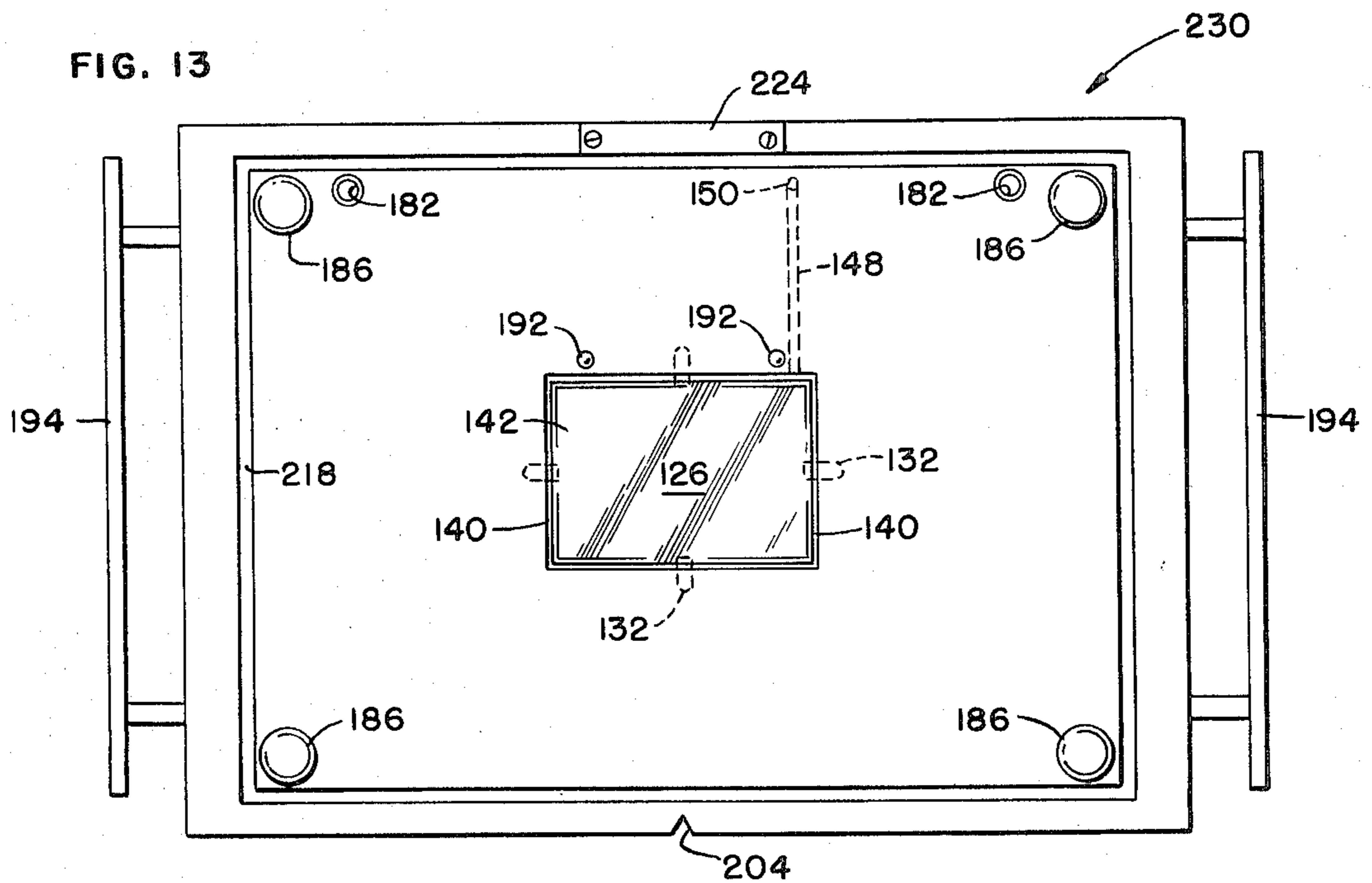
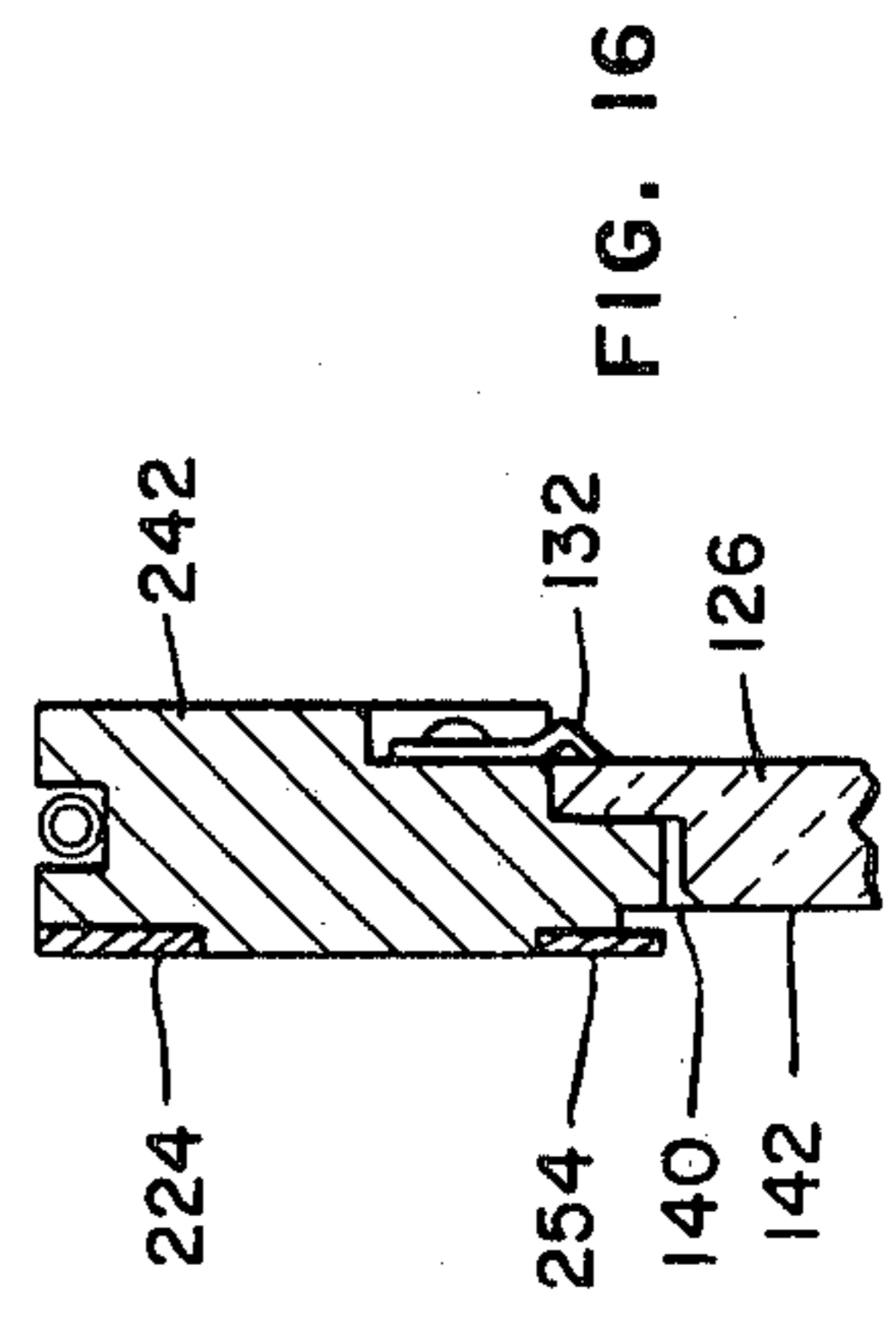
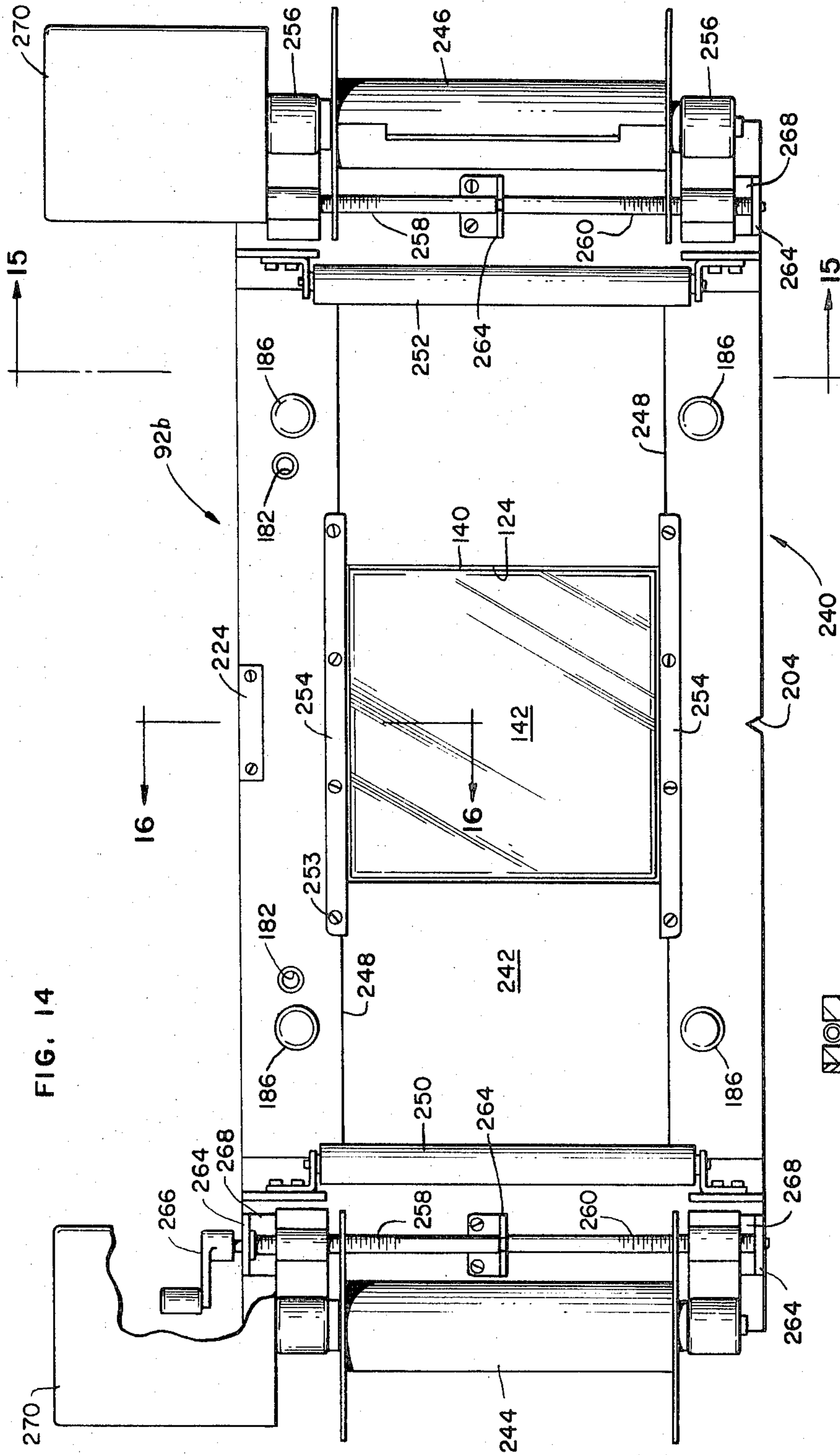
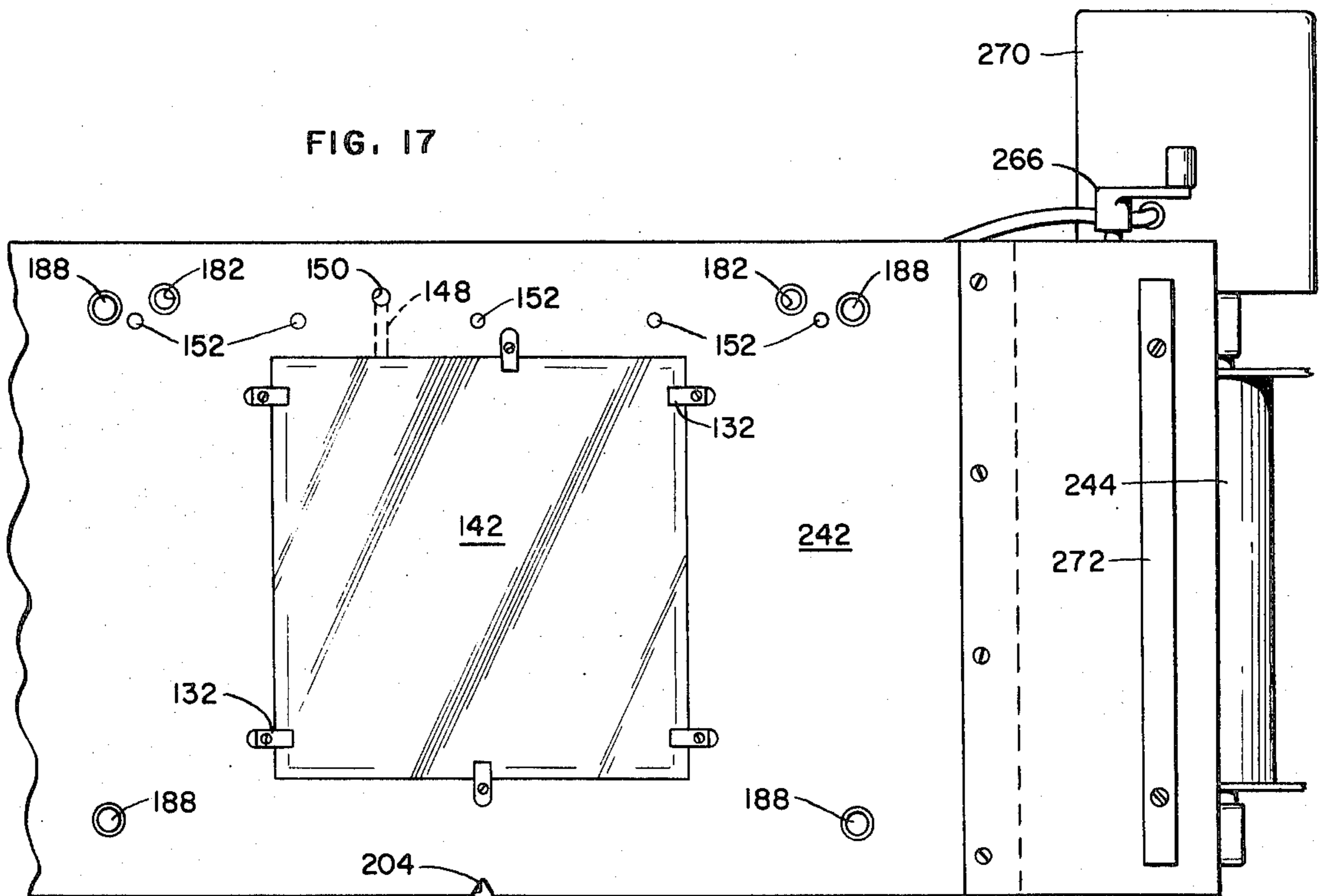
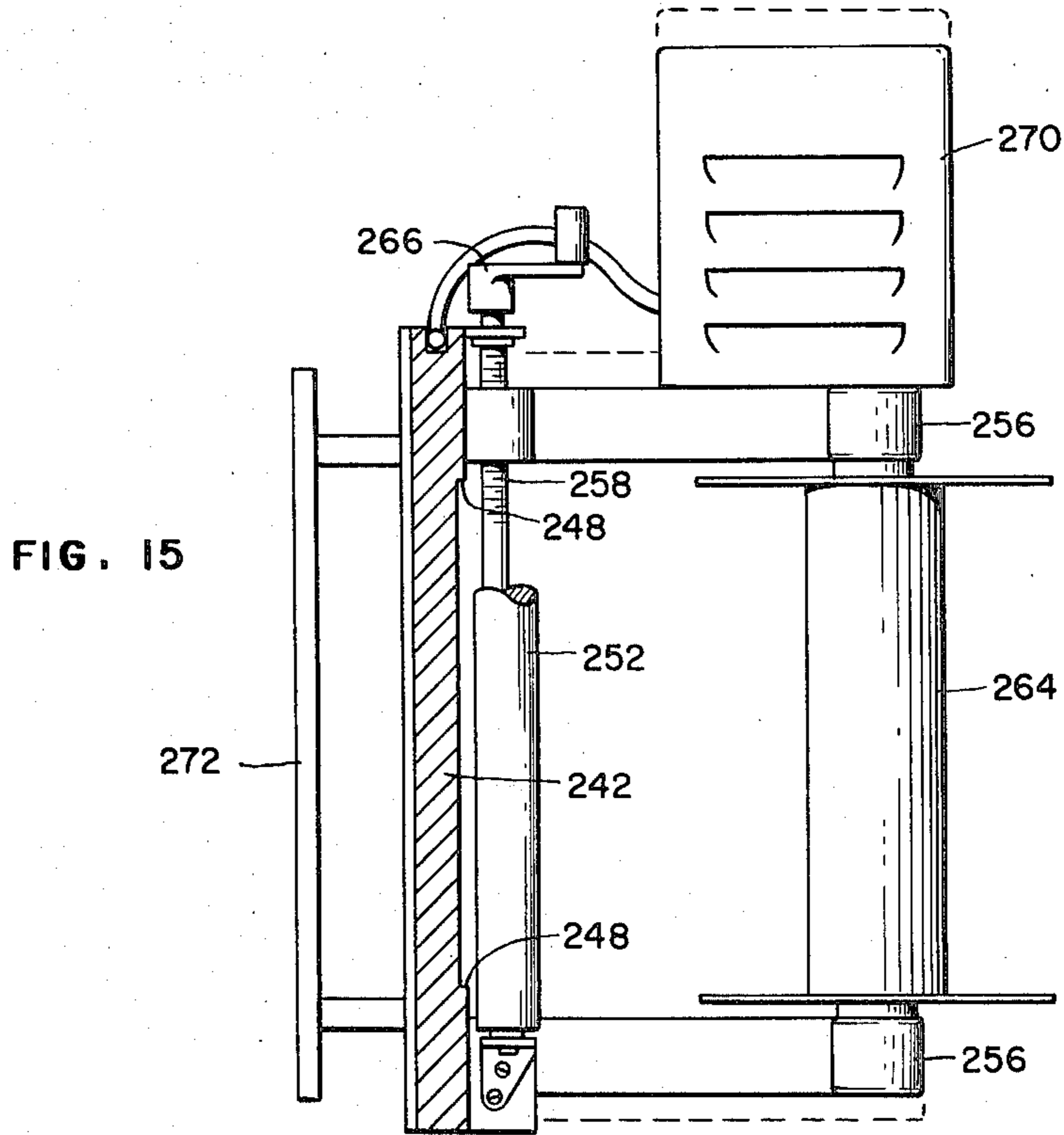


