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R. J. BRINK ET AL
SLIDING PANEL HARDWARE

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2 Sheets-Sheet 1

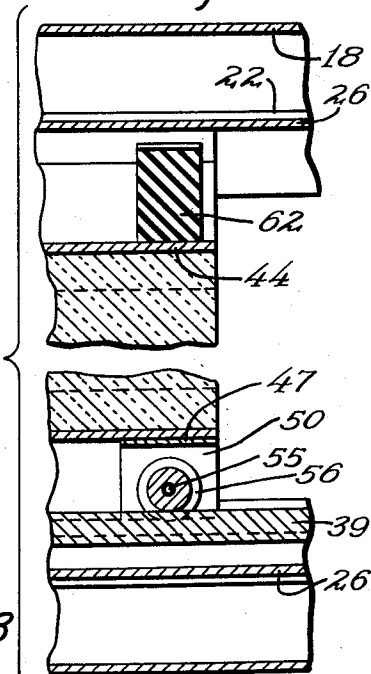
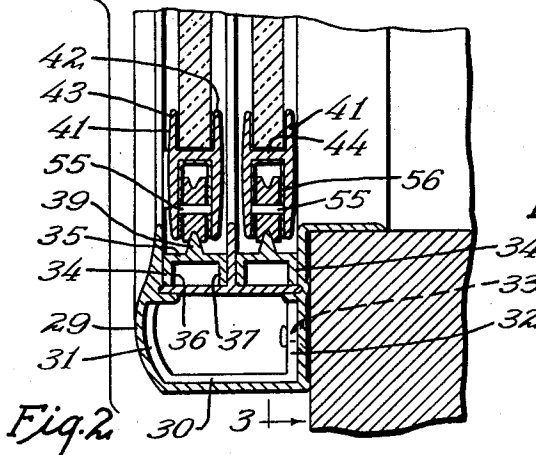
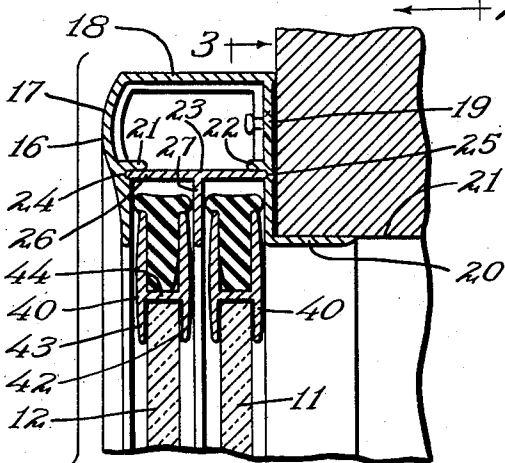
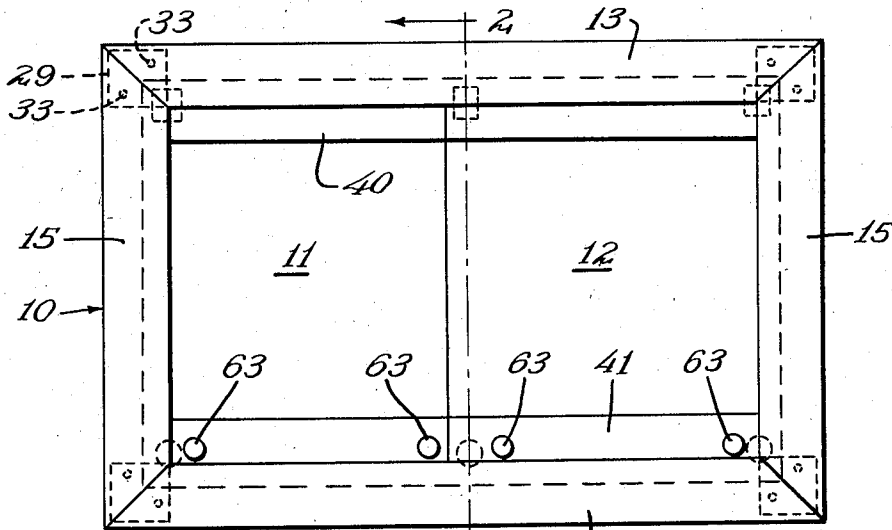


