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STRUCTURAL DEVICE

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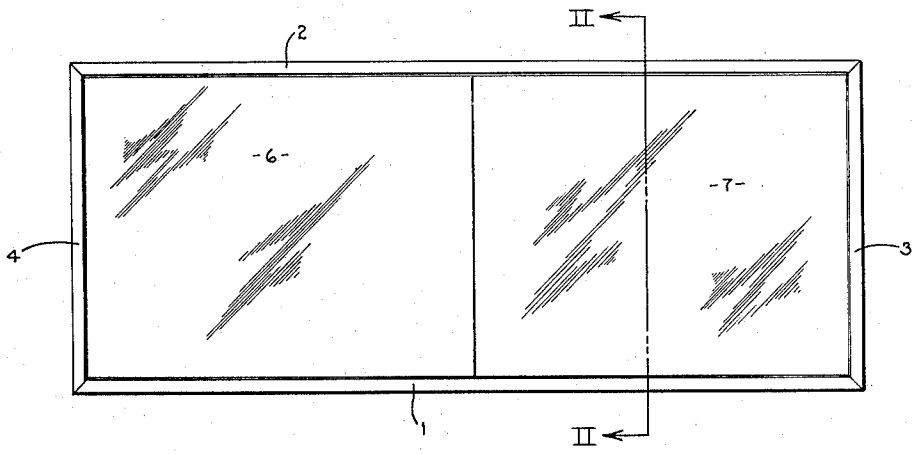


fig. 1

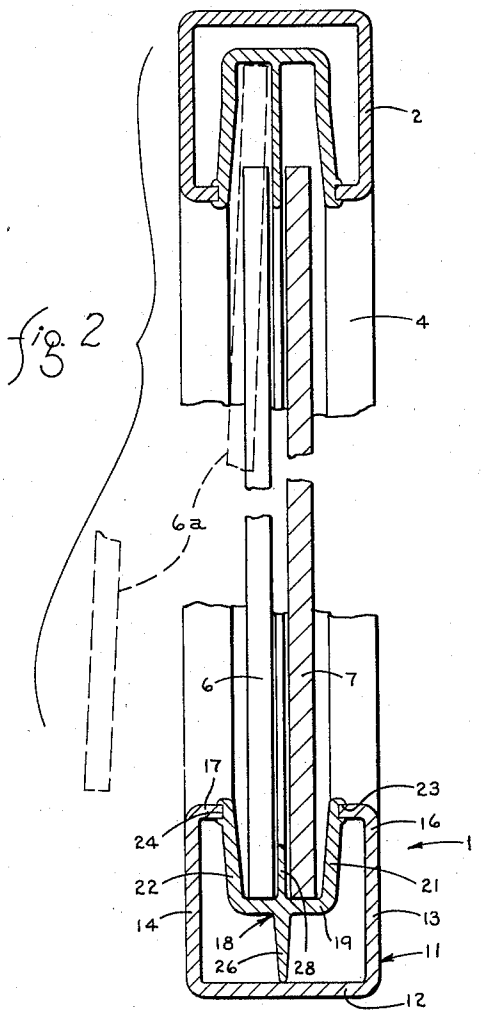


fig. 2

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STRUCTURAL DEVICE

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This invention relates to a frame member adapted to support and guide a slidable closure panel and, particularly, to a frame member which is formed of a plurality of parts of dissimilar materials, at least one of said parts being extruded, said parts being capable of being easily and rapidly assembled to form a firm and rigid frame member.

Designers and manufacturers of various types of sliding closure panel units adapted for use as cupboard doors, store counter doors, certain types of storm windows and other uses, have long recognized that such units employing components which can be readily and inexpensively manufactured by extruding, rolling or otherwise forming long lengths of such components and subsequently cutting such extrusions to whatever length is desired for the fabrication of an individual unit, are of extreme value and many designs have been offered for this purpose. However, these prior designs have, in general, been sufficiently complicated that whatever saving was effected by the use of extrusion, rolling or other continuous methods of fabrication were at least partially offset by the increased cost of assembling the parts so formed.

