The invention avoids springs biasing means and employs in their place a sloping bottom track of essentially V shape and wide enough to accommodate two doors one behind the other. In the known construction a plurality of springs associated with the bottom track act on the door panels from the rear and urge the door bottoms against a front lip on the track.

The present invention relates to passage doors in which the doors must be capable of being displaced in both directions normal to the plane of the doors, as a person may approach the door from one side or the other. This cannot be accomplished by the known construction employing biasing springs.

In addition biasing assemblies employing biasing springs involve numerous other disadvantages. The point of engagement at which the spring force is exerted on the door panels in the known construction shifts as the door is being moved from side to side. For example, it is near the center when the door is closed, but it acts on the door near one end when the door is being depressed and slid partially behind another. Also, the spring force is uneven, depending on whether the spring is deflected slightly, as in the closed door position, is deflected normally by displacement of a single door, or is deflected to a maximum as in the case where one door is behind another.

Furthermore, it is not possible to match the biasing spring force to the weight of the door panels. These may be heavy, depending on whether the door is wide, of solid construction, or containing a glass panel, or they may be light, as in the case of a narrow panel hollow core construction, and so forth.

It is therefore necessary in the employment of a biasing spring force to make the force sufficient for dependable operation of the heaviest door panel in the condition of even minimum spring deflection. Such force is obviously far in excess of that required for the lighter panels which then become unnecessarily hard to move.

Loosely, spring assemblies associated with the bottom track are unsightly when the doors are open, and tend to collect dirt and dust.

The invention avoids springs biasing means and employs in its place a sloping bottom track of essentially V profile whose slope extends throughout the entire range of door movement from side to side, the slope angle being preferably the same for both legs of the V.
may be modified in various respects without departure from the principles of the invention and that the invention may be incorporated in other structural forms than shown.

Rooms A and B are separated by a flush panel passage door assembly generally designated C1 comprising a plurality of panels 11, 12, 13, 14 of equal or unequal width, as may be desired for functional or decorative reasons.

As shown more particularly in FIG. 2, the door panels are guided in two opposite tracks, a sill track 15 and a top track 16. These tracks may consist of metal or plastic material, are preferably extruded or molded, and require only cutting to length to fit a particular installation.

The tracks comprise a generally concave V- or U-shaped door engaging surface 17, 18 which faces up in the sill track and down in the top track. The lowest portion of the track 15 is designated 19.

The shape of the edge of the track is optional. It may be beveled as shown at 20, the beveled shape being preferred where the adjacent floor 21 is hardwood, or overlaid with linoleum or other synthetic sheet floor covering, or the edge may be squared as shown at 22 to fit carpeting 23. The limits of the door engaging surfaces 17 and 18 are defined by lips 24, 25 and 26, 27 which prevent the doors from leaving the tracks when being pushed in the direction towards room A or room B, respectively.

The door panels rest on the bottom track on suitable antifriction devices on which each panel, by reason of its own weight, tends to move down the inclined surface 17 towards the center 19. Such antifriction devices may be made of metal, or from low friction plastics, tetrafluoroethylene polymer, known to the trade as "Teflon" being a preferred example of the latter. These antifriction devices may assume different forms.

FIG. 2 shows a ball 28 held in a socket 29 fitted in a suitable track 30 in the panel bottom. The ball rests in a spherical seat 31 of the socket 29.

The panel tops are equally centered with respect to the center line of the bottom track, so as to maintain the panels vertical on the bottom track. While pairs of oppositely disposed spring assemblies of the type known per se in doors and cabinet doors may be used for this purpose, it is preferred to employ a concave track assembly corresponding to the bottom panel support for this purpose.

A ball 128 rests in a spherical seat 131 in a socket 129. The socket 129 has a stem 32 on it provided with a flange or shoulder 33. A helical compression spring 34 rests against this shoulder with one end, and the other end of the spring rests on the bottom of a cylindrical sleeve 35 fitted in a bore 36 in the panel top. The bore 36 is concentric with a larger bore 36' accommodating the socket 129. Both bores may be drilled simultaneously with a combination tool.

