Sept. 16, 1969 J. DOVEINIS ET AL 3,466,802

SLIDABLE GUIDE ASSEMBLY

Filed June 17, 1968 2 Sheets-Sheet 1

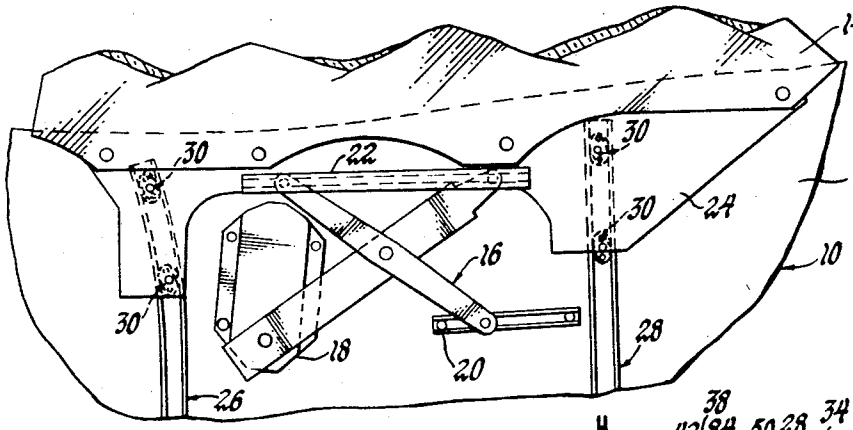


Fig. 1

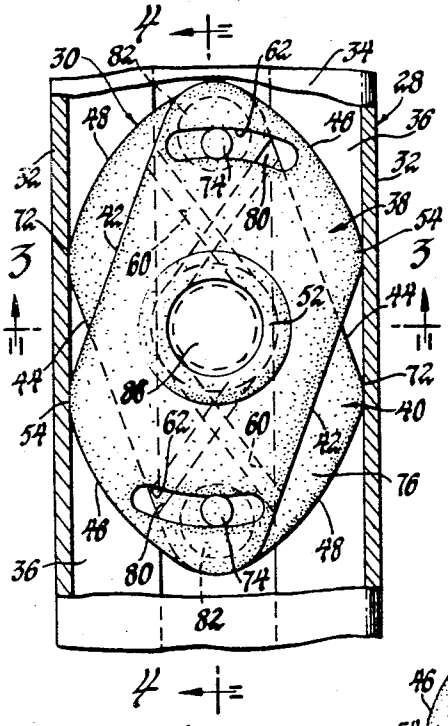


Fig. 2

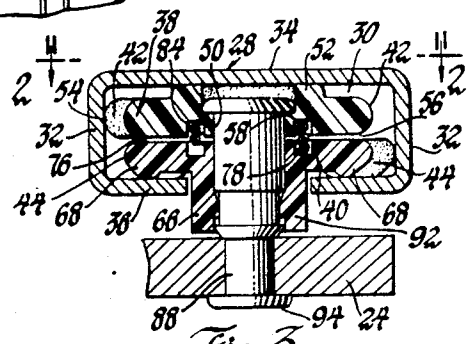


Fig. 3

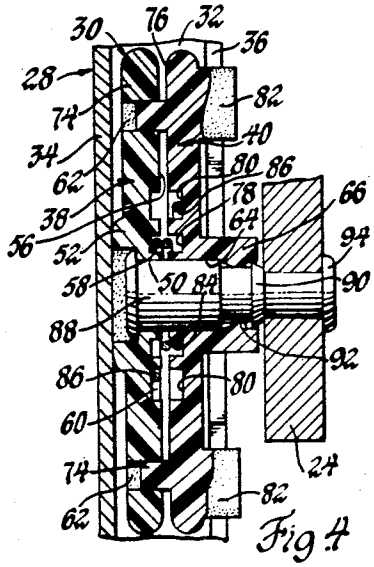


Fig. 4

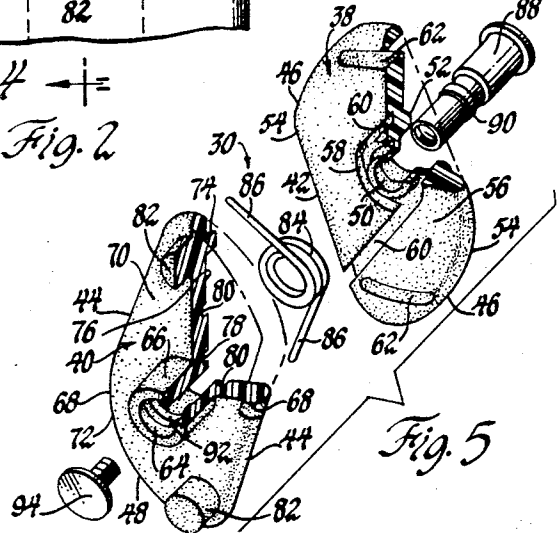


Fig. 5

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SLIDABLE GUIDE ASSEMBLY

Filed June 17, 1968 2 Sheets-Sheet 2

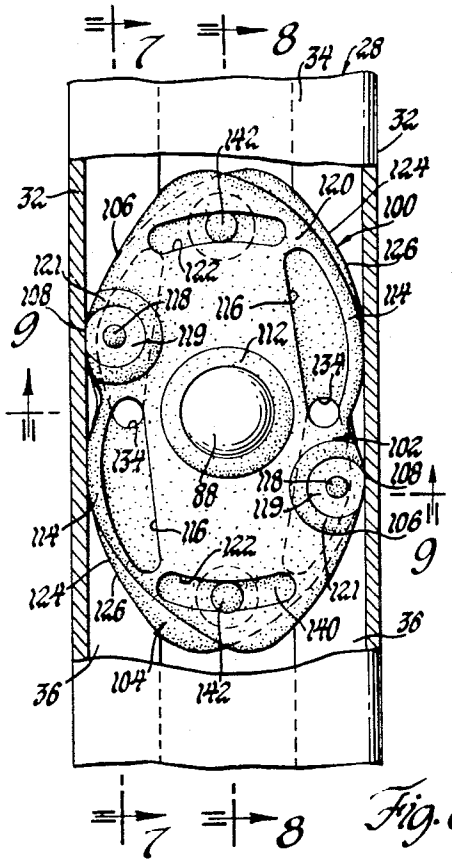


Fig. 6

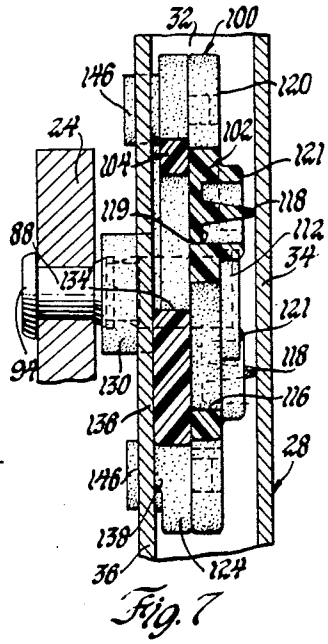


Fig. 7

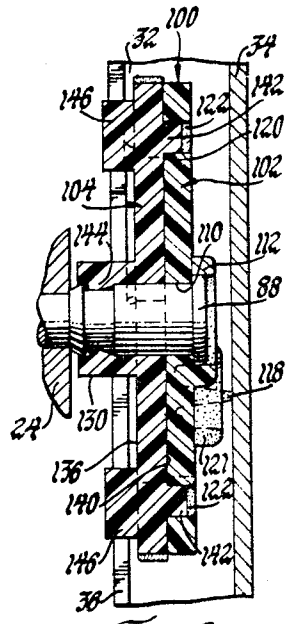


Fig. 8

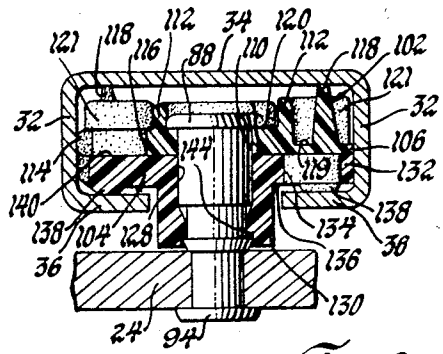


Fig. 9

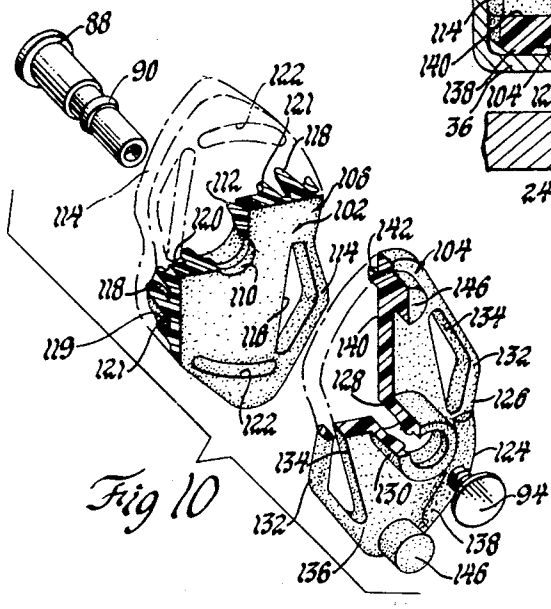


Fig 10

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SLIDABLE GUIDE ASSEMBLY

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U.S. Cl. 49—428 5 Claims

ABSTRACT OF THE DISCLOSURE

A vehicle body window is guided by spaced guide channels and pairs of slide assemblies movable within the channels. Each slide assembly, in one embodiment of the invention, includes elongated slide members having diagonal bearing surfaces on their side walls and outer base walls. A combined torsion and compression spring biases the slide members rotatably relative to each other to hold the bearing surfaces on the side walls of the members in engagement with the side walls of the channel and hold the bearing surfaces on the base walls of the members in engagement with the base wall of the channel. In another embodiment, the slide members are provided with integral flexible webs which rotatably bias each member relative to the other and bearing surfaces on the outer base walls of the members engage the base walls of the channel.