FIG. 13





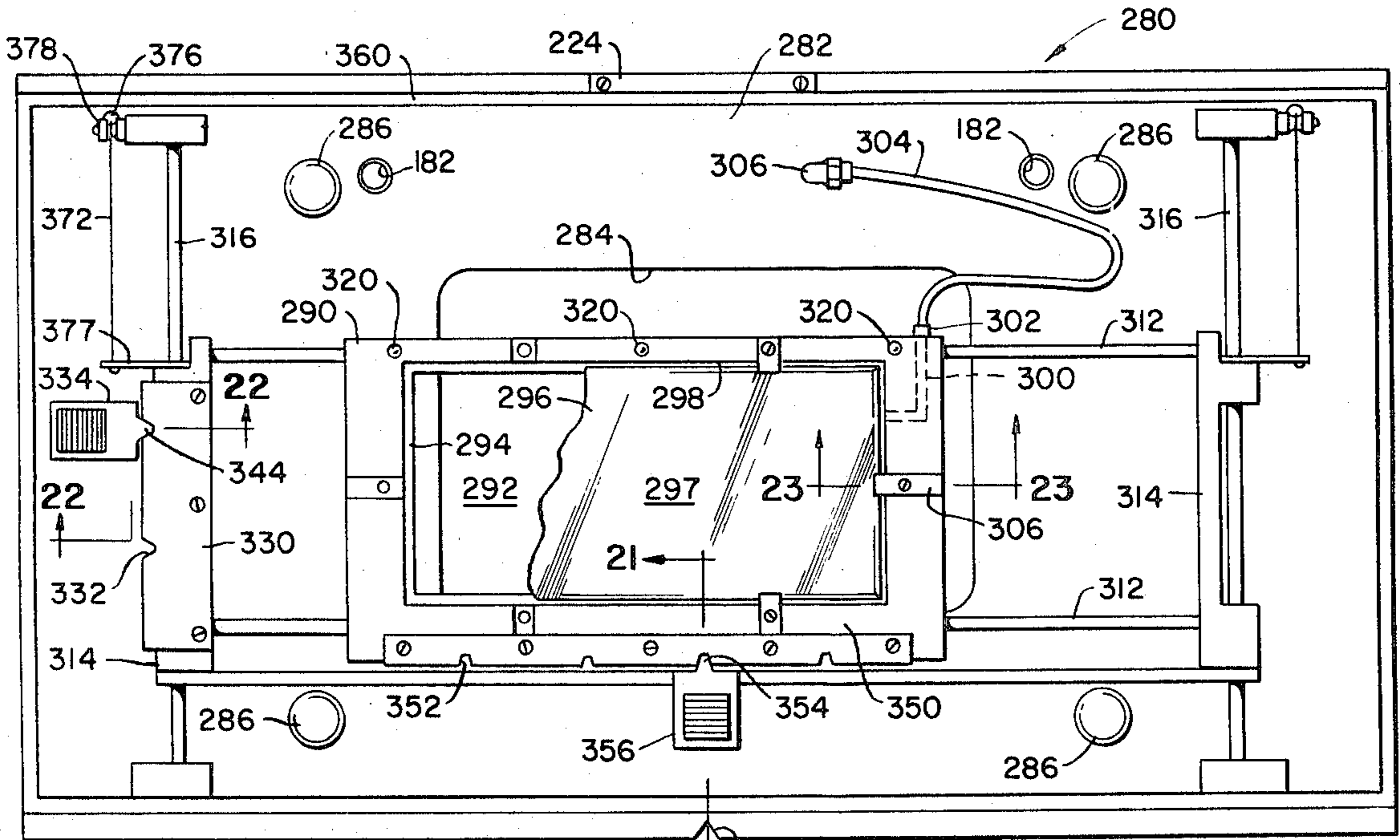


FIG. 18

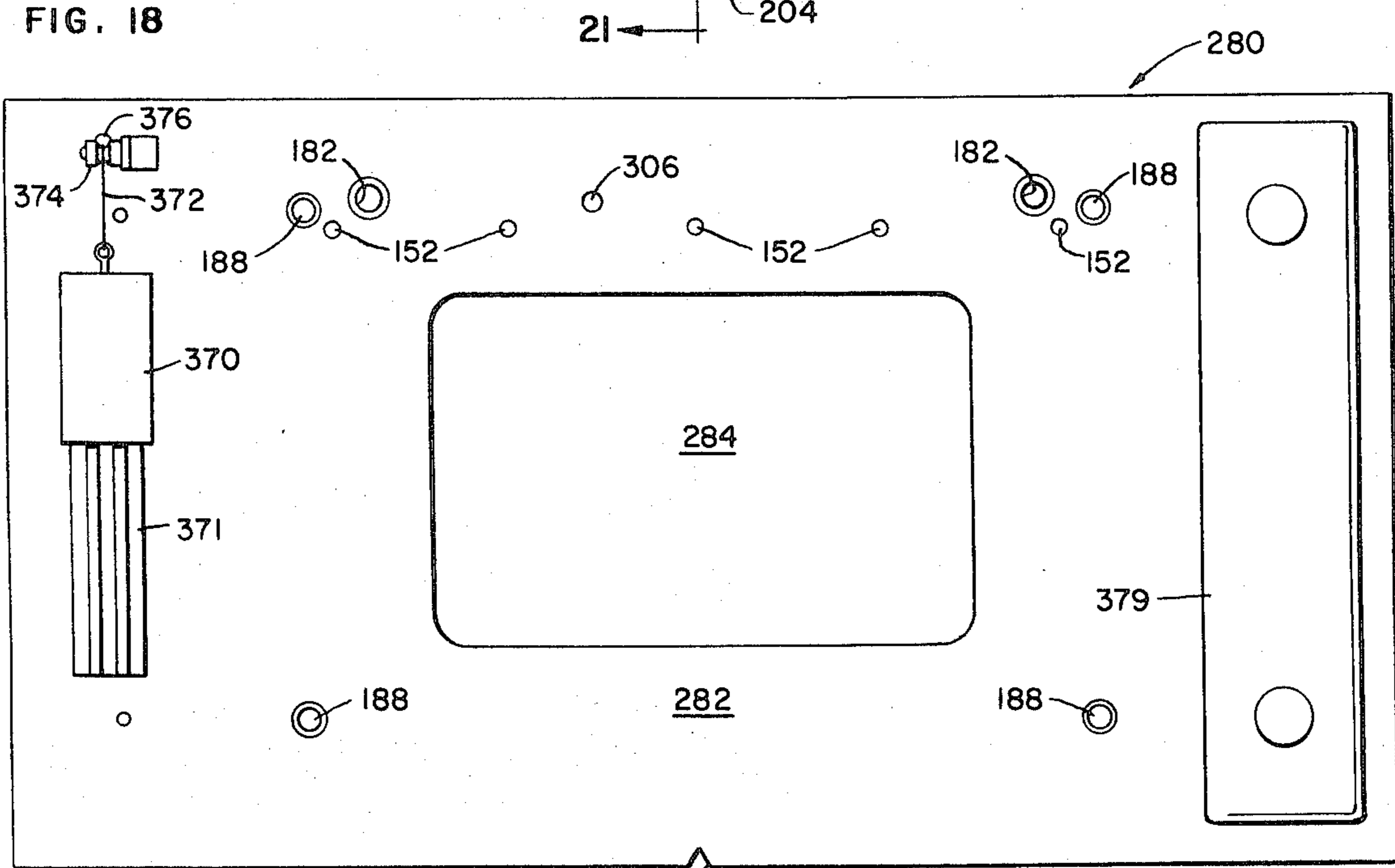


FIG. 19

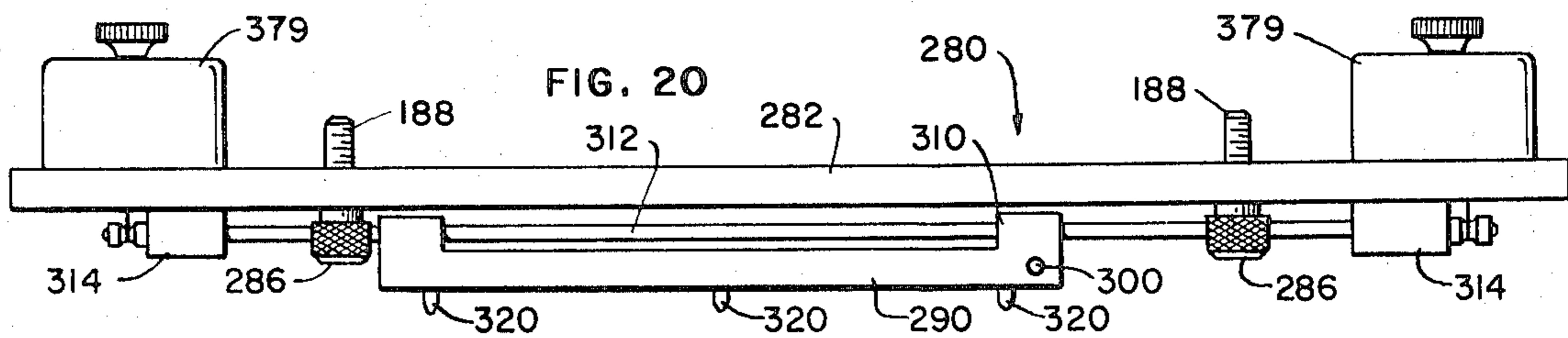
