United States Patent

Tanner

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[54] **UNITARY GUIDE FOR SLIDING PANELS**

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[73] Assignee: **Southeastern Aluminum Products, Inc.**, Jacksonville, Fla.

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[52] **U.S. Cl.** **16/90**, 49/410

[51] **Int. Cl.** **E05d 13/00**

[58] **Field of Search** 49/409–411; 16/93, 16/90

[56] **References Cited**

UNITED STATES PATENTS

3,261,129	7/1966	Brydolf et al.	49/411
3,457,676	7/1969	Ziegler	16/93 X
2,784,445	3/1957	Greig et al.	49/410 X

Primary Examiner—Kenneth Downey

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[57] **ABSTRACT**

A unitary guide including a guide body having a guide element extendable through the guideway entrance and a laterally extending lug engageable with the shoulder within an elongated guideway. The guide body includes a lateral portion bridgeable across the entrance and being of a lateral dimension to inhibit ingress through the entrance when the element is positioned through the entrance. A resilient flexing portion is connected to the lateral portion whereby the lateral portion may bend about a longitudinal axis generally parallel with the guideway. The element and lug are insertable through the entrance by a pushing force thereon exerted perpendicularly to the guideway thereby bending the flexing portion. The element and lug are of a smaller lateral dimension with the flexing portion in a bent condition than the entrance to permit ingress of the element and lug therethrough and into the guideway. The element and lug are of a normal lateral dimension to inhibit egress thereof through the entrance after seating of the element and lug in the guideway by an outwardly pulling force thereon exerted perpendicularly to the guideway. The body has another lateral portion spaced from and above the first lateral portion and defining therebetween and with the flexing portion a space to permit first lateral portion to be swung thereinto upon bending of the flexing portion. The element includes a cam surface disposed rearwardly of the lug, such cam surface and lug being engageable with the entrance upon initial insertion of the element into the entrance.