Fig. 3

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2 Sheets-Sheet 2

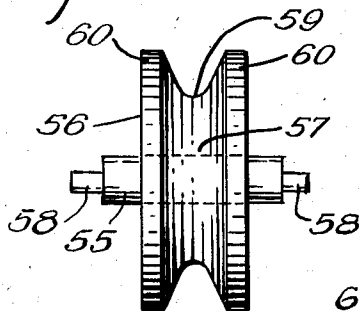
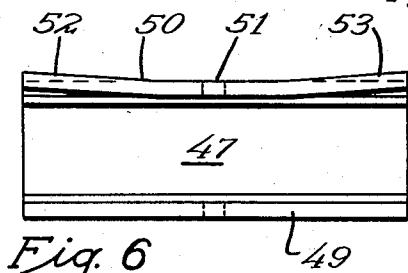
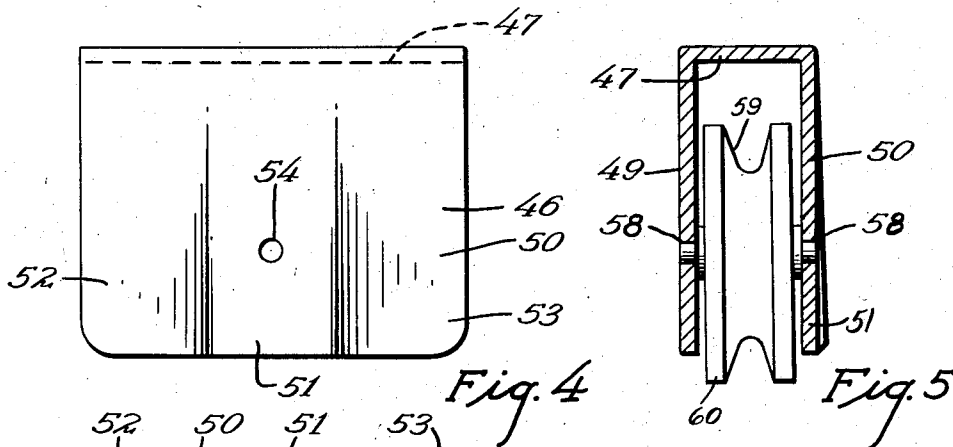


Fig. 7

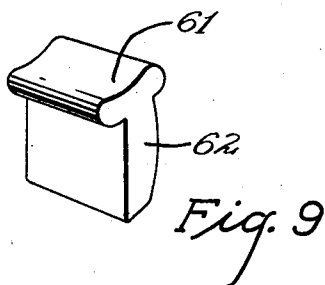


Fig. 9

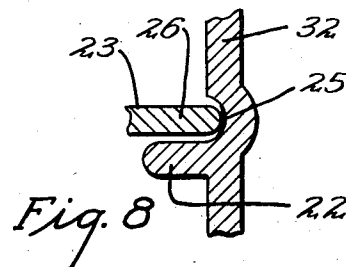


Fig. 8

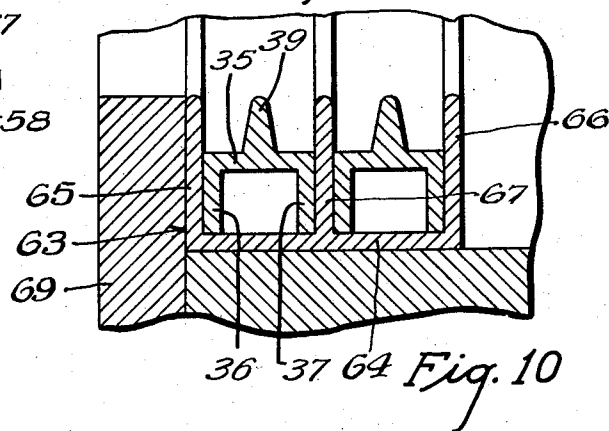


Fig. 10

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SLIDING PANEL HARDWARE

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This invention relates to an improvement in sliding panel construction and deals particularly with a novel and inexpensive manner of producing sliding panels for use for various purposes.

