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[54] **DOOR STRUCTURE**

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[21] Appl. No.: **203,814**

Related U.S. Application Data

[63] Continuation of Ser. No. 59,981, July 31, 1970, abandoned.

[52] **U.S. Cl.** **49/501,** 287/189.36

[51] **Int. Cl.** **E06b 3/00**

[58] **Field of Search** ..... 49/501; 52/627, 624; 287/189.36 H

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[57] **ABSTRACT**

There is provided an improved door structure of the type having a frame supporting a panel of glass or other suitable material and characterized by very narrow stiles. The stiles each have relatively heavy face portions connected by a transverse web and defining confronting shallow and deep glazing pockets. Spaced upper and lower rail assemblies interconnect the stiles, and are each provided with longitudinally extending screw splines. The ends of the upper and lower rail assemblies are coped so that the screw splines fit within the confronting glazing pockets and seat against the respective webs.

3 Claims, 8 Drawing Figures

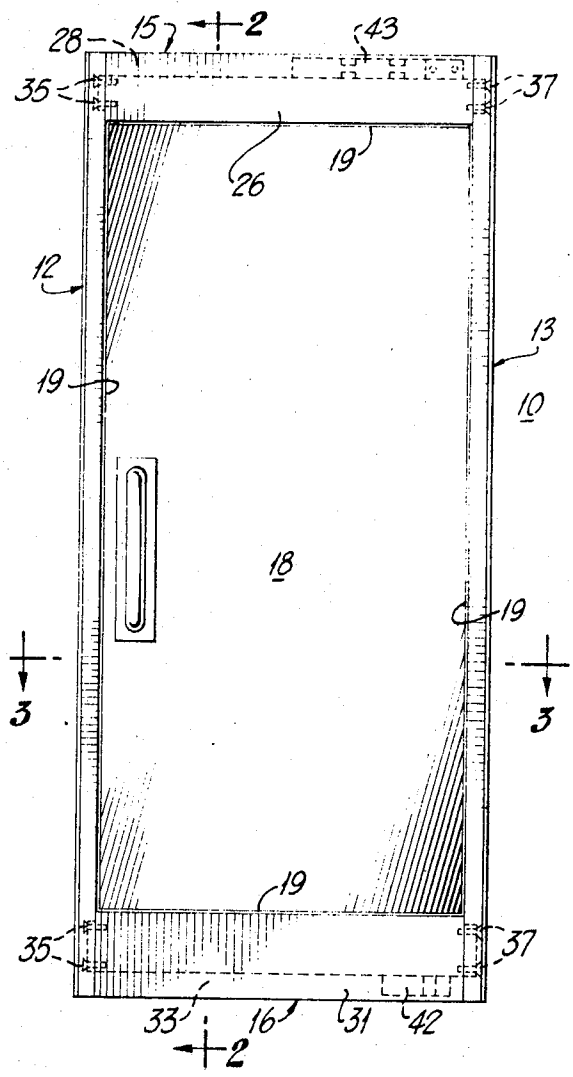

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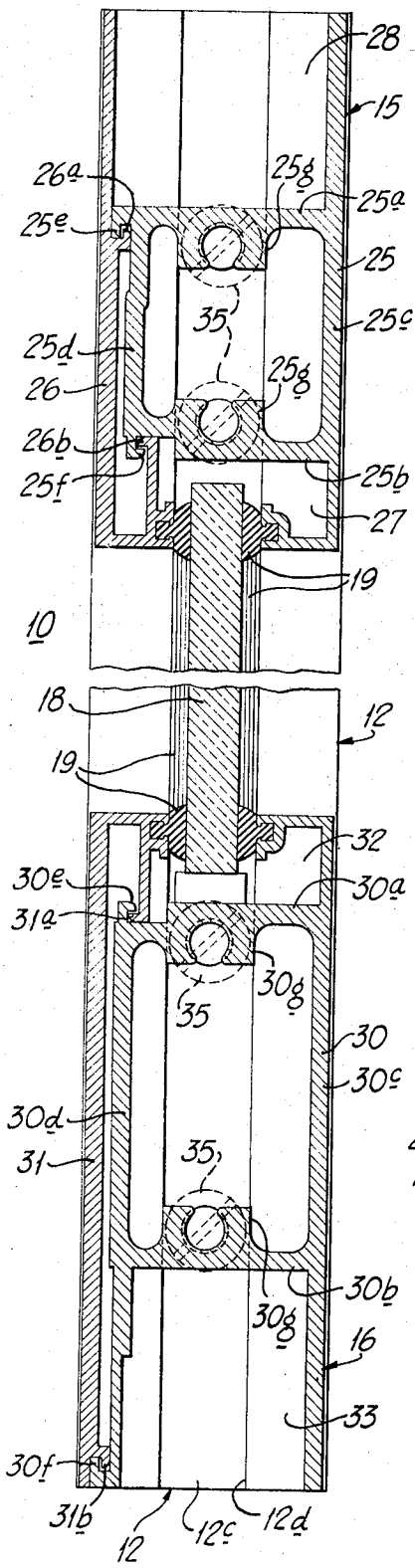
Fig. 2