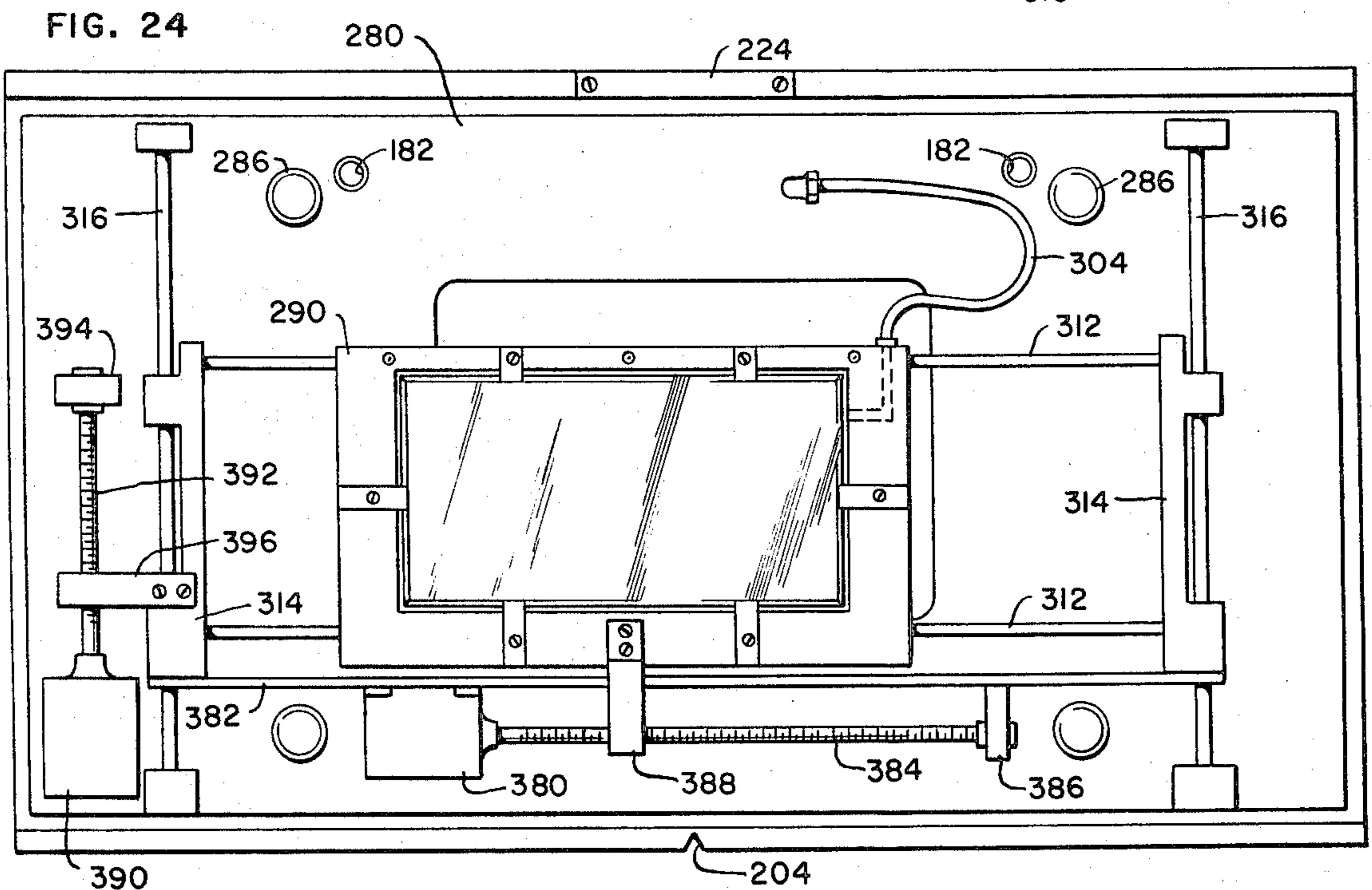
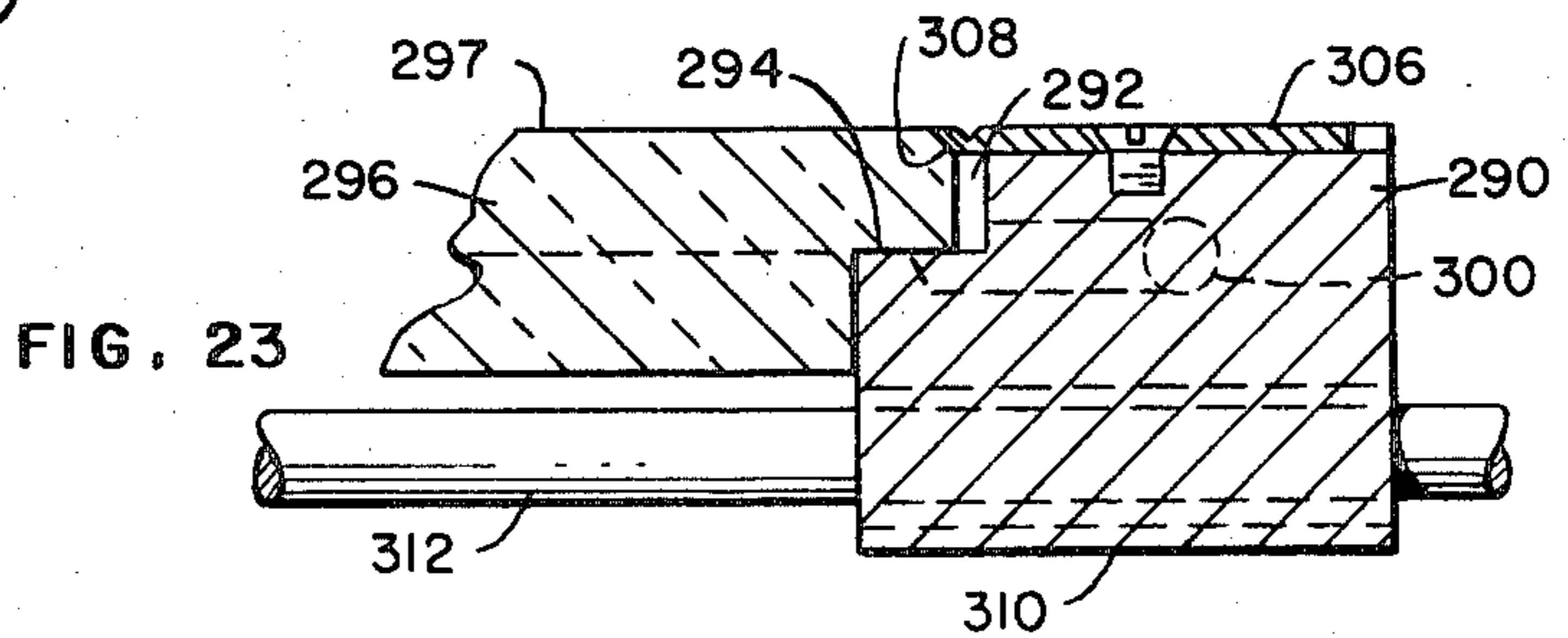
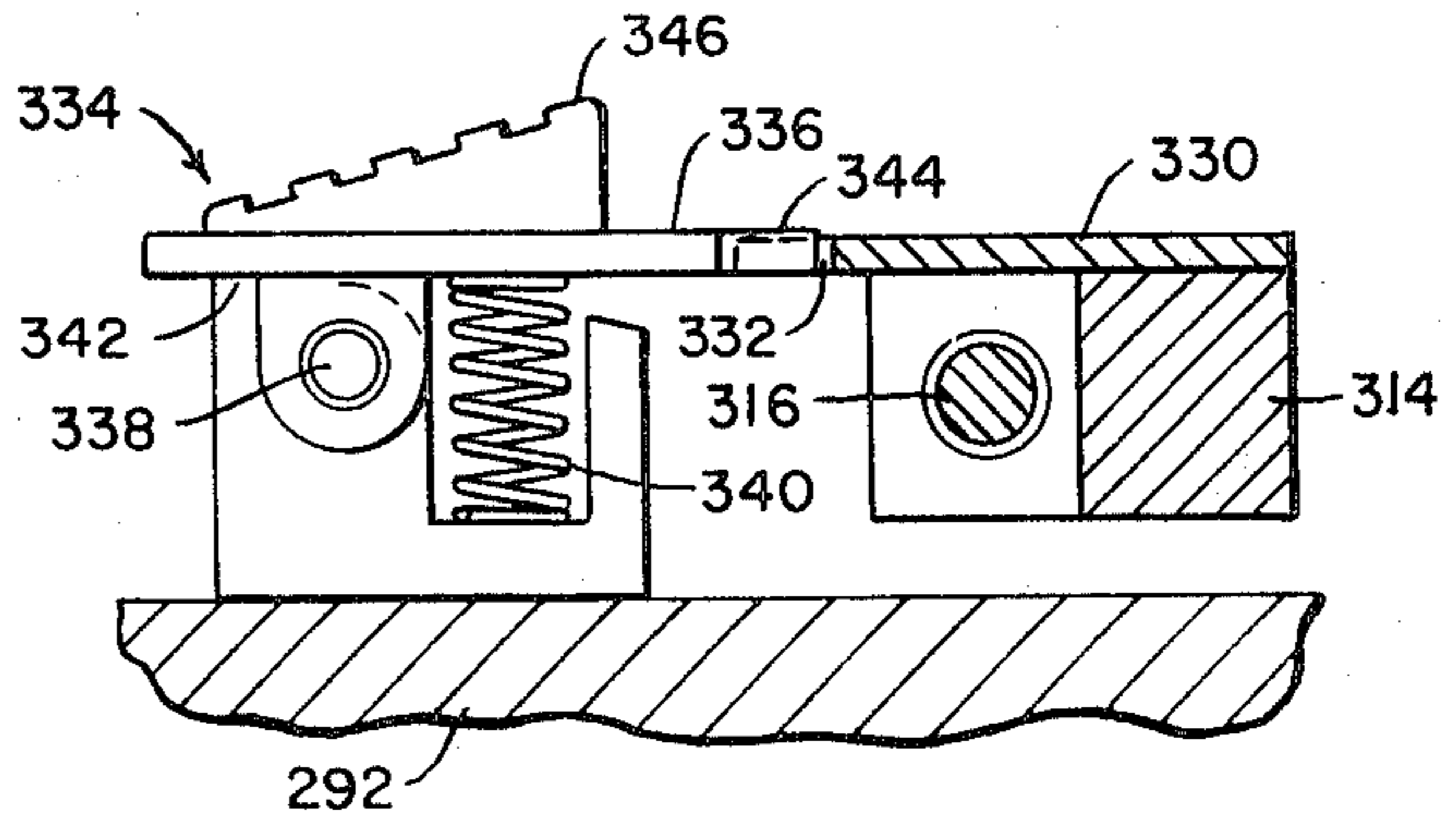
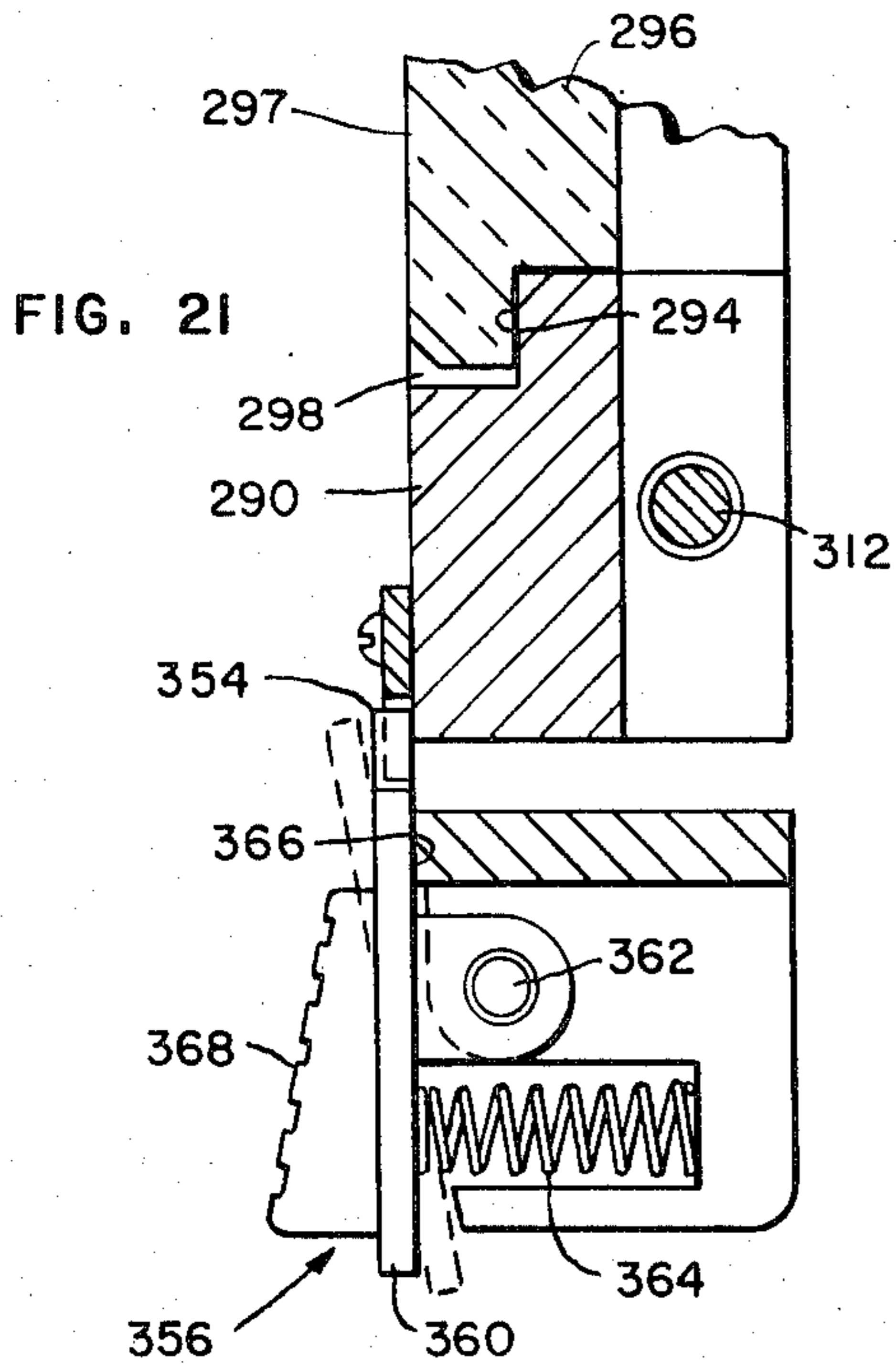