During recent years the use of sliding doors and sliding panels have become increasingly popular. As panels of almost every size and proportion are used, it is desirable to provide a sliding panel construction which may be used in conjunction with frames and panels of various types. By producing sliding panel hardware which is adaptable to fit panels of various sizes, a complete frame and unit may be made up in an extremely short period of time. The present invention deals with sliding panel hardware of this type and which may be quickly and easily employed to form sliding panel doors or closures of any desired size and proportion.

A feature of the present invention resides in the provision of a panel arrangement which is preferably in the nature of a rectangular frame having two or more panels slidably supported therein. The frame may be quickly and easily secured adjoining a wall opening or the like and may serve as a closure therefor. For example, the sliding panels may be in the nature of mirrors which are slidably supported in a rectangular frame and which may be applied to a wall opening which may, or may not, be provided with shelves so as to serve as a bathroom cabinet or a similar wall cabinet.

One of the important features of the present invention lies in the fact that the construction makes possible the use of the entire wall opening, as in preferred form all of the hardware is on the exterior surface of the wall. This is particularly important where the hardware is used in conjunction with a bathroom cabinet or vanity mirror cabinet where the wall in which the cabinet is formed is relatively shallow.

A feature of the present invention resides in the fact that the assembled unit is of unitary construction and is self-sustaining, and as a result it is more easily mounted on a wall or in a door opening than devices of other types. Due to the fact that the sliding panels are mounted in a self-supporting frame, the panels always fit properly in the frame and will operate with a minimum of friction. Furthermore, the construction is such that the panels will slide with a minimum of sound.

A feature of the present invention lies in the provision of sliding panel hardware which includes a series of extrusions which may be assembled together to form the tracks or guides in which the sliding panels are mounted. These extrusions are made in pieces of considerable length and may be cut to form a frame of the desired dimensions. By taking elongated strips of frame forming material and cutting it to the proper dimensions, the frame may be quickly and easily formed and frames may be custom built to any desired size or shape.

A further feature of the present invention resides in the provision of sliding panel hardware which includes a frame member designed to be secured along the top and

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bottom edges of a panel of desired size. Each such frame member preferably includes a channel portion designed to accommodate an edge of the panel and an oppositely directed channel. The oppositely directed channel is designed to accommodate wheels, rollers or other guides, which permit the slidable support of the panels and permit the panels to easily roll along tracks of suitable character.

A further feature of the present invention resides in the particular manner which is employed for supporting the wheels within a downwardly direct channel. The wheels are mounted in resilient clips which are also channel shape in form and which snugly fit within the downwardly directed channel at the lower edge of each frame member. Accordingly, the panels may be slidably supported by merely enclosing an edge of the panel in an upwardly directed channel of the frame member, and by pressing spring clips into the downwardly directed channel of the frame member, these spring clips supporting rollers in properly spaced relation. Accordingly, the entire assembly operation can be accomplished in an extremely short period of time.

A further feature of the present invention resides in the provision of a frame for supporting a plurality of slidably panels which is formed of similar extrusions throughout the entire periphery of the frame. In preferred form the rectangular frame is produced of one or more extrusions which are identical throughout the entire frame periphery. Added extrusions are usually applied along the bottom surface of the frame so as to provide tracks for the rollers. By forming the frame in this manner a minimum of inventory must be maintained in order to form frames of any desired size.

A further feature of the present invention lies in the provision of non-metallic wedge-shaped members which fit into the upwardly opening channels in the extrusions at the upper edges of the panels. These wedge-shaped members extend vertically above the channels and laterally beyond the sides of the channel-shaped extrusions to prevent metal to metal contact between the extrusions and the channel-shaped frame in which it slides.

These and other objects and novel features will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

Figure 1 is a front elevational view of the panel hardware showing the panels in place within a peripheral frame.

Figure 2 is an enlarged section view through the construction illustrated in Figure 1, the position of the section being indicated by the line 2—2 of Figure 1.

Figure 3 is a sectional view through a portion of the structure, the position of the section being indicated by the line 3—3 of Figure 2.

Figure 4 is a side elevational view in enlarged form of one of the wheel supports with the roller mounted therein.

Figure 5 is a sectional view through the wheel support illustrated in Figure 4.