The stem 32 is centered and guided within the sleeve 35 by a narrow neck 37 at the top and a hole 38 at the bottom through which the stem extends. The neck portion 37 comprises an enlarged flange 39 with which the sleeve rests on the bottom of the large diameter bore 36', thus preventing the sleeve from slipping to the bottom of the bore 36.

Under the force of the spring 34 the ball 128 seeks to assume a position of greatest distance from the bottom ball 28. This is the position in which the ball contacts the roof 42 or highest point of the top track surface 16. If displaced towards room A or B or, what amounts to the same, towards lip 26 or 27, the guiding elements of the panel tops return the panels to a centered position.

The operation of the door assembly is now evident. In order to open the door, a panel is pushed back and slid behind another. Thus panel 13 was slid behind panel 12 from room A. Panel 11 was slid behind panel 12 (as viewed from room B) in a similar manner.

In order to reduce the friction between the door panels and in order to prevent scratch marks on the finished panel surface, low friction spacer strips 40 are installed adjacent the top and bottom edges of the panels.

The elements 128, 129, 34 which guide the door panels within the top track 16 also operate by reason of the force of the spring 34 to increase the weight with which the door panels rest on the top track.

Thus the springs in effect increase the force which tends to restore the panel to a centered position within the bottom track after having been displaced towards the front or the back so as to rest on the slanted or sloping portion 17 of the track.

What is claimed is:

1. A flush closing sliding passage door assembly for a structural door opening, the assembly comprising, in combination, a plurality of sliding doors; a common door supporting bottom sill on which the door bottoms are movable with freedom to move from side to side as well as at right angles thereto, said sill having a door supporting upper surface of a shallow substantially symmetrical V-profile in cross section within the range of movement of the doors from side to side and of a depth sufficient to accommodate two doors in a position in which one door is in its lowest position, centered with respect to the V, and the other door is in register with the one door and rests in a higher position on either one of the two legs of the V, the legs of the V being substantially symmetrical with respect to the V bottom and sufficiently steep to impart to a door resting on one of the legs by gravity a bias to move into the lowest, centered position with respect to the profile in all positions within said range; and guide means including spring means positioned between the top of the door opening and the top portion of each door for urging the top portion towards a centered position with respect to the sill profile, said guide means being of a depth sufficient to accommodate two doors in a position one behind the other.

2. A flush closing sliding passage door assembly for a structural door opening, the assembly comprising, in combination, a plurality of sliding doors; a common door supporting bottom sill on which the door bottoms are movable with freedom to move from side to side as well as at right angles thereto, said sill having a door supporting upper surface of a shallow substantially V-profile in cross section within the range of movement of the doors from side to side and of a depth sufficient to accommodate two doors in a position in which one door is in its lowest position, centered with respect to the bottom of the V, and the other door is in register with the one door and rests in a higher position on one of the legs of the V, the legs of the V being sufficiently steep to impart to the doors under the influence of gravity a bias to move into the lowest, centered position with respect to the profile; and guide means for engaging the top portion of the doors at the top of the opening, said guide means comprising a trough shaped member having a concave profile facing said sill and extending throughout the range of movement of the doors from side to side; a tracking element for the top of each door; and means for mounting said tracking element on the top of the door to bear with resilient force against said trough shaped member.

3. An assembly as set forth in the preceding claim in which said trough shaped member is of the profile of an inverted V.

4. A flush closing sliding passage door assembly for a structural door opening, the assembly comprising, in combination, at least three sliding doors; a common door supporting bottom sill in which the door bottoms are movable with freedom to move from side to side as well as at right angles thereto, said sill having a door supporting upper surface of a shallow V-profile in cross section within the range of movement of the doors from side to side and of a depth sufficient to accommodate two doors in a position in which one door is in its lowest position,
centered with respect to the bottom of the V, and the other door is in register with the one door and rests in a higher position on either one of the two legs of the V, the legs of the V being substantially symmetrical with respect to the V bottom and sufficiently steep to impart to a door resting on one of the legs by gravity a bias to move into the lowest, centered position with respect to the profile in all positions within said range; and guide means including spring means positioned between the top of the door opening and the top portion of each door for urging the respective top portion towards a centered position with respect to the sill profile, said guide means being of a depth sufficient to accommodate three doors in a position one behind the other.

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