FIG. 20





## PHOTOREPRODUCTION APPARATUS WITH AUXILIARY FILM HOLDER

This invention relates to photoreproduction apparatus such as projectors and camera-projectors which are used in photocopying graphic sheet material and the like. More particularly, the invention comprises a novel construction of supporting structure utilized in such apparatus for accurately locating the image area of film between the objective and condenser lenses during the copying process.

### BACKGROUND OF THE INVENTION

In my U.S. Pat. No. 3,639,054, issued Feb. 1, 1972, there is shown and described photoreproduction apparatus such as a camera-projector in which the present invention is particularly useful. Such apparatus comprises an optical head which is suspended from overhead tracks for spatial adjustment relative to a vertical subject holder on which graphic sheet material to be copied photographically is supported. The optical head contains a rear illuminated condenser lens, an objective located forwardly thereof and a film holder including a transparent platen therebetween. The film holder embodies a flat platen surface axially aligned with the objective and condenser lens and surrounded by a peripherally disposed continuous channel which is connected to an air evacuating source. The platen has spaced registration pins along its upper edge which locate pre-punched film in a predetermined centered position on the platen where the margins of the film overlie the evacuating channel and so that the image area of the film can be drawn into tight conformity with the flat platen surface as air is evacuated from beneath the film into said channel. In the camera mode of the apparatus, the light source which illuminates the condenser lens is dark and an image of graphic material located on the subject holder is photographically reproduced in the emulsion coating of the film supported on the platen. In the projector mode of the apparatus, the developed film can be relocated on the platen and an image thereof projected onto the subject holder for reproduction in sensitive paper supported thereon to complete the copying process. The aforescribed means assure that the exposed film when developed can be relocated in exactly the same position on the platen and at the same axial distance from the objective and subject holder as the original film. Thus, it is possible to repetitively produce copies which exactly reproduce the original. Also, by changing the spatial setting of the optical head from the subject holder the image copy may be enlarged or reduced with a high degree of reproduction quality. It is also possible to affect the focus by changing the spatial setting of the objective which can be accomplished independently of the film position and spatial setting of the subject holder therefrom.

### SUMMARY OF THE INVENTION

Such camera-projectors as previously available, however, have been limited to one size of film. This is to say that the film must be of a size large enough to cover the whole platen surface area including its surrounding evacuating channel in order that the film holder will properly function. Therefore the dimensions of the film platen and its surrounding evacuating channel determine a minimum film size which the apparatus can handle. However, a camera-projector which will also handle

smaller sizes of film and/or roll film as well as cut film would be extremely valuable to the photocopying industry; and an accomplishment thereof is a first and principal object of the present invention.

Thus it is a feature of this invention that photoreproduction apparatus of the class described may be provided with one or more auxiliary film holders each having a different sized or shaped platen which may be assembled with the principal film holder of such apparatus and supported over the platen thereof in oriented relation to the axis of the objective and condenser lenses. Alternately, an auxiliary film holder may be adapted to handle roll film or to effect a specific function, as for example it may be provided with a movable platen which permits centering selected portions of the film image area on the optical axis of the objective and condenser lenses.

Thus an important feature of the invention is that the film holder of a photoreproduction apparatus comprises several interchangeable film platens, each of which may be mounted between the objective and the light source so as to adapt the photographic apparatus to accommodate a range of film sizes and/or to adapt it to accommodate roll film as well as cut film.

An important feature of the invention is that the auxiliary film platen(s) includes a transparent film platen surface surrounded by an evacuating channel with film registration means along at least one side thereof and that means are provided by which the evacuating channel of the auxiliary platen is automatically connected to the air evacuating source through the main film platen when the auxiliary platen is removably mounted thereon.

In its preferred form the main film holder of this invention will be provided with orienting means as well as mounting means which assure that each auxiliary film platen assembled thereover is removably located in a preoriented relationship.

A further feature of the invention is that the main film platen includes switch means which are actuated when the auxiliary film platen is removably located thereover to automatically shift the pull of the air evacuating source from the vacuum channel of the main film platen to the evacuating channel of the auxiliary film platen mounted thereon.

In preferred forms of the invention the auxiliary film holders have handles and the main holder includes a shelf-like structure by means of which the auxiliary film platen may be conveniently handled and supported during the act of fastening it over the main platen.

Still another feature of the invention is that each of the auxiliary film holders and the principal film holder have cooperating means which accurately orient the platen and film registration means of the auxiliary film holders.