16 Claims, 6 Drawing Figures

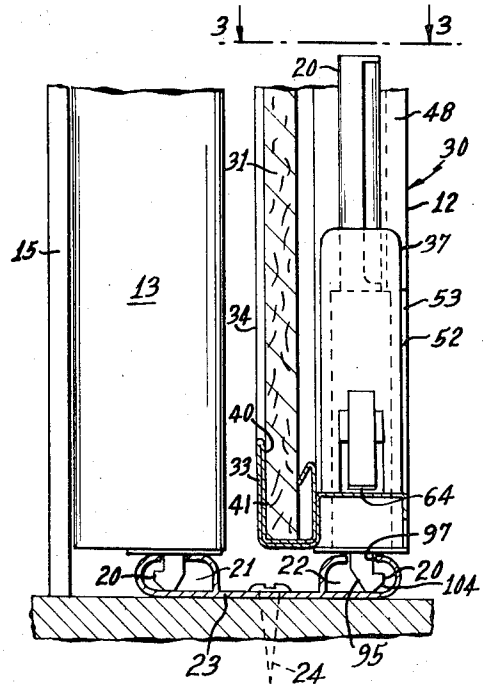


FIG. 1

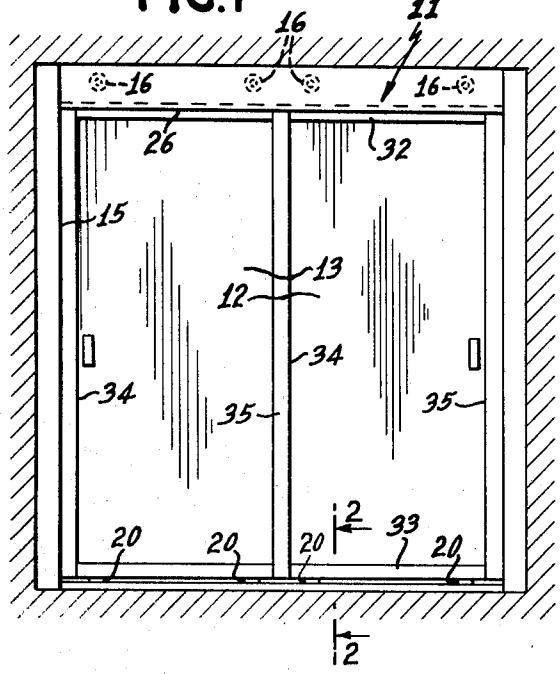


FIG. 2

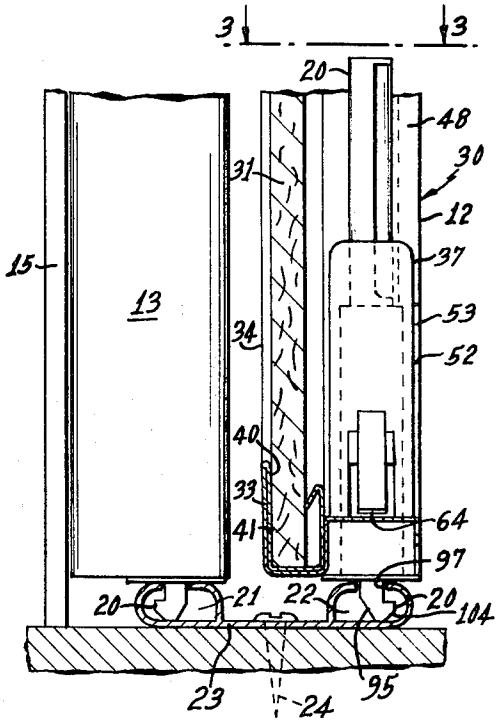


FIG. 3

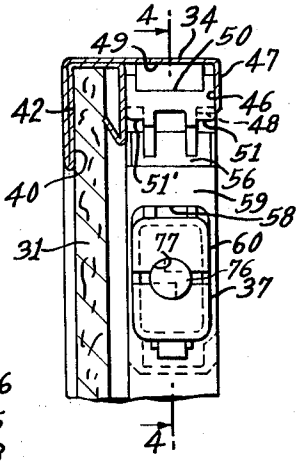


FIG. 6

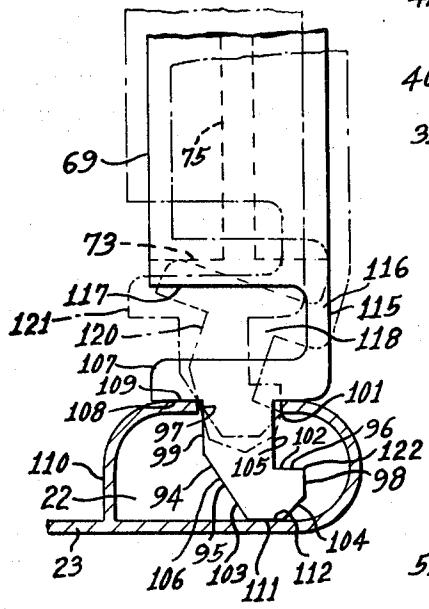


FIG. 5

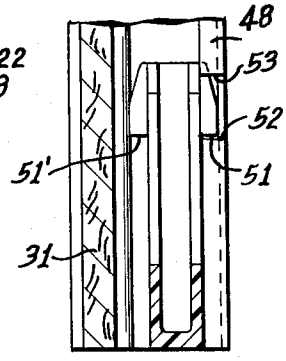
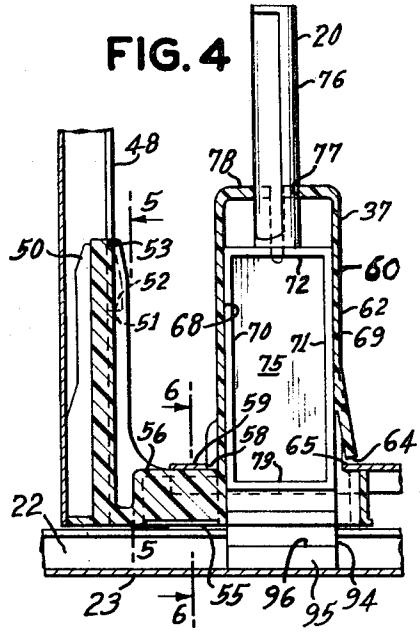


FIG. 4



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UNITARY GUIDE FOR SLIDING PANELS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to guides and more particularly to a unitary guide for guiding sliding panels along a track.