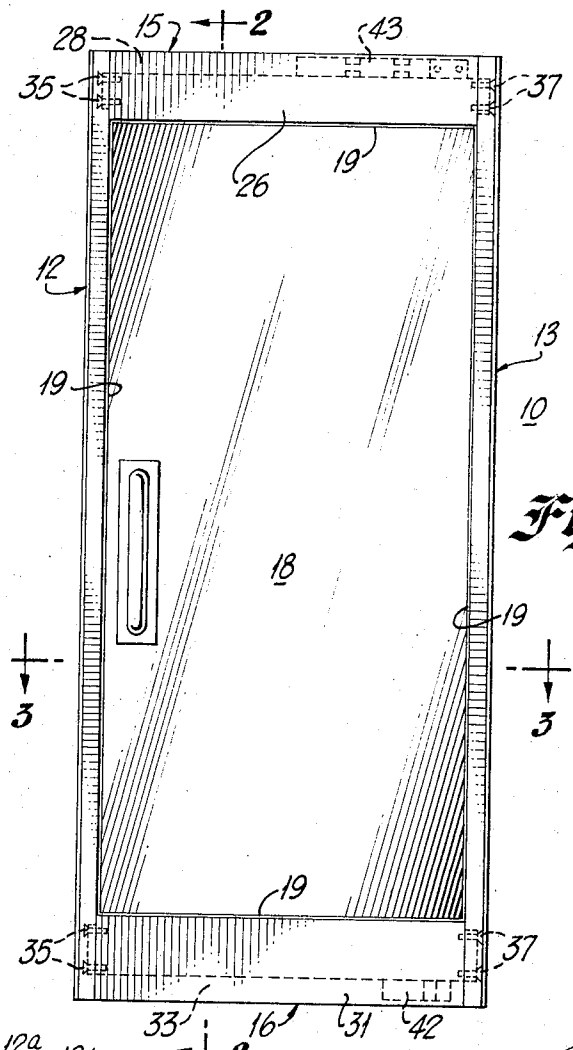


Fig. 1

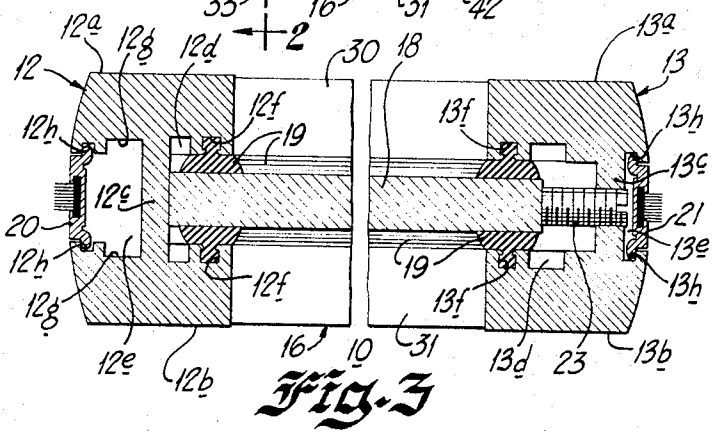


Fig. 3