Figure 6 is a bottom plan view of the wheel support shown in Figures 4 and 5.

Figure 7 is an end elevational view showing diagrammatically one of the wheels used in the wheel support of Figures 4 through 6.

Figure 8 is a detail sectional view through a portion of the apparatus.

Figure 9 is a perspective view of one of the guides employed for holding the panels supported in their frame.

Figure 10 is a sectional view through a frame of modified construction.

A unitary panel support including a supporting frame

and a pair of panels slidably mounted therein is shown in general in Figure 1 of the drawings. In general, the structure includes a rectangular frame illustrated in general by the numeral 10 and a pair of slidably mounted panels within the frame, the panels being indicated in general by the numerals 11 and 12.

The frame 10 includes four rectangularly arranged members including a top frame member 13, a bottom frame member 14, and vertical end frame members 15. The frame members are all similarly shaped and extruded in generally channel-shaped form. The shape of the frame members is best indicated in Figure 2 of the drawings and shows the channel as having opposed sides 16 and 19 with a connecting base 18. The forward side 16 of the channel is outwardly bowed or bulged as indicated at 17 for the purpose of improving the appearances of the structure.

The rear side 19 is designed to fit along the surface of a wall or other support and is provided with a right angularly extending flange 20 designed to extend into a wall opening 21. The channel sides 16 and 19 are also provided with inwardly projecting flanges 21 and 22 in opposed relation. These flanges 21 and 22 are designed to limit the inward insertion of extrusion 23 as will be later described.

The channel sides of each frame member are provided with opposed grooves 24 and 25 adjoining the flanges 21 and 22 and toward the open side of each channel frame member. These notches 24 and 25 engage opposite edges of the partition forming wall 26 of the T-shaped extrusion 23. This extrusion also includes a central dividing wall 27 which divides the channel-shaped frame into two inwardly directed channels which are in side by side relation and which are designed to support the panels 11 and 12.

In the formation of the generally rectangular frame 10, the strips 13, 14, 15 and 16 are cut with mitered corners which fit together along a forty-five degree angled edge so that the extrusions form a continuous frame. Corner members such as 29 are provided at each corner of the frame to connect the two joining frame members. As is indicated in Figure 2 of the drawings the corner member 29 may be channel-shaped in form including a base panel 30, a channel side 31, and a second channel side 32. These channel sides and base are designed to fit within the outer portions of the outer extrusions and may be attached thereto by any suitable means, such as by screws 33 extending through the rear channel side 19 of the outer extrusion and into the channel side 32 of the corner member. As is indicated in Figure 1 of the drawings, each corner member 29 is right angular, and fits within the mitered ends of the frame members 13, 14 and 15 in a manner to be concealed thereby.

Each outer frame member and the T-shaped extrusion 23 which fits within the same has been described as separate pieces which are assembled together. This has been done for simplicity of the construction. However, it is possible to extrude the frame members with the T-shaped extrusion integral with the outer extrusion and, accordingly, the frame may be made in this manner if it is preferred.

When the outer rectangular frame 10 is completed, extrusions are inserted in the lower portion of the frame to provide tracks on which the sliding panels may slide. The track forming extrusions are illustrated in Figure 2 of the drawings and are identified in general by the numeral 34. Each of the extrusions 34 include a channel-shaped body having a base 35 and parallel sides 36 and 37. A central web 39 extends upwardly from the channel base 35 midway between the sides 36 and 37 but projecting in the opposite direction. The track forming extrusions are of a width to fit snugly between a side of the outer extrusion and the center web 27 of the T-shaped extrusion. When the extrusions 34 are inserted in place, they

form tracks having upwardly directed central webs 39 upon which the grooved rollers of the panels may roll.

The upper edge of each of the panels 11 and 12 is enclosed within a frame which is indicated in general by the numeral 40. The lower edge of each of the panels is similarly enclosed within a frame, this frame being identical to the frame 40 but being designated by the numeral 41. Each of the frame members 40 include an inner side 42 and an outer side 43 which are joined intermediate the upper and lower edges of the sides by a cross member 44. Thus, an H-shaped frame is produced which is formed within upwardly directed channel and a downwardly directed channel. The downwardly directed channel acts to enclose the upper edge of the panel 11 or 12 and is secured thereto. The frame fits upon the panel with a friction fit and if desired a piece of tape coated with pressure sensitive adhesive may be pressed between the marginal edge of the panel and the sides of the channel so as to firmly attach the frame member to the panel. Cement or other suitable adhesive may similarly be employed.

