

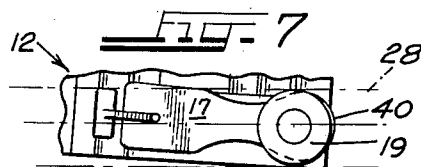
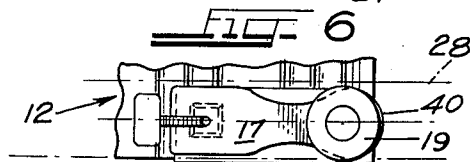
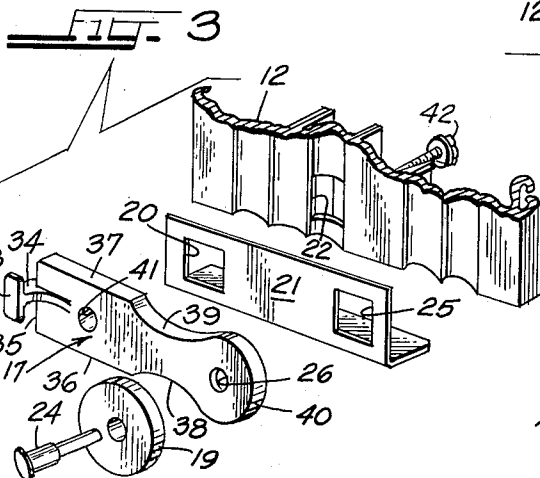
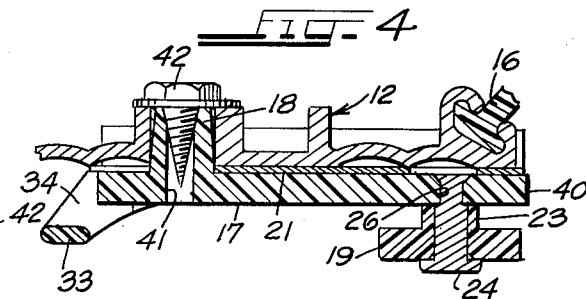
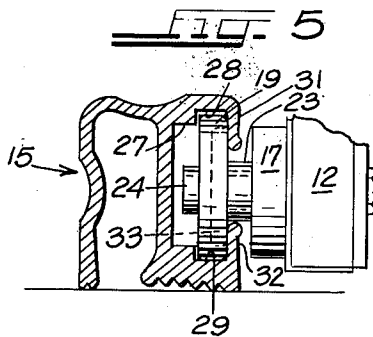
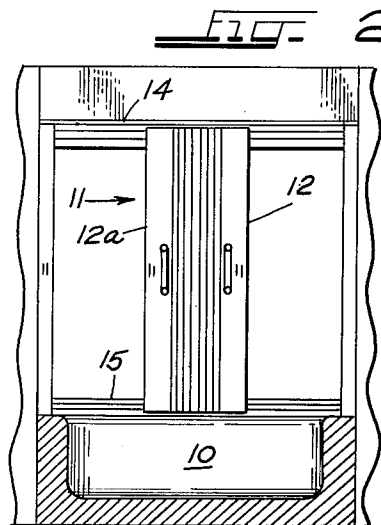
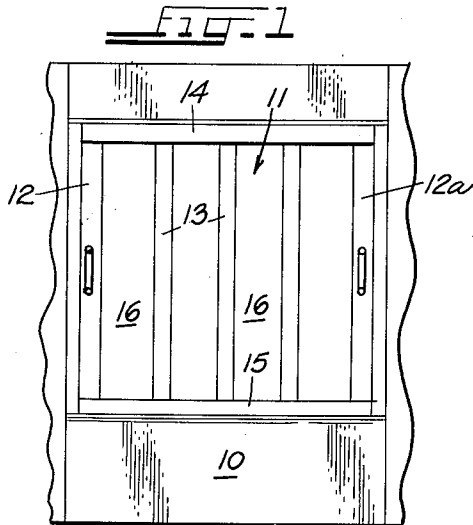
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MOUNTING STRUCTURE FOR SLIDABLE SHOWER DOOR

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1

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MOUNTING STRUCTURE FOR SLIDABLE SHOWER DOOR

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The present invention relates generally to slidable shower doors and more particularly to structure which mounts the leading edge member of the shower door for slidable movement along a pair of rails.