This invention relates to a guide arrangement for vehicle body windows and more particularly to a slide assembly and guide arrangement for guiding vehicle body windows during movement between open and closed positions.

Certain vehicle door windows are guided by spaced rollers which follow spaced curvilinear shaped guide channels. Due to manufacturing tolerances and the curvilinear shape of the channels, it is difficult to adjust the channels with respect to each other and also with respect to the support panel of the door to obtain smooth and easy movement of the rollers within the channels without binding.

The slide assembly and guide arrangement of this invention obviates such difficulties since it permits variations within limits in the spacing of the guide channels without causing binding between the slide members and the channels during movement of the window. The slide assembly generally includes a pair of elongated slide members which are freely axially and rotatably mounted on a shaft secured to the window. The slide members are biased rotatably with respect to each other so that diagonal bearing surfaces on the side walls of each slide member engage the side walls of the guide channel, and diagonal bearing surfaces on the outer base wall of each member engage the base walls of the channel. The slide members are thus continuously rotatably adjusted with respect to each other and with respect to the channel so that any variations in the spacing of the channels is taken up and there is no binding.

In one preferred embodiment of the invention, a combination compression and torsion spring is mounted on the shaft between the inner base walls of the slide members to bias the members axially apart and rotatably opposite with respect to each other so that the diagonal

bearing surfaces on the side walls and outer base wall of each member engage the respective side walls and base walls of the channel. In another embodiment of the invention, deflectable webs on the side walls of each slide member engage the side walls of the channel to rotatably bias the members with respect to each other, and deflectable abutments on the outer base wall of one member engage a base wall of the channel to bias the members toward each other and bias diagonal bearing surfaces on the outer base wall of the other member into engagement with the other base wall of the channel. In both embodiments of the invention, pin and slot means limit rotation of the slide members relative to each other so that they can be preassembled prior to installation within the channel, and abutments on the outer base wall of one member are engageable with the opposite edges of the slot in one base wall of the channel to orient the members upon insertion in the channel.

The primary object of this invention is to provide an improved slide assembly and guide arrangement for vehicle body windows which permits variation in spacing between a pair of spaced guide channels and yet guides movement of a vehicle body window without binding. Another object of this invention is to provide an improved slide assembly and guide arrangement for vehicle bodies wherein spaced pairs of elongated rotatably and axially adjustable slide members are mountable on a vehicle window and slidably engageable with walls of respective spaced guide channels to take up variations in spacing between the channels and obtain free movement of the window without binding.

