This invention relates to door assemblies and, more particularly, to lanai door assemblies constructed of a minimum number of extruded, interchangeable parts.

The increasing popularity of the so-called lanai doors opening into gardens and other outdoor areas has made it increasingly necessary for builders, lumber yards, and the like to maintain a stock of such doors on hand. The principal factor militating against maintaining an inventory of lanai door assemblies occurs due to the tremendous variety of doors—not only in terms of styling but in terms of features necessary to permit proper use in different situations. Too often in the past a distributor of sliding glass door assemblies has had to stock a large number of doors for different size openings, slide directions, and, in many cases, different heights. Some home owners prefer a single stationary door and a single movable door, others two stationary doors and a movable door and yet others, two or three doors, all of which are movable, etc. In order to provide the variety of arrangements necessary for the diversity of tastes, inventory requirements have often been prohibitive.

The principal object of the present invention, therefore, is to provide a sliding door assembly which employs a minimum number of parts adaptable for different size and door arrangements. Beyond this, objects are to provide sliding door assemblies utilizing a minimum number of parts which are readily assembled at the installation location by relatively unskilled labor without elaborate tools, retention members, or other cost increasing requisites.

These and other objects and advantages of the present invention may be more fully understood when the following detailed description is read with reference to the drawings in which:

FIG. 1 is a perspective of the sliding door assembly of the present invention supported interior of a wall with portions of the wall cut away to more clearly illustrate features of the door frame;

FIG. 2 is an enlarged partial perspective and exploded view of end portions of a side and header of the frame which illustrates the means by which the frame members are joined together;

FIG. 3 is an enlarged partial perspective of the junction of the sill and side of the frame as they cooperate with the threshold cover;

FIG. 4 is a partial perspective taken generally along line 4—4 of FIG. 1 of the junction of the frame side and header to illustrate the cooperation therewith of a clip to act as the corner of the flange for the frame members;

FIG. 5 is a cross-section of the sill and threshold cover which illustrates the manner of installing and maintaining the threshold cover over a portion of the sill;

FIG. 6 is a section taken along line 6—6 of FIG. 1 to illustrate the means by which the fixed or non-sliding door is maintained immobile and prevented from being removed from the frame assembly;

FIG. 7 is a section taken along line 7—7 of FIG. 1 with certain parts omitted to more clearly illustrate the relative positions of the fixed and sliding door as they cooperate with the sill member and threshold cover; and

FIG. 8 is a partial plan section which illustrates the cooperation between the stationary and sliding doors when the latter is closed.

Looking first to FIG. 1, the frame of the sliding door assembly can be seen to include a frame header 10, a sill member 11, and the left and right frame sides 12 and 13, respectively. Supported for movement along the plane defined by the header 10 and sill 11 are a pair of glass doors 14 and 16. More particularly, in the exemplary embodiment, door 14 is held stationary while door 16 is free to slide from an open position to the left of the door assembly (with respect to the orientation of FIG. 1 in the drawing) to a closed position immediately adjacent the right side of the jamb 13.

The frame is assembled as particularly illustrated in FIG. 2 by extending screws or other threaded members 21 through apertures 22 formed in the flat surface thereof and self-tapping them into apertured receivers 23. By this simple expedient, it is possible to quickly assemble the basic frame assembly including members 10—13 preparatory to placing it along and interior of a wall. The projecting flange member or plate 24 forms an integral part of all sides of the frame assembly conforming to the outer surface (into the plane of the drawing) of member 26 which defines the upper part of the opening in the wall as well as studs on each side of the opening (not shown). The flange or plate 24 on the sill member is interposed between a sill bracing member (not shown) and the exterior side of the wall, as particularly illustrated in FIGS. 5 and 7.

Looking again to FIG. 1, a glass door assembly such as 14 or 16 is formed of a pair of horizontal rails 27 and stiles 28 which support a pane of single or double thickness glass 29. The forwardmost stile 28a on the outside edge of the door 16, when closed, abuts the door jamb 13, locking door 16, when closed, about the door jamb 13. Locking assembly 31 is provided to cooperate with an aperture 32 in the door jamb 13 to lock the door. A threshold cover 33, partially illustrated in FIG. 3, is placed over the top of the sill along the projected line of movement of the stationary door 14 to provide a smooth transition from the inside room out through the open part of the frame onto the ground or other area beyond the wall in which the door assembly is positioned. The means by which the threshold cover is secured to the sill will be explained in more detail below.