The subject mounting structure is located at each of the opposite ends of the leading edge member and comprises a stud fixedly secured to the end of the member, a wheel which travels along a rail between opposed rail track surfaces, and a resiliently bendable portion extending alongside the rail and connecting the stud to the axle of the wheel.

Unlike most slidable shower doors, a door having the subject mounting structure will not bind or stick when the leading edge member becomes disaligned from its normal disposition perpendicular to each rail. Such disalignment usually occurs when the leading edge member is grasped at one end to slide the door instead of grasping the edge member centrally. Under these circumstances, the ungrasped end will be urged inwardly towards the opposite rail in response to movement along the opposite rail of the grasped end, thereby causing the rail traveling element attached to the ungrasped end to be correspondingly urged into binding engagement with the inner track surface of the adjacent rail.

With the subject mounting structure, a disalignment of the edge member and the attendant inward urging of the ungrasped end merely results in a deformation of the resiliently bendable portion connecting this end to the rail traveling wheel. The wheel is not urged into binding engagement with the rail inner track surface because a substantial portion of the force which causes this binding has been dissipated in deforming the resiliently bendable portion. Furthermore, when the force responsible for the disalignment is removed the resilient nature of the bendable portion urges it back to its undeformed configuration, thereby urging the previously inwardly urged end portion back outwardly and returning the member to its normal perpendicular disposition. Thus, binding is substantially eliminated by the subject mounting structure.

The resiliently bendable nature of the connecting portion also enables an edge member having a length slightly greater than the perpendicular distance between the two rails to be mounted in a perpendicular disposition between the rails, the precise nature of this mounting to be described in detail subsequently.

Another feature of the subject mounting structure is an impact resistant bumper portion integral with the bendable portion and extending in the direction of the rail beyond the axle and wheel of the mounting structure and beyond the adjacent edge of the leading edge member to protect these elements against collision.

The entire mounting structure is composed of nylon which combines low friction with impact resistance, wear resistance and resiliency. The integral construction of the nylon mounting structure renders it relatively easy to form by molding, and the cost of fabrication is thus relatively slight.

It is, therefore, a primary object of the present invention to provide mounting structure for the leading edge member of a slidable shower door which structure prevents binding when the edge member is disaligned from its normal perpendicular disposition.

2

Another object of the present invention is the provision of mounting structure of the type described which urges the leading edge member back toward its aligned perpendicular disposition when the member has been disaligned therefrom.

Still another object of the present invention is the provision of mounting structure of the type described which enables the leading edge member to be mounted in a perpendicular disposition between a pair of rails even though the length of the member is slightly greater than the perpendicular distance between the two rails.

A further object of the present invention is the provision of mounting structure of the type described which is easily fabricated and economical as to cost.

Another object of the present invention is the provision of mounting structure of the type described which also comprises a bumper portion protecting the leading edge member and the mounting structure against collision.

Other objects and advantages are inherent in the structure claimed and disclosed as will become apparent to those skilled in the art from the following detailed description, wherein:

FIG. 1 is a front elevational view of a closed slidable shower door mounted on a bath tub;

FIG. 2 is a rear view of the structure shown in FIG. 1 with the door slid open;

FIG. 3 is an enlarged exploded perspective view showing the mounting structure of the present invention and one end portion of the leading edge member of the slidable door;

FIG. 4 is a horizontal sectional view showing the mounting structure attached to the leading edge member;

FIG. 5 is a vertical sectional view showing the wheel of the mounting structure as it rides between the track surfaces of a rail;

FIG. 6 shows one end portion of the leading edge member and the attached mounting structure when the former is in its normal perpendicular disposition; and

FIG. 7 is a view similar to FIG. 6 and shows the elements when the leading edge member is disaligned from its perpendicular disposition.