Further, in sliding door units of the types generally indicated above, it is desirable to minimize the noise created by the sliding movement of the door. This is sometimes done by providing a non-metallic liner in the door frame for supporting and guiding the door and, sometimes, by providing a non-metallic heading for the door member itself. However, these expedients have not been found to be completely satisfactory, either because they made the door unit more complicated and, therefore, more difficult and expensive to fabricate and assemble or because they did not effectively minimize the noise.

A further problem which is particularly acute when the door and frame structure are both made from aluminum, is that galling or burring inevitably occurs when aluminum parts are caused to be rubbed together.

Accordingly, a principal object of the invention has been to provide an improved and simplified frame structure for supporting and guiding a sliding closure panel for use in cupboards, store counters, sliding windows and the like.

A further object of the invention has been to provide an improved frame structure, as aforesaid which can be made at least in part from extruded members.

A further object of the invention has been to provide an improved frame structure, as aforesaid, which includes a structural frame member which may be either of steel and formed by rolling or of an extruded light metal, such as aluminum, and a panel-engaging member of an extruded plastic material, such as a vinyl plastic.

A further object of the invention has been to provide an improved frame structure, as aforesaid, including outer members of a conventional structural shape, as U-shaped or even partially tubular shape, which are formed of a material of substantial structural strength, such as steel, whereby such structural members may be formed into a load-bearing frame by appropriate corner connections,

such as by welding, and wherein the inner, or panel-carrying members can be assembled subsequent to the assembly of the structural, or load-bearing, members.

A further object of the invention has been to provide an improved frame structure, as aforesaid, wherein the parts can be readily assembled as desired and, further, wherein different kinds of plastic panel-engaging parts can be used as desired in connection with a given structural member.

A further object of the invention has been to provide an improved frame structure, as aforesaid, which is of simple, clean and pleasing lines and which can be incorporated readily into a wide variety of specific designs.

Other objects and purposes of the invention will be apparent to persons acquainted with products of this general type upon reading of the following disclosure and inspection of the accompanying drawings.

In the drawings:

Figure 1 is a front elevational view of a typical closure structure embodying the invention.

Figure 2 is a sectional view taken along the line II—II of Figure 1.

Referring to Figure 1, a typical closure structure embodying the invention includes a sill member **1**, a header member **2**, and two stile members **3** and **4** which are mountable around an opening in the structure with which they are to be associated, such as a store counter, in any convenient and conventional manner. The sill member **1**, header member **2** and stiles **3** and **4** are secured together at their respective ends in any convenient and conventional manner, such as by welding of the outer, or structural, members. The panels **6** and **7** are supported and guided by the sill, header and stile members for horizontal sliding movement for closing the opening, or for opening one-half of said opening, as desired, in a conventional manner.

Referring to Figure 2, there is shown the structure of the sill member **1** and the header member **2** which constitutes the heart of the present invention. Similar members can, if desired, be used for the stiles but this is a matter of choice. In this embodiment the sill and the header are substantially identical and hence the following description will refer solely to the sill member with the understanding that, except as noted, this description applies also to the header.

The sill member **1** includes an outer, structural member **11** and an inner panel-supporting member **18**. The structural member **11** in the illustrated embodiment of the invention comprises a generally U-shaped section having a web **12** and upstanding legs **13** and **14**. The upper ends of the legs **13** and **14** are turned inwardly to define flanges **16** and **17**, respectively. The flanges lie at a substantial angle with respect to their respectively connected legs, which angle, in the illustrated embodiment, is substantially a right angle.

The structural member **11** is preferably of a weldable material, as aluminum or steel, and may be formed by rolling, extrusion or other process, preferably continuous, as convenient. Under some circumstances the structural member may also be extruded from a relatively rigid, strong plastic material, such as substantially unplasticized polyvinyl chloride.