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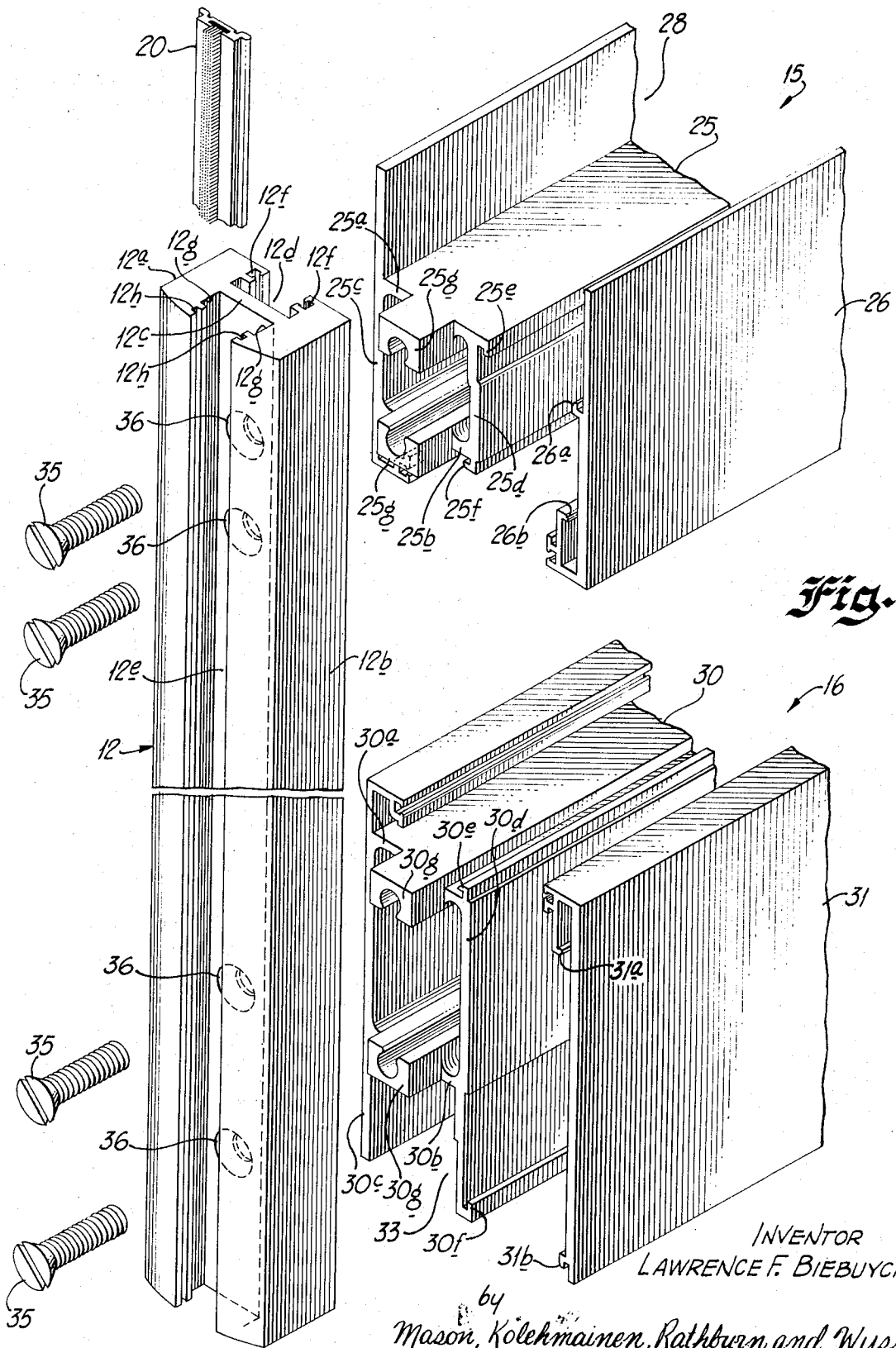