2. Description of the Prior Art

Guides of various types have been known in the art and numerous patents have been granted disclosing same, exemplary of which are U.S. Pat. Nos. 1,343,416; 1,448,845; 1,934,299; 3,005,226; 3,033,285; 3,037,555; 3,052,930; 3,058,173; 3,167,112; 3,184,806; and 3,261,129. Many of the above patents have various deficiencies which are substantially alleviated in accord with the invention hereinafter described.

SUMMARY OF THE INVENTION

A unitary guide in one aspect of the invention includes a guide body having a guide element at one extremity extendable through the guideway entrance and having a laterally extending lug engageable with the shoulder within the elongated guideway. The body includes flexing means connected to the element for swinging the element and lug about a longitudinal axis. The guide element and lug with the flexing means in flexed condition have a smaller lateral dimension than the entrance to permit ingress of the element and lug therethrough by an inwardly pushing force on the body exerted perpendicularly to the guideway thereby flexing the flexing means. The element and lug are of lateral dimension when seated in the guideway to inhibit egress thereof through the entrance by an outwardly pulling force thereon exerted perpendicularly to the guideway.

In other aspects, the invention includes a cam surface disposed rearwardly of the lug with the cam surface and lug being engageable with the entrance upon initial insertion of the element therethrough. The element has a pair of generally parallel and opposite surfaces adjacent respective lug and cam surface and engageable with respective edges defining the entrance when guide element is seated in the guideway. The element includes an end engageable with the bottom surface of the guideway. The flexing means includes a lateral portion bridgeable across the entrance and being of a lateral dimension to inhibit ingress thereof through the entrance when the element is positioned through the entrance, such portion being slidably engaged with the guideway housing along and adjacent the entrance. The flexing means also includes a resilient flexing portion connected to the lateral portion whereby the lateral portion and guide element and lug may be swung about the longitudinal axis. The guide body includes another lateral portion connected generally perpendicularly with the flexing portion and being generally parallel to and oppositely disposed across a space defined between such lateral portions and the flexing portion.

A general object of the present invention is to provide an improved unitary guide for sliding panels.

A particular object is the provision of a bendable portion of the guide so that the single guide element and laterally extending lug may be inserted or snapped into the elongated guideway through an entrance thereof.

Another particular object is directed to a cam surface on the guide element disposed oppositely to the bendable portion for forcing the guide element and lug to a position in which the lateral dimension is temporarily less than the lateral dimension of the entrance when a pushing force is exerted on the guide to insert the element and lug into the guideway.

A specific object is to provide an improved unitary guide in which a lateral portion above the guide element bridges across the entrance and engages the upper surfaces of the guideway adjacently above the entrance.

Another specific object is the provision of a lateral portion bridgingly above the entrance, a guide element extending through the entrance and a resiliently flexing portion above the lateral portion in which the guide element and lateral portion are swung upwardly to insert the guide element and lug through the entrance of the guideway.

A further specific object is to provide an improved unitary lower guide which prevents inadvertent removal of the guide element from the guideway and provides smooth sliding therealong. Also, the guide element extends sufficiently in the direction of the elongated guideway and entrance to inhibit twisting and wedging thereof in the guideway and entrance.

Other specific objects of this invention are the provision of a unitary guide readily and inexpensively fabricated, easy to install, and durable and efficient in operation.

The novel features which are believed to be characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best understood by reference to the following description taken in connection with the accompanying drawing.

BRIEF DESCRIPTION OF DRAWING

FIG. 1 is a front elevational view of a sliding door assembly utilizing the unitary guide in accord with the invention;

FIG. 2 is a cross sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a partial top plan view taken along line 3—3 of FIG. 2;

FIG. 4 is a partial cross sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a partial cross sectional view taken along line 5—5 of FIG. 4; and