Another feature of the invention is the novel arrangement employed for securely fastening each auxiliary film holder in an oriented position over and close to the primary film platen.

Another feature of the invention is the novel locking means employed to releasably but firmly hold the auxiliary film holder in its oriented position over the primary film holder.

A further feature of the invention is that the auxiliary film platens have recessed areas in their rear surface which provide clearance for the registration pins of the principal film platen. Thus it is possible to locate the

auxiliary film platen close to the film platen surface of the primary holder which in one form of the invention constitutes the first surface of the condenser lens system.

A further important feature of the invention is that the photographic apparatus is provided with a retractable film compartment cover providing access to the film platen for mounting and dismounting of the auxiliary film holders.

Still another feature of the invention is that both the principal film holder and the auxiliary film holders are provided with an outer continuous channel which receives the edge of the retractable film compartment cover and effects a light tight seal about the film when supported on either the primary platen or an auxiliary platen during the camera mode of the apparatus.

An auxiliary feature thereto is the provision of the film compartment cover and surrounding frame of the auxiliary and principal film holders with magnetic means which releasably hold the edge of the film compartment cover within said light seal effecting channel about the film platen.

Still other features of the invention include the provision of camera-projector apparatus with a novel construction of film holder which may be moved in directions at right angles, both horizontally and vertically, to the optical axis of the apparatus to permit centering of selected portions of the film on said optical axis for exposure during the camera mode and/or projection during the projector mode of the apparatus.

Thus it is a feature of the invention that a plurality of either identical or dissimilar images may be provided in rows and columns on a single film. Such a film holder is therefore particularly useful for book print manufacturers since the device allows many pages to be printed upon one large printing plate or film in a desired sequence for "signatures."

As hereinafter described, it will be apparent that the disclosed construction not only multiplies and diversifies the utility of photographic apparatus of the class described, but represents structure which is economical and practical to manufacture as well as to operate in the performance of its intended functions.

Many other objects, advantages and features of the invention will become apparent from the description of preferred embodiments of the invention which will now be described.

#### DESCRIPTION OF THE DRAWINGS

Referring therefore now to the drawings wherein like parts are identified by like reference numerals:

FIG. 1 is a view in side elevation of one form of photographic apparatus with which the invention is particularly useful, parts thereof being broken away for clarity of understanding its essential components and operation;

FIG. 2 is a vertical sectional view taken through the optical head of the apparatus illustrated in FIG. 1, the view being on a larger scale and partially fragmented for clarity of disclosure;

FIG. 3 is a fragmented sectional view taken in the area of the film platen and illustrates an auxiliary platen assembled thereon and with the film compartment cover closed thereagainst;

FIG. 4 is a vertical sectional view taken along lines 4—4 of FIG. 2 and illustrates the principal film platen of the apparatus shown on an enlarged scale;

FIG. 5 is a sectional view taken through said film platen of FIG. 4 along lines 5—5 looking in the direction indicated by the arrows;

FIG. 6 is a sectional view taken through the platen of FIG. 4 along lines 6—6 looking in the direction indicated by the arrows;

FIG. 7 is a sectional view taken along lines 7—7 in said FIG. 4 looking in the direction indicated by the arrows;

FIG. 8 is a plan view of an auxiliary film platen which may be assembled with the film platen illustrated by FIG. 4;

FIG. 8a is a fragmented view on an enlarged scale showing one means employed for orienting the auxiliary platen on the main platen;

FIG. 9 is a rear view of the auxiliary platen illustrated in FIG. 8;

FIG. 10 is a sectional view through the auxiliary platen illustrated by FIG. 8, the view being taken along lines 10—10 and looking in the direction indicated by the arrows;

FIG. 11 is a fragmented sectional view taken along lines 11—11 of the auxiliary platen shown in FIG. 8, the view being taken along lines 11—11 and looking in the direction indicated by the arrows;

FIG. 12 is a fragmented sectional view taken along lines 12—12 of FIG. 9 looking in the direction indicated by the arrows;

FIG. 13 is a plan view of a second auxiliary platen, this auxiliary platen being adapted for a still smaller size of cut film;

FIG. 14 illustrates still another auxiliary platen which may be assembled with the principal platen of the apparatus illustrated by FIG. 4, this auxiliary platen being adapted for supporting roll film;

FIG. 15 is a sectional view taken along lines 15—15 of FIG. 14 looking in the direction indicated by the arrows;

FIG. 16 is a fragmented sectional view taken along lines 16—16 of FIG. 14 looking in the direction indicated by the arrows;

FIG. 17 is a partially fragmented view of the rear of the auxiliary platen illustrated by FIG. 14;

FIG. 18 illustrates still another auxiliary platen which may be assembled with the principal platen of the apparatus illustrated by FIG. 4;

FIG. 19 is a rear view of the auxiliary platen illustrated by FIG. 18;

FIG. 20 is a top plan view of the auxiliary platen of FIG. 18;

FIG. 21 is a partially fragmented sectional view taken along lines 21—21 of FIG. 18;

FIG. 22 is a sectional view taken along lines 22—22 of FIG. 18;

FIG. 23 is a fragmented sectional view taken along lines 23—23 of FIG. 18; and

FIG. 24 illustrates a modification of the auxiliary platen illustrated by said FIGS. 18-23.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Although it should be understood that the present invention has general application to photoreproduction devices, FIG. 1 illustrates a camera-projector with which the present invention is particularly useful. Such an apparatus as specifically disclosed in my above mentioned U.S. Pat. No. 3,639,054 to which reference may

be had for a more complete description thereof. However, for purposes of understanding this invention, it will be seen from FIG. 1 that the same comprises an optical head indicated generally at 30. Optical head 30 is suspended by front and rear pairs of wheels 32 which move along a pair of tracks 34 mounted on the two sides of an overhead rigid supporting structure 36 shown supported at one end by a first columnar structure 38 and at its opposite end by a second columnar structure comprising a subject holder 40. Suspended from structure 36 are means 42 for backlighting graphic sheet material supported on the subject holder 40. The details and construction of the subject holder 40 and its back lighting constitute no part of the present invention; however, for purposes of an understanding thereof reference may be had to the aforementioned U.S. Pat. No. 3,639,054.

As more clearly seen in FIG. 2, optical head 30 comprises a pair of plano-convex condenser lenses 44, 46 arranged with their convex surfaces facing and enclosed within dust-tight box-like enclosure or supporting structure 48. Said enclosure 48 has front and rear walls 50, 52 with axially aligned respective openings 54, 56 therethrough and over which openings the respective condenser lenses are assembled. As illustrated in FIG. 5, said condenser lenses are preferably squared and the openings 54, 56 in the front and rear walls of said enclosure 48 are stepped to provide a seat 58 in which the margins of the planar side of the condenser lens seats, the lens being held thereagainst by clips 60 which are bolted to the inner side of the respective front and rear walls 50, 52 of the condenser lens enclosure 48 and have a neoprene tipped end 62 extending into recesses or slots 64 (FIG. 6) provided at spaced intervals about the squared walls of the respective condenser lenses. Said clips 60 are also suitably tensioned to securely hold said margins of the front flat side of the condenser lenses against the seat 58 in the opening of the respective wall with which the condenser lens is assembled. At 66 (FIG. 2) the condenser lens compartment 48 is provided with a filter which admits air into the interior thereof for equalization of pressure between the interior thereof and the surrounding atmosphere while excluding dust so that the interior convex surfaces of the condenser lenses may be kept dust-free.

As will be afterwards explained more in detail, the forward side of the first condenser lens 44 includes a generally rectangular shaped projection 68 which extends through opening 54 so that its flat surface 70 lies substantially in the plane of the front surface of the front wall 50 of said condenser lens enclosure 48. Said surface 70 is hereinafter identified as the primary platen surface of the principal film holder 80 which said surface 70 and the front wall 50 of the lens compartment 48, which frames said surface 70, constitutes in accordance with this invention. At 72 is an objective lens adjustably supported within its mount 73 which in turn is releasably secured to lens board 74 and centered thereby on the optical axis of the condenser lenses 44, 46 and primary platen surface 70 of the principal film holder 80. At 75 is a light source supported on a light board 76 behind condenser lenses 44, 46 and so that its filament is aligned on the axis of said lenses. As illustrated by FIG. 2, lens board 74 and light board 76 are mounted on massive-sized rigid, precisely related parallel rods or cylindrical ways 78 which accommodate axial adjustment of the spatial settings of the objective

68 and light source 75 relative to the primary film platen 70.

Optical head 30 as thus described is utilized as a camera with its light source 75 dark or as a projector when said light source is illuminated. In either of said modes the spatial setting or distance of the platen surface 70 of the subject holder 80 from the surface of the subject holder 40 may be adjusted to introduce a desired image reduction factor or magnification factor as by energizing motor 82 (FIG. 1) which is drivingly connected to the axle of one pair of wheels 32. The spatial setting of the objective 72 and light source 75 may be also adjusted independently of said optical head adjustment for sharpening the focus of the projected image. For this purpose FIG. 2 shows a motor 84 drivingly connected to a rotatably supported shaft 86 to which the lens board 74 and light board 76 are threadedly connected. In accordance with the direction in which the drive motor 84 is driven, the objective 72 and light source 75 move axially relative to the flattened surface 70. As described in my above mentioned patent the light source is simultaneously moved relative to the flattened surface 70 but in a different ratio in order to permit optimum light convergence at the nodal point of the objective lens during projection. It will also be understood that depending on the focal length of the objective lens being used, the objective lens 72 can be located in the plane of or in front of the lens board 74 as well as behind it as illustrated by FIG. 2. In the location of the objective illustrated by FIG. 2 at the inner end of mount 73 it is possible to utilize a relatively short focal length for greater reduction potential by reason of the ability to locate the objective lens close to the film platen 70 than were it located in the plane of or in front of the lens board 74. 79 represents means by which the objective mount 73 is removably secured to the lens board 74. Although shutter 85 is shown located at the inner end of the objective lens mount 73, it will be understood that it could be located at any other appropriate location along the optical axis of the objective lens therebetween and the subject holder.

Referring now to FIG. 4 and considering the same with FIGS. 5-7, as previously described the outer flat surface 70 of the generally rectangular shaped projection 68 on the forward side of the first condenser lens 44 in opening 54 of the front wall of the condenser lens compartment 48 comprise the primary platen of the principal film holder 80. Said front wall 50 which therefore frames platen 70 is also considered a part of the principal film holder 80 of the described apparatus. As illustrated by FIG. 5, platen surface 70 lies substantially in or just short of the plane of said surface of the platen frame 50. The dimensions of rectangular projection 68 of the first condenser lens 44 and therefore its forward flat surface 70 are slightly smaller than the corresponding dimensions of opening 50 in which it is centered so as to provide a continuous channel 90 about the periphery of the platen surface 70 having, as identified in FIG. 6, an inner wall defined by the sides 92 of the lens projection 68, an outer wall defined by the side wall 94 of the opening 54 through frame 50 and a bottom wall defined by the margin 96 of the first condenser lens 44 which seats against the stepped surface 58 of said opening 54.

Considering now FIG. 7 with FIG. 4, channel 90 is connected to the air evacuating pump (not shown) of the apparatus via a bore 98 which communicates

through the thickness of the frame member 50 into channel 90 as at 100 and at its opposite end with a fitting 102 which connects to tubing 104 into a valve structure 106 which connects via tubing 108 to the mentioned air evacuating pump. At spaced intervals above the upper horizontal portion 109 of said evacuating channel 90 are five registration pins 110 over which film having similarly diametered and spaced pre-punched holes is mounted so that its image area is centered on platen surface 70 and its margin overlies channel 90. Thus registered, air is evacuated from beneath the film into the surrounding channel 90 and via bore 98 tubing 104 through valve 106 and tubing 108 under the pull of the evacuating pump to effectively draw the image area of the film into tight conformity with said platen surface 70. Thus the registration pin 110 and evacuating channel 90 cooperate to locate the image area of the film in and oriented position on the film platen surface 70 and in a predetermined planar disposition relative to the axis of the objective and condenser lenses. In one commercially available camera-projector its film holder is adapted to support cut film of approximately 11 × 17 inches, the film having a nominal image area of approximately 10 × 16 inches. However, there are instances where it would be desirable if said camera-projector could also be adapted for either larger or smaller sizes of cut film.