Fig. 4

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Fig. 5

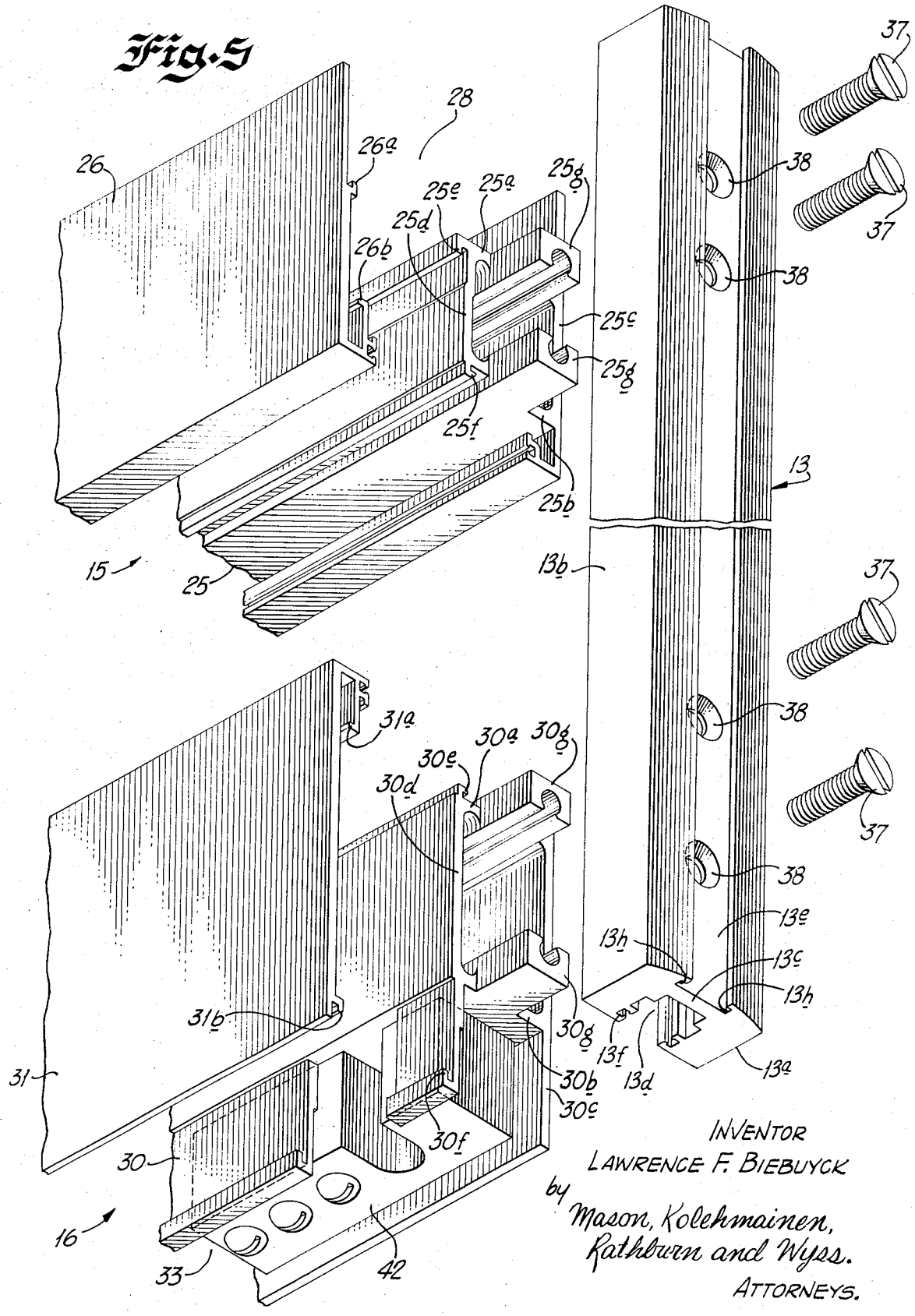

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Fig. 6