FIG. 6 is an enlarged partial cross sectional view taken along line 6—6 of FIG. 5 and showing the guide being inserted into the track.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawing, FIG. 1 depicts a sliding door assembly generally at 11 including a pair of sliding and bypassing doors 12 and 13 with door 13 being outwardly disposed relative to door 12, assembly 11 being installed in a rectangular doorway 15. Each of doors 12 and 13 are slidingly suspended by

a pair of spaced wheels 16 which roll within an upper track (not shown), wheels 16 of door 13 being disposed in the outer track guideway and wheels 16 of door 12 being disposed in inner track guideway as clearly depicted in applicant's pending U.S. Pat. application, Ser. No. 70,383, filed Sept. 8, 1970 and entitled PANEL FRAME ASSEMBLY. Each of doors 12 and 13 are slidingly guided by a pair of spaced lower guides 20 which extend into respective guideways 21 and 22 of lower track 23, track 23 being installed in doorway 15 by spaced fasteners 24 along its length and being generally parallel to the upper track which is similarly affixed in doorway 15. A common type fascia plate 26 is suitably connected to the upper track to outwardly cover or conceal the upper track and the upwardly extending suspension members (not shown) which are suitably connected to the doors 12 and 13 and at their upper end portions rotatably mount respective wheels 16, as more fully described in applicant's aforesaid pending application.

Each of the doors 12 and 13 are substantially identical and further description of door 12 will suffice to particularly describe the invention. Door 12 includes a panel frame assembly, generally indicated by reference numeral 30, and a panel 31 of any suitable material, such as plywood, paneling, plastic or the like. The frame assembly 30 includes a pair of generally horizontal and identical rails 32 and 33 and a pair of generally vertical and identical stiles 34 and 35, stile 34 being behind stile 35 of door 13, and four unitary corner connectors, including corner connectors 37, disposed in each corner and connecting one stile and one rail together, as fully described in applicant's aforesaid pending application. Each of the rails and stiles 32—35 includes a channel 40 opening and facing inwardly with respect to the panel 31 and receiving respective edge portions 41 and 42 of panel 31 thereinto as depicted in FIGS. 2 and 3.

Each of stiles 34 and 35 includes another channel 46 opening and facing inwardly with respect to panel 31 and in the same general direction as channel 40, channel 46 having a rear side wall 47 extending horizontally and a lip 48 extending toward the other channel 40 and generally parallel with the channel bottom wall 49. A generally upright portion 50 of corner connector 37 is disposed in and conforms generally in outline to the space defined by and internally of channel 46. Means are associated between upright portion 50 and channel 46 to affix the connector 37 thereto and is seen to herein specifically include a corner connector shoulder 51 engaging channel lip shoulder 52 which is formed by a cutout 53 in lip 48 as shown in FIGS. 3 and 4. With the shoulders 51 and 52 in engagement the lower surface 55 of laterally extending portion 56 of corner connector 37 is generally flush with the lower extent of rail 33 as shown in FIG. 2. Rail 33 includes an opening 58, as clearly seen in FIG. 4, spaced from the end portion 59 and through which another upright portion 60 extends, portion 60 being spaced from portion 50 and extends generally in the same direction as portion 50. Opening 58 is generally rectangular and the upper housing portion 62 of upright corner portion 60 is generally rectangular and substantially fits within opening 58. Means are associated between upright portion 60 and rail 33 to affix the connector 37 thereto and is seen to herein specifically include a corner connector shoulder 64 engaging beneath a shoulder 65 defining opening 58 in rail 33 whereby corner and rail are self-locked without other separate components.

While corner connector 37 is shown at the lower left hand corner of door 12, the identical corner connector may be employed at the lower right hand corner in which event shoulder 51' would engage a similar shoulder 52 of the corresponding lip of stile 35. Also, identical corner connectors are employed at the upper corners of door 12 with appropriate suspension members, as generally explained in applicant's aforesaid pending application.

A unitary guide 20 in accord with this invention is disposed within passageway 68 of corner connector 37 and is freely movable upwardly and downwardly therein. Guide 20 includes a body 69 of rectangular configuration having side walls 70 and 71 and top wall 72 and lateral portion in the form of bottom wall 73 with a web planar member 75 being medially disposed interconnecting and reinforcing walls 70–73. The guide 20 further includes an upwardly extending element 76 connected to body 69 and top wall 72, element 76 extending through opening 77 in the top 78 of upper housing portion 62.