In accordance with the invention, this increased utility is obtainable by mounting an auxiliary film holder over the principal film holder 80 having a platen of the desired smaller size. Such an auxiliary film holder is illustrated at 120 in FIGS. 8-12 and may be considered as particularly adapted for supporting cut film of 8½ × 11 inches having a nominal image area of 8 × 10 inches. As shown in FIG. 8 such an auxiliary holder 120 comprises a generally rectangular frame member 122 having parallel opposed flat sides and a rectangular shaped opening 124 with a stepped wall (FIG. 11) whose dimensions on the front side of frame 122 slightly exceed the nominal image area of the film but are less than the outer dimensions thereof. In said opening 124 is centered a glass plate 126 having parallel flat front and rear surfaces. As illustrated by FIG. 11, the glass plate also has a stepped periphery such that its forward surface lies substantially in or only slightly short of the plane of the front surface of the frame member 122 and its outer margins 128 will engage ledge 130 of the stepped inner wall of opening 124 in the frame member 122 under the urging of clips 132 (FIGS. 9 and 11) shown bolted to the rear side of the frame member 122 as by screws 134. Glass plate 126 has a thickness less than that of its supporting frame member 122 and the secured ends of mounting clips 132 seat in provided recesses 136 of the rear side of the frame member 122 such that, as shown by FIG. 11, both the clips 132 and the rear side of glass plate 126 lie wholly forwardly of the rear side of the frame member 122 and to not engage the primary platen surface 70 when assembled thereover as later described.

Portion 138 of glass plate 126 which projects forwardly of its outer margins 128 has a length and width slightly less than the corresponding dimensions of opening 124 in the platen frame 122 in which it is centered so as to provide a channel 140 about the forward surface 142 constituting the platen of the auxiliary film holder 120. As is apparent from FIG. 12, said channel 140 has an inner wall defined by the outer edge 144 of

said projecting portion 138 of the glass plate 128, an outer wall defined by the inner edge 146 of frame 122 about opening 124 and a closed bottom wall defined by the margin portion 128 of the glass plate 122. As also shown in FIG. 12, said channel 140 communicates with one end of bore 148 in the frame member 122 which ports at 150 through the rear surface thereof.

As shown in FIG. 9, frame 122 has five appropriately located clearance recesses 152 in its rear surface which receive registration pins 110 of the principal film holder 80 to allow the rear side of said frame 122 of the auxiliary film holder 120 to closely engage the forward side 156 of the principal film holder frame 50 when properly assembled therewith. When the auxiliary film holder is fastened to the principal film holder in its properly oriented relation as later described, its port 150 aligns with port 154 in the front surface 156 of said wall 50 constituting the frame of the principal film holder platen as illustrated in FIG. 4. and 6, port 154 in turn communicates with a bore 158 drilled in said wall parallel to bore 98 and connects to tubing 160 leading to the valve 106 aforementioned.

Referring again to FIG. 4, frame 50 of the principal platen 90 is also provided with a switch 170 on its forward side which is depressed when engaged by frame 122 of the auxiliary film holder so as to complete a circuit represented broadly by leads 172, 174 connecting to an electrical power source so as to energize solenoid 176 which thereupon moves valve plunger 178 to the left of FIG. 4, cutting off communication of tube 104 with the air evacuating source via tube 108 and establishing communication of tubing 160 through the valve 106 and tube 108 to said air evacuating source. Consequently when the oriented auxiliary film platen 120 is supported over the principal platen with its frame closely engaging the frame of the principal platen, its air evacuating channel 140 is connected to the air evacuating source and the air evacuating channel 90 of the principal film platen is cut off from the air evacuating source.

Means are also provided which assure that the auxiliary film holder 120 is fastened to the principal film holder 80 in properly oriented relation thereto in order to assure both that port 150 communicates with port 154 and also to assure that the platen 126 of the auxiliary film holder is properly centered on the platen 70 of the principal film holder and thereby also centered on the optical axis of the objective and condenser lenses. For this purpose, as shown in FIG. 4, a pair of projecting orientation pins 180 are provided in the frame 50 of the principal film holder adjacent the two upper corners of its film platen 70. The auxiliary film holder 120, in turn, has a pair of similar located and correspondingly diametered openings 182 to receive said orientation pins 180 when the auxiliary holder is properly related to center its film plate 126 with the primary film platen 70. As shown in FIG. 10, openings 182 preferably are provided with a wear resistant lining 184 which may be of stainless steel or the like.

In order to securely lock the auxiliary film holder 120 to the frame 50 of the principal film holder when thus oriented by pins 180, the auxiliary film holder is also provided with four torque screws or other locking means 186 appropriately located inwardly of its four corners. The illustrated torque screws are commercially available, each having a threaded end 188 which threadedly connects into the internally threaded open-

ings 190 provided in the corresponding areas of the principal film holder 90 so that when tightened they draw the auxiliary film holder frame tightly against the front surface 156 of the principal film holder 80 in order to firmly fasten the auxiliary film holder thereto. The torque is set with an allen wrench at a desired degree of pressure by the user so that once they are tightened to a maximum degree they do not further tighten. As previously indicated, the registration pins 110 of the principal film holder enter clearance recesses 152 so that the two frames closely engage. However, the rear side of the film platen 126 of the auxiliary film holder remains spaced off the primary platen 70 as do its mounting clips 132. Port 150 also communicates with port 154 and switch 170 is closed so that the evacuating channel 140 of the auxiliary film holder is now connected to the vacuum pump. The auxiliary film holder frame is also provided with three registration pins 90 spaced immediately above its evacuating channel 140 so that the auxiliary film holder may be used in exactly the same manner as is the principal film holder, although for a different and smaller size of film, for example the aforementioned film having an outer size of approximately  $8\frac{1}{2} \times 11$  inches and a nominal image area of  $8 \times 10$  inches. For convenience in assembling the auxiliary film holder over the principal film holder, the former is provided with handles 194 on its opposed sides and the principal film holder has a shelf 200 along its lower edge on which to rest the auxiliary film holder 120 during the act of assembling the same over the orientation pins 180 of the principal film holder. Advantageously said shelf 200 also is provided with an axially-directed cylindrical ridge 202 with which notch 204 in the bottom edge of the auxiliary film holder 120 mates to assist in orientation of the auxiliary film holder on the principal film holder.

The auxiliary film holder 120 also may be provided with a channel element 196 as shown in FIG. 8 which is hinged along its upper end by a piano hinge 198 to frame 122, allowing it to be swung back to expose the registration pins 192 for mounting and dismounting of the cut film thereover. When swung to its closed position it overlies the registration pins and the top margin of the film so that during exposure, as in the camera mode of the apparatus, a clear area remains on the developed negative for imprinting of the trademark and other data such as the image serial number.

In the camera mode of the apparatus it is important that the film with its sensitive coating be protected from ambient light so that the only light which strikes the film comes through the objective 72 with operation of shutter 85. As illustrated in FIG. 2, the area between the lens board 74 and the film holder 80 is therefore enclosed by a retractable film compartment cover 210. As shown in FIG. 2, said film compartment cover 210 comprises an axially expandable and compressible bellows portion 212 of flexible material which is fastened at its forward end to the rear side of the lens board 72 so as to enclose the objective mount 73 and at its opposite end to a rigid box-like portion 214 which is open at both ends and has an edge 215 which engages the film holder frame 50 about the platen 70. When the auxiliary film holder 120 is mounted over the principal film holder it engages the frame thereof about its platen 126. As illustrated, the box-like portion 214 of the film compartment cover is suspended by a set of space bearings 216 which slide along the aforementioned rods or

ways 78. The bellows section 212, in turn, is supported by an element 219 attached to its mid section and which slides on rod 220 secured to the lens board 72 and disposed parallel to said ways 78. Preferably the frames of both the principal film holder 80 and the auxiliary film holder 120 are provided with a rectangular shaped recess or channel 218 which extends about an area including the four torque screws 186 and the orientation pin receiving openings 182 in the case of the auxiliary film holder and about the torque screw receiving openings 190 and orientation pins 180 in the case of the principal film holder as well as the full area of said holders covered by the film. Channel 218 serves to receive the edge 215 of the rigid section 214 of the film compartment to effect a desired light tight seal. It will be appreciated that channel 218 can be wider than the edge 215 of the retractable film compartment since light will not pass around more than one corner. However, to assist in obtaining a close engagement of the film compartment cover edge 215 with the bottom wall of the light seal channel 218 and to prevent its accidental removal therefrom, a magnet 222 (FIGS. 2,3) is mounted on the top of the film compartment rigid section 214 immediately adjacent its rear edge 215 and the principal film holder frame 150, being constructed of aluminum, is provided with an appropriately located plate 224 of steel or other magnetically attractable material immediately above its channel 218. A similarly located steel plate 224 may be also mounted on the auxiliary film platen holder and so serves to hold the film compartment edge 215 within the channel 218 until the film compartment cover is manually withdrawn therefrom. It will, of course, be appreciated that in the mounting and dismounting of the auxiliary film holder and rigid section 214 of the film compartment is backed away from the film holder. However, because this action is exerted against the expandable and compressible bellows section 212, the spatial setting of the objective 72 is not disturbed. As noted above, the movement of the film compartment cover may be done manually and no special locking means other than the aforesaid magnet 222 and magnetic plate 224 are required to lock the film compartment cover to the principal film holder frame or the auxiliary frame holder frame as the case may be.

In FIG. 13 a second auxiliary film holder 230 is illustrated. This auxiliary film holder 230 is of a construction generally similar to the above described first auxiliary film holder 120 but differs therefrom in that it is adapted for supporting a still smaller size of cut film, for example a film of the order of  $5 \times 7$  inches having a nominal image area of  $4 \times 6$  inches or approximating that of so-called 105mm film. As shown in FIG. 13, auxiliary film holder 230 also includes a frame 122 which supports a glass plate 126 as by clips 132 in the manner described above for auxiliary film holder 120. Glass panel 126 is also located so that its forward surface 142 is disposed substantially flush with or slightly below the plane of the front surface of frame 122 and it is surrounded by an air evacuating channel 140 which connects via bore 148 to a port 150 in the rear surface of its frame 122. This port is also so located that when the auxiliary film holder 230 is oriented on a principal film holder, as by means of openings 182 which receive orientation pins 180 of the principal film holder and its V-shaped notch 204 which seats on ridge 202 of the shelf of the principal film holder, and is tightly drawn

against the film platen frame surface by torque screws 186, said port 150 establishes communication of its air evacuating channel 140 via valve 106 to the air evacuating source of the camera projector. However, as illustrated in FIG. 13, because of the smaller size of film which the auxiliary film holder 230 is intended to handle, it requires but two film registration pins 192. As in the case of auxiliary film holder 120, film holder 230 also has similarly located handles 194 at its two sides and its rear surface has the five clearances recesses 152 which receive the registration pins 110 of the principal holder to allow the film holder 230 to be closely assembled therewith. The auxiliary film holder 230 is also mounted on the principal film holder and used in the same manner as the auxiliary film holder 120.