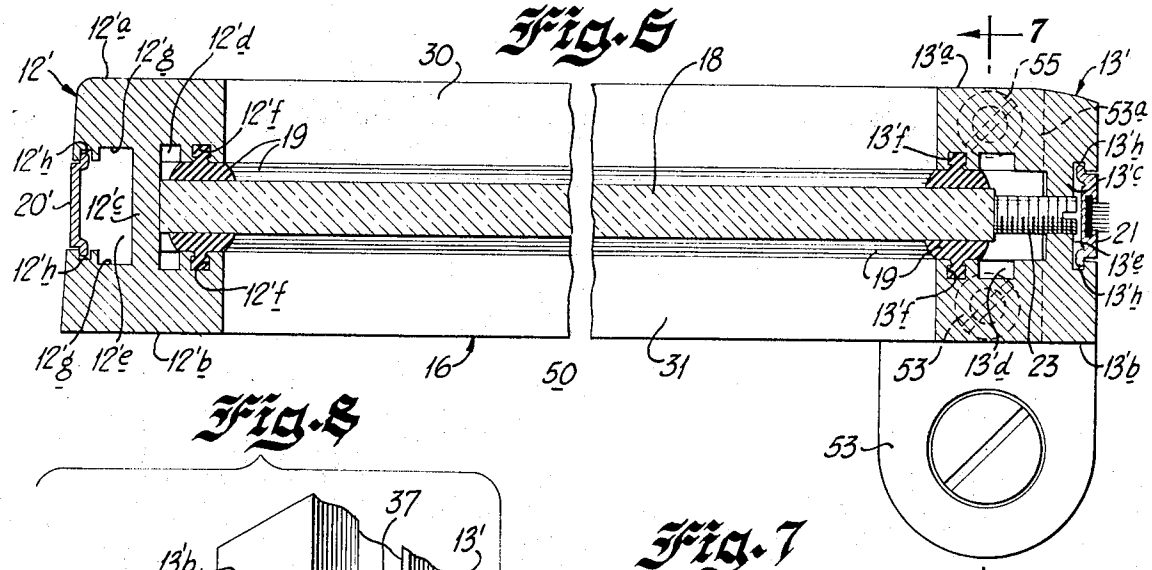


Fig. 8

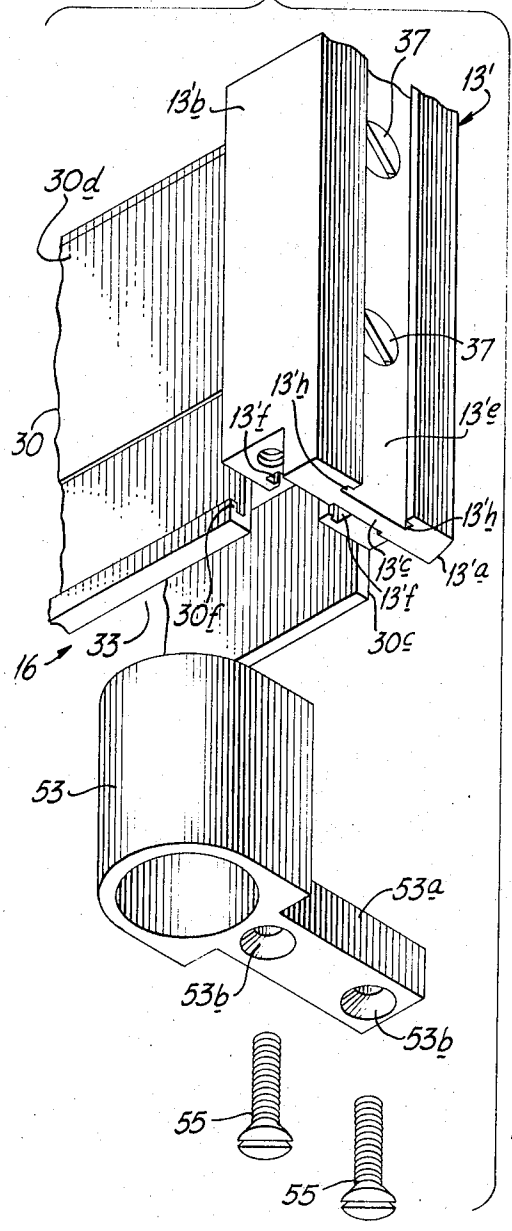
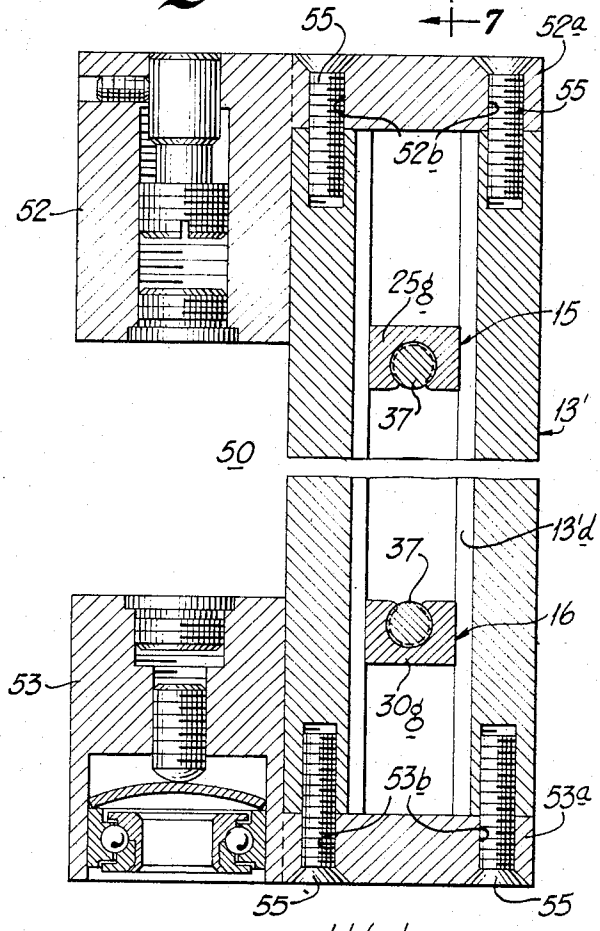