Referring to FIGS. 1 and 2, there is generally indicated a bath tub 10 along the outer wall of which is mounted a slidable shower door 11 having a pair of vertically disposed leading edge members 12, 12a, and a plurality of vertically disposed intermediate frame members 13, all slidably mounted between upper and lower rails 14, 15 respectively. Extending between each pair of adjacent vertical members are flexible plastic panels 16 which together with the members 12, 12a, 13 form the slidable shower door.

Each end of each leading edge member is slidably mounted on a respective upper or lower rail by mounting structure shown in FIGS. 3 to 7. The mounting structure comprises a molded nylon element generally indicated at 17 (FIG. 3) and having a rear edge 35 from which extend a pair of parallel edges 36, 37 from each of which extends a concave edge 38, 39, delineating a necked-down portion, and joined by an arcuate edge 40. Extending from one surface of element 17 between edges 36, 37 is a tapered stud 18 (FIG. 4), rectangular in cross section and having an opening 41 extending axially therethrough. Extending from the other surface of element 17 adjacent rear edge 35 is a web portion 34 integrally connected to a transverse rail-engaging glide portion 33 extending in a plane parallel to the surface of element 17. Adjacent arcuate edge 40 is an opening 26 for receiving the axle shaft 24 of a rail-traveling wheel 19 to rotatably mount the wheel on element 17. Wheel 19 has a spacer portion 23 which engages the surface of element 17 and main-

tains the wheel at a predetermined distance from the element (FIG. 4).

Element 17 is attached to a leading edge member, such as 12, with an L-shaped plate 21 which fits against the end portion of member 12. Plate 21, has a pair of rectangular holes 20, 25 one of which receives stud 18, the receiving hole depending upon whether plate 21 is mounted at the upper or lower end of member 12. Member 12 has a rectangular opening 22 for receiving stud 18. Opening 22 is smaller than the base dimensions of stud 18 adjacent its juncture with the surface of element 17. However, since the stud is composed of soft nylon it may be forceably inserted into opening 22 following which a screw 42 is threadably engaged in opening 41 to prevent withdrawal of the stud. The rectangular configuration of stud 18 and opening 22 prevents the stud from turning about its axis and thus maintains element 17 in its initially mounted position. When thus mounted, edge 40 of element 17 projects forwardly beyond wheel 24 and beyond the right edge of member 12 (FIG. 4) and acts as a bumper to protect the wheel and the member against collision.

Referring to FIG. 5, the rails used with the subject mounting structure are exemplified by the bottom rail 15 which has upper and lower track surfaces 28, 29 between which the wheel 19 travels. The rail has an inner recessed portion 27 having smaller vertical dimensions than the distance between the upper and lower rail and for receiving axle shaft 24. The rail also has upper and lower vertical guard or side portions 31, 32 disposed between the wheel and element 17. Rail-engaging portion 33 of element 17 extends between the upper and lower track surfaces of rail 15 and is engaged by the inner surface of the rail vertical guard portion 31. Wheel 19 is engaged by the inner surface of both guard portions 31, 32. These engagements prevent rail-engaging portion 33 and wheel 19 from moving laterally away from the rail, and this in turn prevents the leading edge member from moving laterally away from the rail.

As previously indicated, edges 38, 39 of element 17 are concaved inwardly. Constructing the element 17 of nylon and forming it in the configuration just noted renders that portion of element 17 between the axis of stud opening 41 and the axis of opening 26 resiliently bendable, which in turn prevents the wheel 19 from binding against a track surface of rail 15 when the leading edge member is disaligned from its perpendicular position, as will be explained in detail in the following paragraph.

Referring to FIGS. 6 and 7, FIG. 6 shows the lower end of leading edge member 12 and the mounting structure attached thereto as these components appear when the leading edge member is in its normal vertical disposition, perpendicular to the two rails. If leading edge member 12 is grasped at the top to move the member, rather than grasping the member centrally, only the top portion of the member will slide along the adjacent rail. The bottom portion will not slide but will be urged upwardly with the result that wheel 19 will be urged toward the upper track surface 28 of rail 15 (indicated schematically by the dash-dot line of FIGS. 6 and 7). The upper peripheral surface of wheel 19 will eventually engage track surface 28 and as the bottom portion of member 12 continues to move upwardly the element 17 will bend between the axes of openings 41 and 26. Since the greater part of the upwardly urging force is absorbed in bending the resiliently deformable portion of element 17, wheel 19 will not be urged into binding engagement with upper track surface 28 and thus will still be free to move along the rail. When the force urging the top of member 12 to the right is released, the resilient nature of element 17 will urge this element back to its normal underformed configuration, thereby urging the bottom portion of member 12 back downwardly and returning the member to its normal perpendicular disposition.