The panel-supporting member **18** of the sill structure **1** comprises a generally U-shaped portion having a web **19** and upstanding legs **21** and **22**. The web **19** will normally be of a width no greater than the distance between the adjacent edges of flanges **16** and **17**, and, will usually be of slightly lesser width. The upper ends of the legs **21** and **22** are provided with means, here outwardly opening, laterally extending grooves **23** and **24**, respectively, for interengaging with and firmly holding the flanges **16** and **17**. A fin **26** extends downwardly from the web **19**. When the panels **6** and **7** are supported on web **19**, fin **26**

contacts the upper surface of web 12 and assists in supporting the weight of the panels and the panel-supporting member 18 on the structural member 11. However, this fin 26 may be omitted where such supplemental support for the panels and panel-supporting member 18 is unnecessary. It will be noted that the header member 2 is not, in this embodiment, provided with a fin corresponding to fin 26 in the sill member. The panel-supporting member 18 also has a fin or partition 28 extending upwardly from the upper surface of flange 19 substantially at the mid-point thereof and extending between the legs 21 and 22 and defining therewith a pair of side-by-side, parallel channels for reception of the panels 6 and 7.

The panel-supporting member 18 may be formed as an extrusion of any conventional extrudable material suitable for the service to which the closure structure is to be put. For example, where the panels 6 and 7 are made of aluminum, or at least are edged with aluminum, the panel-supporting member 18 is desirably made from a plastic material on which the panels will slide readily but which will have the requisite strength to remain firmly in position in the structural member 11. Substantially unplasticized, or at least moderately plasticized, polyvinyl chloride, nylon, or possibly Tenite, may be used for this purpose. It will be recognized that the possible choices of material for this purpose are virtually limitless and that the foregoing examples are illustrative only.

The structural member 11 and the panel-supporting member 18 will be separately formed and stockpiled for subsequent assembly and use as desired. Each type may be formed from a variety of different materials and the parts for a particular unit may be subsequently selected, assembled and used as required to provide the desired internal and external members of the frame structure according to the use to be made thereof.

In assembling the structural member 11 and the panel-supporting member 18, said panel-supporting member will be positioned with the web 19 thereof positioned between the legs 13 and 14 of said structural member. The panel-supporting member will be urged transversely into the structural member 11 and the legs 21 and 22 thereof will be temporarily deformed and bent toward each other as said panel-supporting member moves within said structural member. When the lower edges of grooves 23 and 24 clear the flanges 16 and 17, the legs 21 and 22 will quickly snap back into their original position and, thus, said flanges will be releasably received with said groove. Alternatively, the structural member 11 and panel-supporting member 18 may be assembled by aligning the grooves 23 and 24 with the flanges 16 and 17 and sliding said members axially with respect to each other.

In use, the panels 6 and 7 will be positioned, respectively, in the channels between fin 28 and legs 21 and 22, respectively, and will be guided thereby. The panels will be free to slide longitudinally on the panel-supporting member in conventional fashion. Desirably, and as indicated in Figure 2, the webs 19 of the sill member 1 and header member 2 are spaced apart a distance greater than the height of panels 6 and 7 by an amount slightly less than the distance between the upper edges of legs 13 and 14 and the web 19 so that the panels can be inserted into the channels by positioning the panel as shown in broken lines at 6*a* in Figure 2, moving same to a position aligned with the appropriate channel and allowing same to drop into place. The panels may be removed by the reverse series of steps. Obviously, the panels may be inserted or removed in other ways such as by removing one of the stiles and sliding the panels in sideways, if desired.

It will be apparent that the position of the tongues provided by flanges 16 and 17 and the grooves 23 and 24 can be reversed by placing the grooves on the legs 13 and 14 and placing the tongues on the legs 21 and 22.

While a particular preferred embodiment of the invention has been disclosed for illustrative purposes, it will be understood that the invention contemplates such changes or modifications as lie within the scope of the appended claims.

What is claimed is:

1. A frame member adapted to support a pair of closure panels for sliding movement comprising in combination: an elongated, outer, structural member having a first web and a first pair of substantially parallel legs extending therefrom, the outer ends of said legs being turned in toward each other to define a pair of aligned, inwardly directed flanges facing each other; an elongated, inner, panel-supporting member positioned between said first pair of legs and having a planar second web parallel with said first web; a second pair of legs extending upwardly from the respective ends of said second web and substantially in parallelism with said first pair of legs, said second pair of legs being resiliently deformable so that they may be flexed toward each other to fit between said flanges and then may snap back into their original position; said second pair of legs each having a groove facing its associated leg of said first pair of legs, each said flange being releasably received into a groove in its associated leg of said second pair of legs whereby said panel-supporting member is releasably secured to said structural member; and a partition extending upwardly from said second web substantially in parallelism with said second pair of legs and defining therewith a pair of channels into which said closure panels may be received.