Fig. 7



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DOOR STRUCTURE

This application is a continuation U.S. Pat. application Ser. No. 59,981 filed July 31, 1970, now abandoned.

The present invention relates to a new and improved door structure, and particularly a stiles has structure of connected by type having extruded frame members supporting a panel such as of glass, and characterized by very narrow stiles. glazing

Heretofore difficulty has been experienced in obtaining door construction having a maximum glass or panel size and characterized by having a minimum width of stile members. Some of the difficulty arises from the requirement that in order to glaze a door after assembly of the door frame, it is necessary for a shallow and deep glazing pocket to confront each other in order to provide for installation clearance of the glass. Moreover it is necessary that the door frame members have sufficient strength to withstand the loads imposed thereon. The door frames may be particularly critical with regard to the strength of the joints between the stiles and upper and lower rail members.

Accordingly it is an object of the present invention to provide a new and improved door structure.

Another object of the present invention is to provide a new and improved door structure having relatively narrow stiles.

Still another object of the present invention is the provision of a new and improved door structure having improved strength.

Other objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In accordance with these and other objects, there is provided an improved door structure of the type having a frame supporting a panel such as of glass, and characterized by very narrow stiles. Each of the stileshas face portions connectedby a transverse web and defining confronting shallow and deep glazing pockets. Upper and lower rail assemblies interconnect the stiles and are provided with coped ends having screw splines fitting into the confronting glasing pockets. Fastener means extend through the transverse webs into the screw splines to secure the rail assemblies and stiles together. Suitable stile caps cover the exposed fastener heads in the webs.

For a better understanding of the present invention, reference may be had to the accompanying drawings wherein:

FIG. 1 is an elevational view of a door according to the present invention;

FIG. 2 is a fragmentary elevational sectional view of the door of FIG. 1, taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary plan sectional view of the door of FIG. 1, taken along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary perspective exploded view of the door of FIG. 1, illustrating the connection of the lock stile to the horizontal rails.

FIG. 5 is a fragmentary perspective exploded view of the door of FIG. 1, illustrating the connection of the pivot stile to the horizontal rails;

FIG. 6 is a fragmentary cross sectional plan view of a door according to the present invention and illustrating the securement of an offset pivot to the door.

FIG. 7 is a fragmentary elevational sectional view of the door of FIG. 6, taken along line 7—7 of FIG. 6; and

FIG. 8 is a fragmentary exploded perspective view of the door of FIG. 6, illustrating the attachment of the lower pivot to the door.

Referring now to the drawings, and particularly to the embodiment of FIGS. 1 through 5, there is a door 10 according to the present invention illustrated as of the center pivoted, double-acting type. The door 10 is formed of spaced vertical stile members 12 and 13 interconnected by upper and lower rail assemblies 15 and 16. The stile members and rail assemblies define a door frame supporting a panel 18 of glass or other suitable material. In the illustrated embodiments the stile member 12 may be referred to as the lock stile, while the stile member 13 may be referred to as the pivot stile.