In general practice the panels are of one quarter of an inch in thickness and these panels may be of any suitable material. In many instances the panel bodies are formed of mirrors particularly when the structure is designed to form a wall cabinet. However, the panels may be of wood or other suitable composition where a mirror surface is not desirable or necessary. Plate glass is commonly and effectively used where transparency is desired.

With reference now to Figures 4, 5 and 6 of the drawings, these figures illustrate spring clips which are employed to hold the rollers which support the panels. The spring clips are indicated in general by the numerals 46, each spring clip including a channel base 47 and generally parallel sides 49 and 50. As is evident from the drawings, the channel side 50 includes a portion 51 which is generally parallel to the panel 49 and side portions 52 and 53 which slant outwardly to a slight extent. This arrangement is made so that when the spring clips are urged into the space between the sides 42 and 43 of the channel frame members 41, the edges of the clip will bind against the channel side and retain the clip in a fixed position. The slight bow of the clip sides which is best illustrated in Figure 6 of the drawings, tends to prevent either edgewise or downward movement of the clip.

From Figures 4 and 5 of the drawings it will be noted that the clip sides 49 and 50 are provided with aligned apertures 54 extending therethrough for accommodation of a pivot shaft such as 55 as illustrated in Figures 2 and 3 of the drawings. Each pivot shaft 55 is designed to support a wheel or roller 56, the construction of which is best illustrated in Figure 7 of the drawings. From the examination of this figure it will be noted that the wheel or roller 56 is provided with an axial aperture 57 into which the pivot shaft is pressed. The shaft 55 is provided with reduced diameter ends 58 to hold the shaft from lateral movement. The intermediate portion of the shaft 55 holds the clip sides 49 and 50 from being pressed together beyond a predetermined amount. It will also be noted that the wheel is provided with a peripheral groove 59 extending thereabout between a pair of flanges 60. Accordingly, the wheel 56 is well designed to run along the track of rail 39 forming a part of the extrusion 34.

In Figure 9 of the drawings is disclosed a guide which is preferably formed of resilient material and which is T-shaped in cross section. The guide 61 includes a wedge-shaped body 62 which is of proper dimensions to fit within the sides 42 and 43 of the upper frame member portion 40. The guides 61 are made of non-metallic material, and project above, and laterally beyond the sides 42 and 43 of the extrusions 40 to prevent metal to metal contact between the extrusions 40 and the sides 16 and 19 of the frame member 13.

The operation of the structure is believed obvious from the foregoing description. The frame is produced by

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cutting the various frame members 13, 14 and 15 to the proper dimensions. These frame members are attached together by the corner members 29 in the manner previously described. Thus, a rectangular frame is formed for the accommodation of the panels 11 and 12.

The T-shaped extrusions 23 are next inserted in the frame, these extrusions being cut similarly to the outer frame members. The corners of the extrusions 23 may be mitered or may be cut off to fit one against the other.

The extrusions 34 are next inserted in the lower frame member 14 in the manner best illustrated in Figure 2 of the drawings. The bodies of the panels 11 and 12 are next formed of the desired material and the frame members 40 are attached to the upper edges of these panels, the frame members 41 attached to the lower edges thereof. The lower frame members 41 are provided with spaced sides 42 and 43 and a transverse connecting member 44 or are identical to frame members 40.

After the frame members 40 and 41 are attached to the panels, the rollers 56 are inserted between the sides of the clips 46, and these clips are then inserted between the sides 42 and 43 of the lower channel members 40. Usually two such rollers are provided on the undersurface of each panel, although more of these rollers may be supplied if desired.