At the lower end portion 94 of guide 20 is an integral guide element 95 terminating in a laterally extending lug 96 which prevents inadvertent removal of the guide member 20 from guideway 22 of track 23, track 23 including a slot or entrance 97 into guideway 22 along its length with the lateral distance thereof being less than the distance between the extremity 98 of log 96 and the rearward surface 99, as clearly shown in FIGS. 2 and 6, surfaces 98 and 99 being generally parallel. Track 22 includes a shoulder 101 defining track entrance 97 adapted to be engaged by lug surface 102 to prevent inadvertent dislodgement of guide element 95 from within guideway 22. Guide element 95 is provided with a cam surface 103 and cam surface 104 so that when the guide element 95 is initially inserted or pressed into and through entrance 97, the guide element 95 is swung upwardly about a longitudinal axis, as hereinafter more fully described, which is generally parallel to guideway 22, so as to reduce the distance between the extremity 98 of foot 96 and cam surface 103 so that the guide element 95 may pass through entrance 97 and be positioned within guideway 22 with lug 96 extending laterally of shoulder 101. When guide element 95 is properly positioned, the vertical and parallel surfaces 99 and 105 extend through the entrance 97, and the lug 96 and the portion 106 bounded by cam surface 103 are within guideway 22, as clearly shown in FIG. 6.

Guide 20 includes a lateral portion 107 of sufficient lateral dimension to bridge across the entrance 97 for inhibiting ingress thereof through such entrance 97. In common practice, however, the bottom surface 108 may engage or ride on the upper outer surface 109 of track housing 110 forming guideway 22, top surface 109 being interrupted by longitudinally extending entrance 97. Also the bottom surface 111 of guide element lower end portion 94 may engage or ride on the inner surface 112 of track housing 110. Due to the fact that irregularities do exist in the vertical distances between the upper track and lower track 23, the guide

20 will either have both surfaces 108 and 111 engaged with respective housing surfaces 109 and 112 or the lug surface 102 will be engaged with shoulder 101. However, since the guide element 20 is relatively freely slidable in housing upright portion 60, the position shown in FIGS. 2, 4 and 6 is the usual position assumed by element 20 with respect to guideway 22.

Flexing means 115 are disposed between guide body 69 and lateral portion 107 whereby the guide element 94 and lug 96 may be swung about a longitudinal axis extending generally parallel with guideway 22 or with entrance 97. Flexing means 115 may be seen to include lateral portion 107, a resilient flexing portion 116 extending generally perpendicularly with respect to lateral portion 107 and another lateral portion 117 extending perpendicularly with respect to flexing portion 116 and being generally parallel with and adjacently spaced above lateral portion 107. Lateral portions 107 and 117 are flexing portion 116 define a space 118 to permit lateral portion 107 to be swung upwardly to temporarily assume the broken line position 120 as shown in FIG. 6 upon forcible depression of guide 20, as hereinafter more fully described.

With the door 12 properly suspended in the upper track and the guide 20 being fully withdrawn into housing upright portion 60 of corner connector 37, element 76 is initially depressed so that element 95 assumes the broken line position 121 at the entrance 97 of guideway 22. Upon further depression of element 76, lateral portion 107 is swung upwardly with the flexing portion 116 in bent condition and the guide 20, corner connector 37 and door 12 being temporarily displaced laterally with respect to the seated condition of guide element 94 within guideway 22. In other words, the guide 20 with the cam surface 103 and lug surface 98 engaging entrance 97 is laterally offset to the left, as seen in FIG. 6, upon initial engagement of the guide element 94 in entrance 97, and guide 20 becomes offset to the right when the corner 122 of lug 96 passes through the entrance 97 with the flexing portion 116 in bent condition and the lateral portion 107 occupying a part of space 118. Thereupon, the guide 20 becomes operatively seated with respect to guideway 22 with the seated position being between the right and left offset positions as described above.

While the invention has been described with respect to a certain specific embodiment, it will be appreciated that many modifications and changes may be made by those skilled in the art without departing from the spirit of the invention. It is intended therefore, by the appended claims to cover all such modifications and changes as fall within the true spirit and scope of the invention.