Also cooperating with the door frame of members 10, 11, 12 and 13 is a sliding screen door 36 which is exemplarily guided on the sill member along upstanding projection 37 (see FIG. 7). Nylon or other type rollers connected along the top of the door may be supported on an interior track of the header member 10, as is well known in the sliding door art.

Once the frame members 10—13 have been joined by screws 21, filler clips 41, as particularly illustrated in FIG. 4, are inserted to fill out the open corners between the flanges or plates 24 which are an integral part of sides 12 and 13, header 10 and sill 11. Of course, it is possible to form the frame members so that the flanges or plates 24 thereon form a full rectangle, but such would be extremely difficult if advantage is to be taken of extrusion techniques. Thus, the instant filler clip provides a full rectangular flange about the periphery of the frame and yet permits the components of the sliding door assembly to be extruded.

The filler clip comprises a body portion 42 having a pair of 90° displaced flanges 43 and 44 extending therefrom. The flange 43 lies in a plane just to the rear or outwardly of the body portion 42 (with reference to the side of the sliding door assembly which faces outwardly into the garden or other exterior location) and although the planes of the flange 43 and body 42 are roughly parallel. In a similar manner, the flange 44 extends in a plane parallel to the body 42 but displaced forwardly thereof. A tab 46 is formed on the rear side of flange 43 which adapts the flange to cooperate with an L-shaped groove 47 formed along the length of...
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the frame header 10, which groove or lip can be seen in FIGS. 2 and 4. To place the filler clip 41 in position, the flange 44 is positioned over the forward part of the flange or plate 24 on a side member, as for example, the tab 46 of the slider (see FIG. 4). The lip of this flange 44 is inserted underneath the lip of the U-shaped channel 57 with the flange 34 lying behind flange 24 on the frame header 10. With the assembly as described, the tab 46 acts to hold flange 44 firmly against the rear surface of flange or plate 24 on header 10 and flange 44 is thereby held firmly against the forward surface of flange or plate 24 on the frame side 12. A similar filler clip 41 may also be inserted in the right corner between frame header 10 and the right frame 13, as will be apparent. The necessity for providing such a filler clip is, of course, to permit a complete seal to be effected between the studs and support members defining the wall opening and the frame of the sliding door assembly.

With the frame positioned in the opening defined by the studs, one or more nail clips (not shown) are inserted along the proper channels 48 and secured to the studs to hold the frame in the wall opening. This particular means of maintaining the frame 24 firmly against the studs defining the opening is, of course, not the only means by which it may be done, but is one particularly suitable. This nail clip assembly is disclosed in more detail in my co-pending application, Serial No. 32,228, filed on May 27, 1960, now abandoned.

With the frame retained in the door opening, the stationary door 14 is placed along the channel running along the lie of the wall and disposed immediately adjacent the room side of the frame assembly. With the door 14 so situated, it is prevented from being removed by an L-shaped bracket 51 which cooperates with the channel along the interior side of frame assembly. With the door 14 so situated, it is prevented from being removed by an L-shaped bracket 51 which cooperates with the channel along the interior side of frame header 10 and an anchor assembly 52 which is adapted to cooperate with the horizontal channel formed along the length of the sill member 11.

The L-shaped locking member 51 is adapted to lie along the flat transverse surface of the stile 28 of door 14 and define the cross section configuration of the channel in which the door is maintained. With the locking device 51 in place, it is threadedly retained along the stile 28 by a screw or other member 56. The anchor device 51 and the bracket 51 cooperate to prevent transverse and longitudinal movement of the stationary door. Also, they cannot be removed after the sliding door is placed in position since the rearmost stile on door 16 will always overlap the stile on the stationary door 14 to prevent access thereto unless the sliding door is removed.

With the stationary door in place, a length of the threshold cover 33 is cut to fit between the stile 28 on door 14 and the right side frame 13, as can be particularly seen in FIG. 1. In cross-section, the threshold cover is illustrated in FIGS. 5 and 7. In most sliding door assemblies a threshold plate or cover is merely placed along the opening between the end of the stationary door and the opposite frame side and secured to the sill frame by screws. One of the disadvantages of this procedure is that overlying apertures must be pre-drilled in the frame sill and threshold cover to permit such securing devices to be inserted during assembly—either approach is unsatisfactory if the desire is to provide a simply and easily assembled sliding door assembly. This particular problem has been overcome in the present threshold cover 33 by forming it with the main plate 61 having an L-shaped projecting or auxiliary plate 62 extending parallel to the cover plate 61 and terminating approximately adjacent the edge thereof. The rear part of the plate 61 has a projecting tab 63 formed thereon which cooperates with the lip of an open groove defined by a longitudinal projection 64 in the sill member.