The T-shaped wedge members 61 are next inserted between the sides 42 and 43 of the channel members 40. These members project somewhat above the members 40, and laterally thereof, to prevent the members 40 from directly contacting the sides 16, 19 of the frame member 13. The panels are next inserted in the rectangular frame by inserting the upper edge of each panel in its proper channel of the frame member 13, and swinging the lower edge of the panel to a position above the proper channel of the frame member 14. The panel is then lowered until the rollers 56 rest upon the proper track 39. The panels are held by gravity upon the tracks 39, but may be lifted and the lower end thereof swung forwardly to remove the panels from the outer frame.

Buttons, such as 63, are supported on the lower frame members 41 so as to provide a means of sliding the panels 10 and 11. These buttons 63 are relatively short so that the two panels can clear one another while sliding in their respective tracks.

In the construction described, the entire unit may be assembled and mounted, or the outer frame may be mounted and the panels then inserted. As the flanges 20 of the frame members 13, 14 and 15 are substantially flush with the inner edges of these frame members, the opening in the frame may be the same size as the wall opening. Furthermore, as the frame is mounted on the wall surface, the cabinet formed may be the full depth of the wall cavity.

In Figure 10 of the drawings is shown a modified form of construction in which the hardware is built into the wall aperture, or is concealed. In this arrangement the outer frame members 13, 14 and 15 are omitted, and a rectangular channel-shaped frame 63 is substituted. The sides of the frame 63 each include a base 64, parallel sides 65 and 66, and a central parallel web 67 therebetween. The extrusions 34 are placed in the bottom side of the frame 63, providing tracks 39 for supporting the panel rollers. Usually a frame or moulding member 69 is provided forwardly of the front sides 65 of the frame 63 to conceal the hardware.

This structure does not have the advantages of the previously described construction, but is preferred when a concealed type of construction is desired. Only one additional extrusion (that used to produce the sides of the frame 63) is required to form this modification, as the structure is otherwise similar to the first described construction.

In accordance with the patent statutes, the principles of construction and operation of my sliding panel hard-

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ware have been described and while it has been endeavored to set forth the best embodiment thereof, it is desired to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of the present invention.

I claim:

1. A sliding panel structure including in combination a rectangular frame consisting of four frame members of similar cross channel-shaped section having mitered corners, the frame members being arranged with bases forming the periphery of the frame and with parallel sides forming the front and rear surfaces, a partition extending between the channel sides spaced inwardly from each channel base, and a divider parallel to, and between, the channel side forming two side by side channel portions, panels within said frame, each panel having an H-shaped frame secured to the upper and lower edges thereof forming channel grooves extending longitudinally of its top and bottom surface, rollers supported in said channel groove for supporting said panels, and a resilient guide secured in said top channel groove engaging the relative channel sides of said rectangular frame.

2. The structure defined in claim 1 and including corner members at each corner of the frame including angularly extending portions engaging into the frame members within the sides thereof to connect said frame members.

3. The structure described in claim 1 and in which the partition and divider are integral and are removable from the channel frame members.

4. Sliding panel hardware including a rectangular frame of channel-shaped section having the base of the channel forming the periphery of the frame, a T-shaped partition extending between the sides of the channel frame and with the top of the T generally parallel to the channel base and in spaced relationship thereto, said T-shaped partition forming a dividing web between the channel sides and extending inwardly to form a pair of side-by-side channel portions therewith within said frame, tracks supported by the portion of the T generally parallel to the channel base in each of said channel portions in the lower portion of the frame and in spaced relationship to said base of the channel, panels in said frame each having a channel groove member secured along their lower edges depending in spaced relationship thereto and extending from end to end thereof, and rollers mounted in said channel grooves supported by said tracks.

5. The structure described in claim 4 and in which the rollers are supported by U-shaped resilient clips engaged in said channel grooves said clips being short relative to the length of said channel grooves, and being detachably engaged at any desired position in said grooves.

6. The structure described in claim 4 and in which the partition and dividing web are integral and are removably supported in the rectangular frame.

7. A hardware frame assembly for mounting in a wall opening and supporting pairs of sliding panels therein comprising in combination similarly shaped and extruded channel-shaped frame members including a top member, a bottom member and parallel side members having connected mitered corners forming a continuous rectangular frame, each of said frame members having an open side, opposed side walls and a connecting base, one of said side walls being provided with right angularly extending flange means adapted to extend into a wall opening and support the frame externally of the wall opening, and said top member and said bottom member including a T-shaped central divider wall in spaced relationship to said connecting base and forming with said side walls a parallel pair of spaced mounts for supporting sliding panels in spaced relationship to said connecting base.