2. A frame member adapted to support a pair of closure panels for sliding movement, comprising in combination: a one-piece, elongated, U-shaped, structural member having a first planar web and a first pair of substantially parallel legs extending substantially at right angles to said web, the outer ends of said legs being turned in toward each other to define a pair of aligned, inwardly directed flanges; a one-piece, elongated substantially U-shaped, inner panel-supporting member positioned between said first pair of legs, said panel-supporting member having a second planar web parallel with and spaced from said first web and being of a width less than the spacing between the adjacent ends of said flanges; a second pair of legs extending upwardly from the respective ends of said second web and diverging upwardly with respect to each other, said second pair of legs being resiliently deformable so that they may be flexed toward each other to fit between said flanges and then may snap back into their original position, said second pair of legs each terminating at its upper end and having a groove facing its associated leg of said first pair of legs, the flanges on said first pair of legs being snugly but releasably received into the grooves in said second pair of legs, respectively, whereby said panel-supporting member is releasably secured to said structural member; a partition integral with said panel-supporting member and extending upwardly substantially from the mid-point of said second web and defining with said second pair of legs a pair of channels into which said closure panels may be received; and a support fin extending downwardly from said second web toward said first web.

3. A frame member adapted to support a pair of closure panels for sliding movement, comprising in combination: a one-piece, elongated, U-shaped, structural member having a first planar web and a first pair of substantially parallel legs extending substantially at right angles to said web; a one-piece, elongated, substantially U-shaped, inner panel-supporting member positioned between said first pair of legs, said panel-supporting member having a second planar web parallel with and spaced upwardly from said first web and being of a width less than the spacing between the opposing surfaces of said first pair of legs; a second pair of legs extending upwardly from the respective ends of said second web and diverging upwardly with respect to each other so that the remote edges of the upper ends thereof are normally further apart than the adjacent edges of said first pair of

legs, said second pair of legs being resiliently deformable so that they may be flexed toward each other to fit between said first pair of legs and then may snap back into their normal position; interfitting means on said first and second pair of legs for releasably securing said panel-supporting member to said structural member; said panel-supporting member having an integral partition extending upwardly substantially from the mid-point of said second web, said partition and said second pair of legs defining a pair of upwardly flaring channels into which said closure panels may be received.

4. A frame member adapted to support a closure panel for sliding movement, comprising in combination: an elongated, outer, structural member having a first web and a first pair of substantially parallel legs extending from said first web; an elongated, inner, panel-supporting member received between said first pair of legs, said panel-supporting member having a second web extending transverse to said first pair of legs and located between the ends thereof and spaced from said first web, said panel-supporting member having a second pair of legs extending away from both said first web and said second web substantially parallel with said first pair of legs, said second pair of legs being resiliently deformable so that they may be flexed toward each other and then may snap back into their original position, said panel-supporting member defining a channel opening away from said first web; and interfitting tongue and groove means on said first and second pair of legs for releasably securing said panel-supporting member to said structural member.

5. A frame member adapted to support a closure panel for sliding movement, comprising in combination: a one-

piece, elongated, substantially U-shaped structural member having a first planar web and a first pair of substantially parallel legs extending substantially at right angles to said first web; a one-piece, elongated, substantially U-shaped, inner, panel-supporting member positioned between said first pair of legs, said panel-supporting member having a second planar web parallel with and spaced upwardly from said first web and being of a width less than the spacing between the opposing surfaces of said first pair of legs, said panel-supporting member having a second pair of legs extending upwardly from the respective ends of said second web and away from both said first web and said second web and diverging upwardly with respect to each other so that the remote edges of the upper ends thereof, are normally further apart than the adjacent edges of said first pair of legs, said second pair of legs being resiliently deformable so that they may be flexed toward each other in order to fit between said first pair of legs and then may snap back into their original position; interfitting means on said first and second pair of legs for releasably securing said panel-supporting member to said structural member.

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