An auxiliary film holder for said camera-projector or other photoreproduction apparatus may also comprise structure adapting it for projecting roll film such as used in aerial photography. A suitable auxiliary film holder for this purpose is illustrated at 240 in FIG. 14-17. Referring first to FIG. 14, auxiliary film holder 240 comprises a plate 242 corresponding to frame 122 of auxiliary film holders 120 and 230. Plate 242 thus has a centrally located rectangular shaped opening 124 in which is supported a glass plate 126 as by means of clips 132 which engage the back surface thereof about its margin. Glass plate 126 also has a forward surface 142 which constitutes the film platen of said holder 240 and approximates the dimensions of one frame of the film roll with which the auxiliary film holder 240 is intended to be utilized. For example, it may approximate 9 x 9 inches as is used in aerial photography. Said rectangular shaped glass plate is similarly shaped so that it has a length and width only slightly smaller than the corresponding dimensions of the plate opening 124 in which it is centered, thus providing a surrounding channel 140 which is connected via bore 148 to a port 150 which exits through the rear side of the plate 242. Port 150 similarly aligns with port 154 in the forward side of the principal film holder frame 50 when assembled therewith. Plate 242 also has a pair of openings 182 which are so located as to engage over orientation pins 180 of the principal film holder. It also has a V-shaped notch 204 in the lower edge thereof which cooperates with ridge 202 on shelf 200 of the principal film holder. Plate 242 similarly has recesses 152 in its rear surface which are located to receive the registration pins 110 of the principal film holder and it has torque screws 186 which threadedly connect into the internally threaded openings 190 of the principal holder to closely mount plate 242 to frame 52 of the principal film holder 80, its oriented relationship thereon being determined by said orientation pins 180 and ridge 202 engaging in openings 182 and notch 204 respectively of plate 242. Although plate 242 does not have a light-seal channel 218, since it is intended to be used only in the projector mode, it does have a steel plate 224 which is positioned to attract the magnet 222 of the film compartment cover 210 so as to hold the edge 215 thereof against said plate in surrounding relation about the film platen 142.

Differing from the previously described auxiliary film holders 120 and 230 for cut film, plate 242 has extensions on either side thereof which carry supporting structure for a supply reel 244 and a take-up reel 246. It also has a rectangular path on either side of platen 142 which is defined by walls 248 so as to confine and

guide the film as it moves across the plate from supply reel 244 beneath roller 250 across the film platen 142 and beneath roller 252 to take up reel 246. It also has plates 254 which lap the edges of the film as it moves over the platen 142. By reason that walls 248 have a height only slightly greater than the thickness of the film, the edge 215 of the film compartment cover may be brought firmly against plate 242 on either side of said walls 248 without contacting the film.

The mounting structure for the film supply and take-up reels as seen in FIGS. 14 and 15 comprise upper and lower spool holders 256 which are threadedly connected to reversely threaded portions 258 and 260 of a vertical shaft 262 which is rotatably supported in spaced bearings 264. At the upper end of shaft 262 is a crank handle 266 by which shaft 262 may be rotated in order to move the upper and lower spindle holders toward and away from each other, depending on the direction in which the crank is operated. In said movement the spool holders 254, 256 are guided by ways 268 such that their movement is essentially rectilinear or axial with respect to shaft 262. Spool holders 254, 256 may therefore be readily separated in order to permit insertion and removal of the respective reels 244, 246 in a film loading or unloading operation and afterwards brought together to rotatably hold the reels in place. The spool holders themselves are a commercially available item and their construction therefore is not a part of this invention.

Although the film could be manually moved off the take up roll 244 across the platen 142 to the take up reel 246, preferably this is accomplished by motors 270 which are drivingly connected to the respective reels 244 and 246. It also will be understood that the circuit which is closed to drive the motors 270 also opens a normally closed switch in the operating circuit for the air evacuating pump in order that the pull of said pump on the film frame across the platen 142 will be relieved simultaneously as the motors are energized to move the next frame into position on the film plate 142. Any other suitable drive means or mount for the take up and supply reels may be utilized in accordance with the invention.

Preferably, the handles for the auxiliary film holder 240, one of which is illustrated at 272 in FIG. 15, are disposed on the rear side of the plate 242 adjacent the ends thereof so that they may also act as supporting feet for the film holder on which it may be rested in a horizontal position when not in use.

FIGS. 18 through 23 show still another auxiliary film holder 280 which may be mounted on the principal film holder 80 of the illustrated camera-projector. As shown in FIG. 18, auxiliary film holder 280 embodies a supporting plate 282 having a pair of spaced orientation openings 182 by which it may be oriented on pins 180 of the principal holder in order to center its light aperture 284 with the primary plate 70 as in the case of the other described auxiliary film holders 120, 230 and 240. Plate 282 also has a V-notch 204 in its lower edge which helps in said orientation by engaging ridge 202 of shelf 200 of the principal film holder. It is also provided with four torque screws 286 which threadedly connect into internally threaded screw holes 180 in frame 50 of the principal film holder in order to secure plate 282 in close relation to said principal film holder, and rear side of plate 282 having clearance recesses

152 which receive the registration pins 110 of the principal film holder when assembled thereon.

Unlike the previously described film holders, aperture 284 does not contain the film platen. Instead, the film platen comprises a glass plate 296 which is mounted within a separate frame 290 slidingly supported on the forward side of plate 282 for vertical and horizontal rectilinear movements. Referring to FIGS. 18 and 23 it will be seen that frame 290 has a rectangular shaped opening 292 corresponding in size and shape to light aperture 284 and about the periphery of said opening is a depressed ledge 294 on which rests the peripheral edge of the rectangular shaped glass plate 296 constituting the film platen. As illustrated, the opposed sides of plate 296 are ground parallel and flat and said plate has a thickness such that when resting on ledge 294, its forward surface 297 lies substantially in the plane of the surrounding surface of the plate 282 or slightly therebelow. Rectangular plate 296 has a width and length slightly less than the corresponding dimensions of opening 292 so that when centered thereon a channel 298 is provided about the glass platen 296 which as shown in FIG. 18 is connected by means of a bore 300 in frame 290 to a fitting 302 which connects by means of a flexible tubing 304 to a second fitting 306 which ports through plate 282 to the rear surface thereof. Suitable clip means are illustrated at 306 which engage and overlie the beveled margins of glass plate 296 and are secured within suitably recessed portions of the plate 282 so as to be flush with the surface thereof. As shown, said clips 306 have a beveled outer edge 308 which engage a complimenting beveled edge of the plate 296 so that the clips secure the plate in its required center relation to provide the evacuating channel 294 while also being essentially flush with the platen surface against which the film is tightly drawn as when air is evacuated from said channel 298 when fitting 306 connects through valve 106 to the air evacuating source as it is aligned with port 154 of the primary film holder and switch 170 is closed.

It is contemplated that particularly in the camera mode of the photoreproduction apparatus, although it also will be true when the apparatus is in its projector mode, that the film thus supported on platen 296 through the cooperation of the surrounding evacuating channel 298 and registration pins 320, may be moved both horizontally and also vertically so that selected portions of its image area may be centered on the optical axis of the objective and for optimum focusing of an image of graphic sheet material located on the subject holder 40. Thus it is contemplated that the image area of the film may be divided into, for example, two horizontal rows of four image sectors each. By masking seven of the eight image sectors a different sector may be successively centered on the axis of the apparatus to produce the same or different images of graphic sheet material supported on the subject holder. It is contemplated that such a "step and repeat" film holder will be particularly useful to the book printing industry since each image sector can therefore comprise one page of a book with the pages reproduced on the eight image sectors in a desired sequence to form a "signature." After the film containing the eight images comprising the "signature" has been developed, it may be relocated on the film platen 297 which is now centered with the light aperture 284 and the apparatus used in its projector mode to expose a projection speed offset

plate or to print the required number of proof copies on sensitive paper supported by the subject holder. A larger number of copies of the signature may therefore be produced quickly and inexpensively, ready to be cut and assembled as is conventional in the book printing industry today.

Therefore, referring now to FIG. 20, and considering the same with FIG. 18, it will be seen that frame 290 is mounted on spaced bearing blocks 310 which slide along two parallel spaced horizontally disposed cylindrical ways or rods 312, the opposite ends of which are fixed in a pair of spaced vertical slides 314. Vertical slides 314, in turn, are slidably mounted on a pair of vertically disposed cylindrical guides or rods 316. In order that each image sector of the several rows thereof can be individually centered with the optical axis of the objective, suitable indexing means are provided. Thus, as illustrated in FIG. 18, such means comprises a vertical indexing plate indicated at 330 and a horizontal indexing plate indicated at 350. As illustrated in FIG. 18, vertical indexing plate 330 has two notches 332 with which the projection of detent mechanism 334 engages and indexing plate 350 has four notches 352 with which the projection of indexing mechanism 356 engages. Thus, a film on platen 297 may be divided into two horizontal rows having four image sectors each. However, as illustrated, indexing plates 330 and 350 are removably mounted by suitable screws to vertical slide plate 314 and frame 290 respectively, so that they may be replaced by index plates having a greater or lesser number of notches to permit changing the number of rows as well as number of image sectors in each row.

As illustrated by FIGS. 21 and 22, said indenting mechanism take two different forms, although it should be understood that both indexing means may be similarly constructed and therefore operated in the same fashion. Thus, as illustrated in FIG. 22, the detent mechanism 334 which indexes the vertical movement of the film platen comprises a lever 336 which is hinged at 338 under the biasing of a spring 240 located between pintle 338 and projection 334 so that it engages against a stop 342 causing said projection 344 to engage in one of the two illustrated notches 332 of the index plate 330 aligned therewith. Pressing on portion 346 against the biasing of spring 340 causes projection 344 to be lowered below the indent plate 330 so that slide 314 may be moved vertically either up or down (in the illustrated example upwardly) to align the next horizontal row of image sectors of a film on platen 296 with the optical axis of aperture 282. As soon as the platen has been moved vertically far enough to move notch 332 of the index plate 330 out of alignment with projection 344, pressure on portion 346 may be released. Thereafter the projection will ride beneath the index plate until it is moved into alignment with the next succeeding notch whereupon spring 340 will act to relocate projection 344 in said notch and hold the platen in its next adjusted position. Considering now FIG. 19 with FIG. 18, it will be seen that the vertical movement of the film platen by means of vertical slides 314 on ways or guides 316 is counter balanced by weights 370 which slide along tracks 371 on the rear side of plate 282. Each said weights is suspended by means of a cord or chain 372 which passes over a pulley or sprocket 374, through an opening 376 in the plate, and over sprocket 378 to a respective one of vertical slides 314 with which it connects as at 377. The



counterweights, their tracks 371 and sprockets 374 are preferably enclosed by suitable removable covers indicated at 379.

Turning next to FIG. 21, detent member 356 is seen to also comprise a lever 360 hinged on a pintle 362 and actuated under the biasing of a spring 364 to engage a stop surface 366 in which position its projection 354 engages in an aligned notch 352 of the horizontal index plate 350. However, in this instance the biasing spring 364 is on the opposite side of pintle 362 so that pressure applied at 368 causes projection 354 to rise out of notch 352 as spring 364 is compressed. However, as soon as the platen frame 290 has been shifted horizontally, pressure upon 368 may be released, and as before, spring 364 will cause projection 354 to reengage in the next notch as soon as it aligns therewith.

Since auxiliary film holder 280 is intended to be operated in the camera mode of the camera projector as well as in its projector mode it is important that the film compartment cover effect a light seal about the film platen. However, in order to accommodate the full sweep of the horizontal, as well as vertical, movement of the platen frame 290, it is necessary to replace the rigid section of the film compartment cover so that its cross section approximates the dimensions indicated by the light seal channel 360 of FIG. 18.

Referring now to FIG. 24, it will be appreciated that instead of manually moving the film platen frame 290, the same movements can be accomplished by means of a pair of electrically operated motors. Thus, in FIG. 24 a first electrical motor 380 is shown mounted on a spanning member 382 which is connected at its opposite ends to vertical slide elements 314 and parallels horizontal guide rods 312 along which the film platen frame 290 slides. Motor 380, when energized, turns a threaded shaft 384 having its opposite end rotatably supported in a bearing 386 also secured to said spanning member 382, thus causing follower element 388 threadedly connected thereto and the platen frame 290 to move therewith in the direction determined by the direction of rotation of motor 380. Vertical movement of the film plate 290 may be obtained by means of a second motor 390 secured to plate 282 which similarly rotates a threaded shaft 392 having its opposite end rotatably mounted in a bearing 394 so as to drive a follower 396 attached to the adjacent slide 314 and threadedly connected with shaft 392. The circuits for motors 390 and 380 also may be designed so that they will move their respective followers a controlled amount and then stop. In this event the detent mechanisms as represented at 334 and 356 in the aforescribed embodiment of FIG. 18 can be omitted.