8. A hardware frame assembly for mounting sliding panels over a wall opening with retention of the frame externally of the wall comprising in combination, similarly shaped and extruded channel-shaped frame members including a top member, a bottom member and

parallel side members having connected corners forming a continuous rectangular frame adapted to be mounted externally of a wall opening, each of said frame members having opposed open sides, opposed external and internal side walls and connecting bases, said internal side walls being provided with right angularly extending integral flanges adapted to extend into a wall opening and support the frame externally of the wall opening, divider walls mounted in said top member and said bottom member between the side walls thereof, and in substantially spaced parallel relationship to the connecting base for each side wall, central dividing walls forming parallel channels in side by side relationship between the side wall portions extending beyond said divider walls in spaced relationship to said connecting base for each side wall, and panel means mounted between said top member and said bottom member to ride in sliding relationship between said parallel side members.

9. Sliding panel hardware in combination with a wall opening including a rectangular frame including a pair of parallel side members and parallel top and bottom members, means connecting said side members to said top and bottom members to form a continuous frame structure, all of said members being of similar cross-sectional shape and being channel shaped with the base of the channel forming the outer periphery of the frame and the front and rear sides of the channel being directed inwardly toward the center of the frame, a center partition web between said front and rear sides forming two side by side channels, and a right angularly extending flange on said rear side substantially flush with the inner edge of each said channel side, the flanges of said members forming a rectangular frame portion insertable into said wall opening.

10. The structure of claim 9 and in which each said central partition member is mounted on a cross member parallel to the base of the channel and spaced therefrom to provide a hollow tubular portion in each of said members between the channel sides, and between the channel base and said cross member.

11. The structure of claim 9 and in which each of said channel-shaped members is provided with opposed grooves in the inner surfaces of said channel sides, and in which said center partition web is supported upon a cross member extending between said channel sides parallel to the channel base with the edges of the cross member engaged in said grooves.

12. A slidable closure panel assembly comprising a frame structure, the panel being slidably mounted in the frame, at least one edge of the panel having embodied therewith roller carrying means including an elongated groove of substantially uniform width, a plurality of resilient substantially U-shaped clips, a roller mounted in and rotatably carried by each clip and constituting a complete unit, each clip being provided with portions extending outwardly to engage opposed walls of said groove,

said portions being spaced a distance slightly greater than the dimensions of the interior cross section of the groove, and the clips being pressed into the groove in spaced apart relation therein and held therein solely by frictional engagement of the clip with opposed portions of walls defining the groove, and track means embodied with a part of the frame on which the rollers roll to allow sliding movement of the panel thereon relative to the frame.

13. The structure set forth in claim 12 and including means for confining the upper edge of the panel during sliding movement thereof.

14. A sliding closure panel assembly comprising a frame structure, such panel being slideably mounted in the frame, at least one edge of such panel having embodied therewith roller carrying means including an elongated groove of substantially uniform width, a plurality of resilient substantially U-shaped clips, including a pair of resilient arms respectively having a pair of opposed shaft receiving apertures formed therein, a roller shaft having the end portions thereof respectively insertable into said apertures and a pair of stop elements provided on said shaft in predetermined spaced apart relation and of a size to respectively engage the inside walls of said clip arms to positively limit the inward movement of said clip arms and produce an effective fulcrum line about which the outer free ends of said arms resiliently swing, a roller carried by said shaft for rotation on the axis of the shaft and combining with the clip and shaft to form a complete unit, each clip arm being provided with portions extending outwardly to engage opposed walls of said groove, the spacing between said stop elements maintaining said outwardly extending portions in spaced apart relation a distance slightly greater than the dimensions of the interior cross section of the groove, said clips being pressed into the groove in spaced apart relation therein and held therein solely by the frictional engagement of the outwardly extending portions of the clip arms with opposed portions of the walls defining the groove, and track means embodied with a part of the frame on which the rollers roll to allow sliding movement of the panel thereon relative to said frame.

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