The resilient nature of element 17 also enables a lead-

ing edge member to be mounted perpendicularly between a pair of rails when the distance between the lower track surfaces 29 of each rail is less than the distance between the axes of the axle shaft-receiving openings 26 on respective elements 17 positioned at opposite ends of the member. This can be accomplished by bending each resilient element 17 until the attached wheel 19 is positioned for insertion between the track surfaces of the adjacent rail. The discrepancy between the distance separating the rails and the distance separating the axes of the upper and lower openings 26 is absorbed by the bending of the resilient element 17. Thus precision spacing of the upper and lower openings 22 in element 12 is not necessary.

It is to be understood that the embodiment shown and described above is only one of the many forms which the present invention may take in practice without departing from the scope of the invention as defined in the appended claims.

I claim:

1. In a slidable door, a longitudinal member having an opening therein, a rail extending transversely to said member, a stud fixedly engaged in said opening in said one end of the longitudinal member, resiliently bendable means extending alongside said rail and having a pair of opposite end portions, a rail-traveling wheel adjacent one of said end portions, an axle for said wheel, means connecting said one end portion to said axle, and means connecting the other of said end portions to said stud, wherein said longitudinal member has a polygonal opening therein and said stud has a tapered correspondingly polygonal shape with a base dimension slightly larger than said opening, said stud being composed of soft resilient plastic material rendering the stud forcibly insertable into said opening to form a tight fit therein, whereby pivotal movement of said inserted stud about its axis is prevented.

2. In a slidable door structure as recited in claim 1, means connected to the other of said end portions on the resiliently bendable means for slidably engaging said rail, the slidable engaging means being spaced from the axle a distance at least equal to the distance between said stud and said axle.

3. In a slidable door structure as recited in claim 2, wherein said rail comprises a track surface against which said wheel rides and a guard portion extending transversely to said track surface between said wheel and said longitudinal member, said slidable engaging means comprising a glide portion extending substantially parallel to said guard portion, said guard portion extending between said glide portion and said longitudinal member, and means connecting said glide portion to the stud, said rail guard portion including means for engaging the adjacent surfaces of said glide portion and of said wheel, whereby lateral movement of the glide portion or of the wheel in a direction toward the longitudinal member is obstructed.

4. In a slidable door structure, a leading edge member, a rail extending transversely to said member, resiliently bendable means extending alongside said rail and having a pair of opposite end portions, a rail-traveling element adjacent one of said opposite end portions, means connecting said rail-traveling element to said one end portion, means fixedly securing the other of said opposite end portions to one end of said edge member, and a bumper portion extending integrally from said resiliently bendable means at said one end portion thereof, said bumper portion extending in the direction of said rail beyond said rail-traveling element and beyond the adjacent edge of said leading edge member.

5. Structure for mounting one end of a longitudinal member for slidable movement along a rail extending transversely to the member, said mounting structure comprising a tapered polygonal stud portion forcibly insertable into a correspondingly polygonal opening in said one end of said member to form a tight fit therein, re-

5

siliently bendable means extending along side the rail and having a pair of opposite end portions, the first of said end portions being integrally connected to said stud portion, a rail-traveling wheel adjacent said second end portion, means for rotatably mounting said wheel at the second of said end portions on said resiliently bendable means, a bumper portion extending integrally from said second end portion in the direction of said rail beyond the adjacent edge of said longitudinal member and beyond the adjacent extremity of said wheel, means adjacent said first end portion for slidably engaging said rail,

6

and means integrally connecting said slideable engaging means to said first end portion.

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