It will therefore be appreciated that the versatility and convenience of a photoreproduction apparatus such as a camera-projector illustrated by FIG. 1 can be considerably enhanced through the employment of auxiliary film holders, their principal film holder being suitably modified to accommodate ready mounting and dismounting of the auxiliary film holders as above described. Thus in the embodiment of the invention described the apparatus may be utilized with its principal film holder to photographically reproduce images of graphic sheet material on cut film having image areas in the order of 10 × 16 inches or even larger. By assembling auxiliary film holder 120 thereover, the same camera-projector can be adapted for use with films having a smaller image area, for example, of the order

of 8 × 10 inches and by using auxiliary film holder 230 it can be utilized with film having a still smaller image area, for example, in the order of 4 × 6 inches. By assembling the film holder 240 over its principal film holder the same apparatus can be utilized to project, for example, aerial roll film. By mounting the auxiliary film holder 280 on its principal film holder the camera-projector then becomes an effective tool for the book printing industry or any industry requiring a multiplicity of either the same images (such as labels) or non-identical images (such as in book page signatures) as described above in connection with the embodiments of the invention illustrated by FIGS. 18 through 24.

In the above described example, the platen of the principal film holder has been described as comprising the first surface of the condenser lens assembly. It will be understood, however, that the invention also has application where the platen of the principal film holder comprises the first surface of a framed translucent or light transmitting member separate from the condenser lens or used in place of or as a substitute for the condenser lens or lenses of a photoreproduction apparatus, as for example a so-called opal glass, ground glass or a back-lighted member of translucent plexiglass. Moreover, although the invention has been described in connection with a camera-projector, it also will have application to other photo reproduction apparatus, as for example a projector.

Thus it will be apparent that all of the recited objects and advantages as well as features of the invention have been demonstrated as being obtainable in a highly practical yet conveniently simple manner.

Having described my invention, I claim:

1. In photoreproduction apparatus, the combination of a first film mounting structure and a second film mounting structure each having a flat rectangular transparent platen, a surrounding outer frame and a vacuum channel peripherally disposed about said platen, a conduit means connecting the vacuum channel of the first film supporting structure to an evacuating pump and means for orienting and removably mounting said second film supporting structure in coaxially aligned relation on the first film supporting structure, said first and second film supporting structures having cooperating means which connect said conduit means to the vacuum channel of the second film supporting structure when the second film supporting structure is mounted on the first film supporting structure.

2. The combination of claim 1 wherein the cooperating means includes first port means in the frame of the first film supporting structure which connects to the conduit means, second port means in the frame of the second film supporting structure which connects to the vacuum channel thereof, the second port means having an entrance which communicates with the first port means when the film supporting structures are mounted together and oriented in aligned relation, the first port means being normally closed to the conduit means, and switch means operable to open the first port means to the conduit means and close the conduit means to the vacuum channel of the first film supporting means.

3. The combination of claim 2 wherein the switch means is located on the frame of the first film supporting structure for operation by engagement thereof by the frame of the second film supporting structure.

4. The combination of claim 1 wherein the frame of at least the first film supporting structure has film registration means related to the platen, and the frame of the second film supporting structure has clearance means which allow close engagement of the two frames when the film supporting structures are mounted in oriented relation.

5. The combination of claim 1 wherein the film supporting structures have orienting means separate from mounting means.

6. The combination of claim 5 wherein the orienting means comprise spaced orientation pins projecting from one structure and openings in the other structure to receive said orientation pins.

7. The combination of claim 6 wherein the orienting means also include a shelf on the first film supporting structure on which to rest the bottom edge of the second film supporting structure.

8. The combination of claim 7 wherein one of the bottom edge and shelf has a recess and the other has a projection which fits therein.

9. The combination of claim 5 wherein the mounting means comprises torque screws on the second film supporting structure which threadedly connect into internally threaded openings in the frame of the first film supporting structure.

10. In photoreproduction apparatus, the combination of a first film supporting structure and a second film supporting structure, each said structures having a flat generally rectangular transparent platen and an outer surrounding frame having spaced projecting film registration pins along at least one edge of the transparent platen of said structure, the frame of the second film supporting structure having a flat undersurface and means therein which receive the film registration pins of the first film supporting structure to allow the second film supporting structure to be disposed flat against the first film supporting structure, and means for orienting and removably mounting the second film supporting structure over the first film supporting structure in said flat and axially aligned relation.

11. The combination of claim 10 wherein the transparent platen of each said film supporting structure has a vacuum channel extending about the periphery thereof.

12. The combination of claim 10 wherein the frame of the second film supporting structure has a hinged cover overlying the spaced film registration pins thereof.

13. In photoreproduction apparatus, the combination of film supporting structure which includes a transparent platen and a surrounding frame, an objective lens support axially slidably supported forwardly of said film supporting structure, an axially retractable film compartment secured at its forward end to said objective lens support, said surrounding frame having a channel in its forward face which receives the rearward edge of said film compartment, the rearward edge of said film compartment being axially movable into and out of said channel to permit access to the transparent platen without changing the axial position of the objective lens support relative to the plate, and magnetic means on said frame and film compartment for releasably retaining said edge in the channel to provide a light tight assembly therebetween.

14. The combination of claim 13 wherein the film compartment comprises a rigid portion and a bellows portion.

15. The combination of claim 14 wherein the rigid portion of the film compartment is on the end thereof adjacent the film supporting structure.

16. The combination of claim 14 wherein its rigid portion is suspended from spaced ways on which it is axially movable toward and away from the film supporting structure.

17. The combination of claim 16 wherein the objective lens support is slidable along the same ways.

18. The combination of claim 17 wherein the objective lens support has means which protrude into the film compartment for supporting an objective close to the platen of the film supporting structure.

19. The combination of claim 13 further including a second film supporting structure embodying a smaller sized transparent platen and a supporting frame, the frame of said second film supporting structure having means cooperating with means on the frame of the first mentioned film supporting structure for orienting and removably mounting the second film supporting structure with its platen centered on the optical axis of the first mentioned film supporting structure.

20. The combination of claim 19 wherein the frame of the second film supporting structure has a channel in its forward face to receive the rearward edge of the film compartment.

21. In a photoreproduction device having a condenser lens or other light transmitting assembly which includes supporting structure about the front face thereof, the combination of an auxiliary film supporting platen and a surrounding supporting frame therefor, said frame having first means which engage with orienting means on the said assembly supporting structure to locate the platen in axial aligned relation with the assembly when positioned over the front face thereof and having second means for releasably mounting the frame to the assembly supporting structure when the platen is so located, supporting frame of the auxiliary film supporting platen has handles for convenient manipulation thereof, and the supporting structure about the front face of the assembly includes a shelf on which to rest the auxiliary film supporting platen and its frame in oriented relation to the assembly.

22. The combination of claim 21 further having orientation pin means on one of said supporting structure and supporting frame.

23. In a photoreproduction device having a condenser lens or other light transmitting assembly which includes supporting structure about the front face thereof, the combination of an auxiliary film supporting platen and a surrounding supporting frame therefor, said frame having first means which engage with orienting means on the said assembly supporting structure to locate the platen in axial aligned relation with the assembly when positioned over the front face thereof and having second means for releasably mounting the frame to the assembly supporting structure when the platen is so located, wherein a vacuum channel is provided about the periphery of the film platen and the surrounding frame has port means which connect to said channel and to a second port means in the assembly when mounted thereto which second port means establish connection to an air evacuating source.

24. The combination of claim 23 wherein the supporting frame has film registration pins spaced along one edge of the platen.

25. The combination of claim 24 wherein a hinged cover overlies the registration pins on said frame.

26. In a photoreproduction device having a condenser lens or other light transmitting assembly which includes supporting structure about the front face thereof, the combination of an auxiliary film supporting platen and a surrounding supporting frame therefor, said frame having first means which engage with orienting means on the said assembly supporting structure to locate the platen in axial aligned relation with the assembly when positioned over the front face thereof and having second means for releasably mounting the frame to the assembly supporting structure when the platen is so located, wherein the frame of the auxiliary film supporting platen supports a pair of film reels one on each side of the platen.

27. In a camera-projector having a condenser lens or other light transmitting assembly which includes supporting structure about the front face thereof, the combination of a transparent film platen and a support therefor, said support including means which frame the platen and define a vacuum channel about the periphery of the platen to which an air evacuating source is connectible to draw film flat against the platen, and further means which secure the film platen support to the supporting structure of the assembly and locate the platen in an oriented position over the front face of the assembly and with respect to the axis of said assembly, wherein the platen and its frame means are adapted for movement on the support in directions at right angles to the assembly axis.

28. The combination of claim 27 further including index means for releasably locking the platen in different locations on the support to which it is moved.

29. The combination of claim 28 wherein the indexing means comprise a pair of right angularly mounted ratchet bars on the frame means for the platen and associated pawls mounted on the support.

30. The combination of claim 27 wherein the support has guide means along which the frame means and platen move, and means for counterbalancing the movement of said frame means and platen in at least one of the directions of movement.

31. In a camera-projector having a condenser lens or other light transmitting assembly which includes supporting structure about the front face thereof, the combination of a transparent film platen and a support therefor, said support including means which frame the platen and define a vacuum channel about the periphery of the platen to which an air evacuating source is connectible to draw film flat against the platen, and further means which secure the film platen support to the supporting structure of the assembly and locate the platen in an oriented position over the front face of the assembly and with respect to the axis of said assembly,

wherein the support comprises a plate-like member having a rectangular shaped opening which is centered on the axis of the assembly when the support is secured to the supporting structure about the front face of the assembly, the platen and frame means being movable relative to said opening.

32. In a camera-projector having a condenser lens or other light transmitting assembly which includes supporting structure about the front face thereof, the combination of a transparent film platen and a support therefor, said support including means which frame the platen and means separate from the platen film means which define a vacuum channel about the periphery of the platen to which an air evacuating source is connectible to draw film flat against the platen, and further means which secure the film platen support to the supporting structure of the assembly and locate the platen in an oriented position over the front face of the assembly and with respect to the axis of said assembly, the platen frame means having spaced registration pins by which film may be located over the platen and vacuum channel to assure a registered position as it is drawn tightly against the platen with evacuation of air from the vacuum channel.

33. The combination of claim 32 wherein the frame means has a port which communicates with the vacuum channel and an entrance which aligns with an exit in the condenser lens assembly supporting structure which communicates with air evacuating means when the support is secured to the supporting structure.

34. The combination of claim 33 wherein the support is provided with handle means.

35. The combination of claim 33 wherein the support includes a notch in its bottom edge which mates with a provided projection on a shelf of the assembly.

36. The combination of claim 33 wherein the support also includes spaced openings which engage with orientation projections on the supporting structure of the assembly.

37. The combination of claim 33 wherein the frame means has a cover member which overlies the registration pins.

38. The combination of claim 31 wherein the platen is secured within the rectangular shaped opening of the support, and the frame means include the portion of the support about said opening in which the platen is secured.

39. The combination of claim 38 wherein the plate-like member has means for rotatably supporting film spools at either side of the platen.

40. The combination of claim 39 wherein the film spool supporting means are motorized to effect rotation of the film spools.

41. The combination of claim 39 wherein the plate-like member has means between which the film is guided in a path across the film platen.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,762,816 Dated October 2, 1973

Inventor(s) JOSEPH H, WALLY, JR.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 18, line 41, After "located"  
insert --wherein the--.

Signed and sealed this 1st day of January 1974.

(SEAL)  
Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

RENE D. TEGTMEYER  
Acting Commissioner of Patents