Aligned apertures 65 are formed through the parallel surfaces of plates 61 and 62 at selected intervals along the length of the cover 33 and the aperture in plate 61 is threaded to cooperate with a tapped hole to place the threshold cover 33 in position, plates 61 and 62 are placed over a rear upper lip 67 formed along the inside of frame sill 10 (as illustrated in FIG. 5) and the rear projecting tab 33 under the lip of projection 64 and the machine screw 66 is thereafter screwed through the auxiliary plate 62 to cause the plates 61 and 62 to firmly grip the projection or lip 67 along the front edge of sill 10. This maintains the threshold cover 33 firmly in place without necessitating forming aligned holes in the threshold cover and sill or requiring that they be drilled during the course of installation. With the stationary door 14 and the threshold cover 33 installed, the sliding door 16, which has a plurality of grooved rollers 71 rotatably supported along the lower rail 27, is placed in its defining horizontal track (adjacent the channel for the stationary door). More particularly, the grooved rollers engage longitudinal projection or track 72, which permits the door 16 to be moved along the lie of the wall. The upper rail of the door 16 is placed interior of the guide channel formed along the lower surface of frame header 10 and the door thereafter lifted upwardly and pivoted transversely to place the rollers 71 on guide rail 72. As can be appreciated, the sliding road 16 can be removed from the exterior side of the door frame assembly when unlocked. However, means are provided for positively locking it along the length of the door jamb 13 to prevent its being moved upwardly or transversely outward. Such a locking device is disclosed in detail in my co-pending application filed on an even date herewith.

The stile 28 of stationary door 14 as well as the stile 28b of sliding door 16 are formed of an extruded rectangular member 81 and an L-shaped snap bracket 82. The bracket 82 has a pair of upstanding projections 83 extending from its interior side having outwardly disposed lips which engage an edge of the rectangular stile member 81 to firmly maintain the body 81 and bracket 82 as a unit. This arrangement has the advantage of permitting extended members to be used, not to mention the advantage of locking the members together without screws, etc.

The other leg of the L of bracket 82 extends forwardly along the lie of the door and has a surface 84 which is designed to cooperate with the corresponding taper on the corresponding leg of bracket 82 maintained along the stile of the other door. This can be particularly seen in FIG. 8 between the full line view of the bracket and the dotted line view of its cooperating counterpart. Formed on the outer surface of the projecting leg or bracket 82 is a channel which retains a weather strip 85 which bears against the side of the body 81 of the other door assembly to provide a weather tight seal. The advantage of the surfaces 84 contacting each other when the sliding door 16 is closed is to prevent overtravel and also assure that the stile for the moving door never moves beyond the stationary door thereby making it possible for someone to remove the locking bracket 51 and anchor device 52 which maintain the stationary door in situ.

Besides the weather strip 85 supported along the length of the stile brackets 82, as mentioned above, similar channels are formed on various parts of the extruded assembly to prevent air from freely flowing through interstices when the doors are closed. Such weather strips are illustrated as 88a in FIGS. 7 and 88b in FIG. 6.

Then to the frame sides 12 and 13 and would also have a fixed piece of weather stripping formed along the sides of the channels in which the sliding and fixed doors rest in order to avoid air leakage therethrough.

While the various improvements that are incorporated in the present sliding door assembly have been described
with reference to the preferred embodiments thereof, it should be apparent to those skilled in the art that certain variations may be envisioned without departing from the teaching of the present invention. It is for this reason that the invention should not be limited except to the extent of the appended claims.

What is claimed is:

In a sliding door frame assembly of the type having a frame sill that includes a horizontal inwardly projecting edge and an upstanding horizontal shoulder defining a retaining lip disposed inwardly from said edge along the surface of the sill in parallel relation to the projecting edge, a threshold cover for the sill comprising a U-shaped front portion forming upper and lower spaced apart legs, the rear edge of said cover engaging said horizontal retaining lip and said U-shaped front portion movable to a position wherein said upper leg overlies and said lower leg underlies said inwardly projecting edge, and means for moving the legs of the U-shaped portion together whereby the threshold cover is firmly held by the lip engaged rear edge and the projecting edge that is maintained between the legs of said U-shaped front portion, said leg moving means including a threaded aperture on said lower leg, an aperture in said upper leg aligned with said threaded aperture, and a screw passing through said aperture in said upper leg threadably engaged in said threaded aperture.

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