Referring first to the lock stile member 12, it is formed by an extruded element, such as of aluminum, and provided with relatively heavy face portions 12*a*, 12*b* interconnected by a transverse web 12c. The face portions and web, 12*a*, 12*b*, 12*c*, together define a shallow glazing pocket 12*d* and an opposed edge channel 12*e*. The confronting edges of the glazing pocket 12*d* includes parts defining gasket channels 12*f* for retaining suitable glazing gaskets 19. In the illustrated embodiment, the edge channel 12*e* is of somewhat T shape, having undercut portions 12*g*. In addition the edge channel 12e has confronting grooves 12*h* for slidably receiving a stile cap 20.

The pivot stile member 13 is similar to the lock stile member 12, having the same narrow width, and includes relatively heavy face portions 13*a*, 13*b* interconnected by a transverse web 13*c*. The face portions and web 13*a*, 13*b*, 13*c* together define a deep glazing pocket 13*d*, and an edge channel 13*e*. The confronting edges of the glazing pocket 13*d* are provided with gasket channels 13*f* supporting suitable glazing gaskets 19. Moreover the confronting edges of the edge channel 13*e* are provided with confronting grooves 13*h* slidably receiving a pivot stile cap 21. If desired studs 23 of nylon or other suitable material may be threaded through the web 13*c* against the glazing 18 to prevent creeping of the glazing into the deep glazing pocket.

It will be appreciated that the lock stile member 12 is formed with the shallow glazing pocket 12*d*, and has a relatively deep edge channel 12*e*, while the pivot stile member 13 is formed with a deep glazing pocket 13*d* and has a shallow edge channel 12*e*, thus permitting maximum utilization of material and minimum width to the stile members.

The upper rail assembly 15 is formed of a rail member 25 and a face member 26, both of extruded aluminum or other suitable material, and each having parts interfitting to lock the face member 26 to the rail member 25. More specifically, and as best illustrated in FIG. 2, the rail member 25 includes a generally tubular center portion having transverse webs 25*a*, 25*b*, an outer face portion 25*c*, and an inner web 25*d*. Formed integrally with the inner web is a toe portion 25*e* and hook portion 25*f* forming parts interlocking with corresponding parts of the face member. Screw splines 25*g* are formed with the transverse webs 25*a* and 25*b* defining relatively heavy metal portions at the centers of the webs. The face member 26 includes a toe portion

26*a* and a hook portion 26*b* for camming and interlocking relation with the respective toe and hook portions 25*e*, 25*f* of the rail member 25. When assembled the upper rail assembly 15 defines a glazing pocket 27 and an upper open pocket 28 for receiving door closures, operators and the like.

The lower rail assembly 16 is similar to the upper rail assembly 15, but may differ primarily dimensionally. More specifically the lower rail member 16 includes a rail member 30, FIG. 2, having a generally tubular center portion formed of transverse webs 30*a*, 30*b*, a face portion 30*c*, and an inner web 30*d*. A toe portion 30*e* and a hook portion 30*f* are provided along the inner web 25*d* for interlocking relationship with a face member 31. Suitable screw splines 30*g* are provided generally centrally of the rail assembly 16 and define relatively heavy central portions to the transverse webs 30*a*, 30*b*. The face member 31 also includes a toe portion 31*a* and a hook portion 31*b* for interlocking relationship with the toe and hook portions, 30*e*, 30*f* of the rail member 30. The lower rail assembly 16 also defines a glazing pocket 32 at its upper end, and a downwardly opening pocket 33 at its lower end.

The joint or corner connection of the stile members and rail assemblies are best illustrated in FIGS. 4 and 5. Referring first to the lock stile end of FIG. 4, the end of the rail assemblies 15 and 16 are coped back so that only the relatively heavy portions of the transverse webs defined by the screw splines project in tongue-like manner and are closely fit and confined within the glazing pocket 12*d* of the lock stile member 12. Suitable screw fasteners, such as screws 35, are driven into the respective screw splines 25*g*, 30*g* through apertures 36 in the stile member 12. The stile cap 20 covers the exposed heads of the screws 35.