What is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. A unitary guide for use in a longitudinal guideway of a track having an inwardly directed shoulder defining an entrance and communicating between the guideway and outwardly thereof comprising a guide body having a guide element extendable through the entrance and having a laterally extending lug engageable with the shoulder within the guideway, said guide body having a lateral portion integral with said guide element and bridgeable across the entrance and being of sufficient lateral dimension to inhibit ingress thereof through the entrance when said guide element is positioned through the entrance, said body having a flexing portion connected to said lateral portion whereby said lateral portion may bend about a longitudinal axis, said guide element and lug being of sufficient lateral dimension to inhibit egress thereof through the entrance by an outwardly pulling force thereon exerted perpendicularly to the longitudinal guideway, said guide element and said lug being insertable through the entrance by a pushing force thereon exerted perpendicularly to the longitudinal guideway thereby bending said flexing portion, said guide element and lug having a lateral dimension with said flexing portion in a bent condition sufficiently smaller than the entrance to permit ingress of said guide element and lug therethrough and into the guideway.

2. The guide as defined in claim 1 wherein said guide body has a space adjacent said lateral portion located opposite to said guide element, said flexing portion being located adjacent said lug.

3. The guide as defined in claim 1 wherein said flexing portion is located adjacent said lug, said guide body having another lateral portion spaced from said lateral portion and defining therebetween and with said flexing portion a space to permit said lateral portion to be swung thereinto upon bending of said flexing portion.

4. The guide as defined in claim 1 wherein said guide element includes a cam surface disposed rearwardly of said lug, said cam surface and said lug engageable with the entrance upon initial insertion of said guide element into the entrance.

5. The guide as defined in claim 1 wherein said guide body includes an elongated portion adjacent said flexing portion and adapted and arranged to be slidably engaged within a housing attached to a sliding door, said elongated portion and flexing portion and lateral portion defining a space to permit said lateral portion with said attached guide element and lug to be swung about said longitudinal axis thereby partially closing said space.

6. The guide as defined in claim 1 wherein said flexing portion is resilient so that after bending thereof to permit insertion of said guide element and lug through the entrance the flexing portion will return to its original unbent condition with said guide element extending through the entrance and said guide element and lug being located in the guideway.

7. A unitary guide for use in a longitudinal guideway of a track having an inwardly directed shoulder defining an entrance and communicating between the guideway and outwardly thereof comprising a guide body having a guide element at one extremity extendable through the entrance and having a laterally extending lug engageable with the shoulder within the guideway, said guide body including flexing means connected to said guide element for swinging said guide element and lug about a longitudinal axis, said guide element and lug being of sufficient lateral dimension to inhibit egress thereof through the entrance by an outwardly pulling force thereon exerted perpendicularly to the longitudinal guideway, said guide element and lug having a lateral dimension with said flexing means in flexed condition sufficiently smaller than the entrance to permit ingress of said guide element and lug therethrough by an inwardly pushing force on said

guide body exerted perpendicularly to the longitudinal guideway thereby flexing said flexing means.

8. The guide as defined in claim 7 wherein said flexing means is resilient.

9. The guide as defined in claim 7 wherein said guide element includes an end engageable with the bottom surface of the guideway.

10. The guide ad defined in claim 7 wherein said guide element includes a cam surface disposed rearwardly of said lug, said cam surface and lug engageable with the entrance upon initial insertion of said guide element into the entrance.

11. The guide as defined in claim 10 wherein said guide element includes a pair of generally parallel and opposite surfaces adjacent respective said lug and cam surface and being engageable with respective edges defining the entrance.

12. The guide as defined in claim 7 wherein said flexing means includes a lateral portion integral with said guide element and bridgeable across the entrance and being of sufficient lateral dimension to inhibit ingress thereof through the entrance when said guide element is positioned through the entrance and a flexing portion connected to said lateral portion whereby said lateral portion and guide element and lug may be swung about said longitudinal axis.

13. The guide as defined in claim 12 wherein said lateral portion is adapted and arranged to engage the track outwardly of the entrance.

14. The guide as defined in claim 12 wherein said lateral portion and flexing portion are generally perpendicularly connected with a space being defined therebetween to permit swinging of said lateral portion toward said flexing portion.

15. The guide as defined in claim 14 wherein said guide body includes another lateral portion connected generally perpendicularly with said flexing portion and being generally parallel to and oppositely disposed across said space from said lateral portion.

16. The guide as defined in claim 7 wherein said guide element extends longitudinally of the guideway and having an elongated dimension greater than the lateral dimension of the guideway whereby twisting and lodgement of said guide element in the guideway is inhibited.

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