The connection between the rail assemblies 15 and 16 to the pivot stile member 13 is similar, with the lock ends of the upper and lower rail assemblies 15 and 16 being coped back so that the material in the area of the screw splines 25*g*, 30*g* projects in tongue-like manner into the deep glazing pocket 13*d* of the pivot stile member 13. Suitable screw fasteners, such as screws 37, are secured within the screw splines 25*g*, 30*g* through apertures 38 in the transverse web 13*c* of the pivot stile member 13. The stile cap 21 covers the exposed heads of the fasteners 37.

Advantageously the projecting tongue-like portions of the upper and lower rail assemblies being closely fit within the respective glazing channels and carry the torsion load directly between the rail assemblies 15 and 16 and the stile members 12 and 13, so that the fasteners 35 and 37 carry only tensile loads which they are designed to do. Moreover it will be appreciated that the particular arrangement of deep and shallow glazing pockets, and deep and shallow edge channels in the stile members 12 and 13 there is provided maximum utilization of material along with a minimum width of door stile.

The embodiment of FIGS. 1 through 5 is illustrated for a center hung, double acting door. To this end there is provided a pivot fitting 42 in the lower pocket 33 of the lower rail assembly 16 for receiving a pivot pin, the inner web 25*d* being cut away to accommodate the pin. Moreover a suitable upper pivot, somewhat diagramatically illustrated in FIG. 1 as 43, is readily accommodated within the upper pocket 28 of the upper rail assembly 15.

FIGS. 6 through 8 illustrate one other form of supporting a door 50 by means of an offset pivot. The members forming the door 50 are similar to those heretofore described, however since the door 50 is a single acting door the outer contour of the stile members is changed in accordance with the desired door function. Accordingly the lock stile member of the door 50 is represented by 12', and the pivot stile member of pivot door 50 is represented by 13'. Similar components of the door 50 with the door 10 heretofore described are represented by the same reference characters.

As illustrated there is provided an upper pivot fitting 52 and a lower pivot fitting 53. Each of the pivots 52, 53 are provided with tongue portions 52*a*, 53*a* and the face portions 13'*a*, 13'*b* of the pivot stile member 13' are cut away along their inner edges to receive the tongue portions 52*a* and 53*a* without cutting into the transverse web 13'*c*. Suitable threaded fasteners 55 are threaded directly into the relatively heavy face portions 13'*a*, 13'*b* through suitable apertures 52*b*, 53*b* of the respective pivot fittings 52,53.

A door structure in accordance with the described invention provides for maximum utilization of the stile material so that a door with minimum width stiles is provided. Advantageously the door provides pleasing lines and appearance for the architect. Moreover the corner joint of the door frame is strong and sturdy, accomplishing transfer of torsional loads between the members without the addition of shear blocks and the like.

Although the present invention has been described by reference to several embodiments thereof, it will be apparent that numerous other modifications and embodiments intended by the appended claims to cover all modifications and embodiments which will fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A door structure of the type having a frame supporting a panel such as of glass and characterized by very narrow stiles, said door structures comprising:
   - spaced vertical door stiles, each having relatively heavy face portions connected by a transverse web defining confronting shallow and deep glazing pockets;
   - spaced upper and lower rail assemblies interconnecting said stiles::
   - at least one of said rail assemblies including:
     - a rail member having a generally tubular center portion having parts thereon defining longitudinally extending screw splines and a face portion, and
     - a face member defining a glass stop and forming a glazing pocket with its face portion;
     - said rail member and said face member having interlocking parts;
   - the ends of said rail assemblies being coped with the ends of the screw splines fitted within the confronting shallow and deep glazing pockets of the door stiles and against the webs thereof, and
   - fastener means extending through the transverse webs into said screw splines securing said rail assemblies and said vertical stiles together.

2. A door structure as set forth in claim 1 wherein channels are defined in the outer edges of said door

stiles for receiving stile caps covering said screw fasteners.

3. A door structure as set forth in claim 2 wherein said door stiles define lock and pivot stiles respectively, each having the same width, and wherein the shallow glazing pocket is defined in said lock stile and the deep glazing pocket is defined in the pivot stile, and wherein the channel in said lock stile is deeper than the channel in said pivot stile, whereby said lock stile is adapted to receive door hardware associated with said stile.

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