These and other features of the invention will be readily apparent from the following specification and drawings wherein:

FIGURE 1 is a broken away view of a portion of an automobile body mounting a vertically movable window guided by a slide and guide arrangement according to one embodiment of this invention;

FIGURE 2 is an enlarged broken away view taken along the plane indicated by line 2—2 of FIGURE 3;

FIGURE 3 is a sectional view taken along the plane indicated by line 3—3 of FIGURE 2;

FIGURE 4 is a sectional view taken along the plane indicated by line 4—4 of FIGURE 2;

FIGURE 5 is an isometric exploded view of the guide assembly;

FIGURE 6 is a view similar to FIGURE 2 showing another embodiment of this invention;

FIGURE 7 is a sectional view taken along the plane indicated by line 7—7 of FIGURE 6;

FIGURE 8 is a sectional view taken along the plane indicated by line 8—8 of FIGURE 6;

FIGURE 9 is a sectional view taken along the plane indicated by line 9—9 of FIGURE 6; and

FIGURE 10 is an isometric exploded view of the guide assembly.

Referring to FIGURE 1 of the drawings, a vehicle body door 10 includes an inner panel 12 and an outer panel, not shown, which provide a well for a door window 14 when the window is moved from the closed position, shown, to an open position, not shown. A conventional cross arm type window regulator 16 is mounted on the inner panel 12 by a back plate 18 and a cam channel 20. The arms of the regulator are pivotally and slidably secured in a conventional manner to a cam

channel 22 secured to a mounting plate 24 which is bolted to the window 14. The regulator 16 includes suitable operating means to move the window between its open and closed positions.

Front and rear guide channels 26 and 28 are mounted on the inner panel 12 and receive slider assemblies 30 mounted on plate 24 to provide a slide and guide assembly according to this invention to control both fore and aft and tilting movement of window 14 as it moves between open and closed positions. Since each channel is of the same cross section and each slider assembly 30 is the same, only channel 28 and one assembly 30 will be particularly described.

As shown in FIGURE 3, channel 28 includes a pair of side walls 32, and base walls 34 and 36, the latter of which is slotted longitudinally of the channel.

The slider assembly 30 includes generally trapezoidal shaped slider members 38 and 40 formed of antifriction plastic material. The width of the members between their respective pairs 42 and 44 of parallel side walls is generally the same and less than the distance between the walls 32 of the channel 28. The diagonal length of each member is greater than such distance and each member has its respective pairs 46 and 48 of end walls of arcuate shape. The slide member 38 has a central shouldered bore 50 for receiving a connecting stud, later to be described, and a bearing surface or rib 52 surrounding the bore and adapted to slide on the wall 34 of the channel. Generally diagonally located arcuate slide surfaces or corners 54 between the walls 42 and 46 are each adapted to engage a wall of the channel when the slide member is rotated through a predetermined arc out of parallel relationship with the channel. The slide member 38 also includes on its inner base wall 56 a circular groove 58 which surrounds and is concentric with the bore 50 and opens to oppositely extending tangent straight grooves 60. Member 38 also includes arcuate slots 62 formed about an arc concentric with the axis of the bore 50.

The slide member 40 has a central bore 64 and a coaxially apertured hub 66 adapted to project through the slot in the wall 36 of the channel. Bearing ribs or surfaces 68 are provided on the outer base wall 70 of member 40 at the diagonally located arcuate slide surfaces or corners 72 between the respective pairs of walls 44 and 48. Corners 72 are adapted to engage the walls 32 of the channel 28 when the slide member 40 is rotated through a predetermined arc out of parallel relationship with the channel. A pair of integral pins 74 project from the inner base wall 76 of the member 40 and are adapted to be received in respective arcuate slots 62 of the slide member 38 to limit rotation of the slide members relative to each other when they are initially assembled, as will be described. Slide member 40 also includes a circular groove 78 in wall 76 which is concentric with the bore 50 and complementary to the groove 58 in the slide member 38. Groove 78 connects with oppositely extending tangent straight grooves 80 which cross grooves 60 when the slide members are assembled, as will be described. A pair of alignment buttons 82, shown best in FIGURE 5, project from wall 70 through the slot in the wall 36 of the channel to properly orient the slide assembly in the channel during initial installation as will be described.

A combined coil and compression spring includes a coil portion 84 and oppositely extending arms 86. Upon assembly of the slide members, the coil portion 84 fits within the grooves 58 and 78 and the arms 86 are respectively received within a groove 60 of the member 38 and a groove 80 of the member 40 to rotatably bias the members oppositely with respect to each other. The action of the spring is limited by the engagement of the pins 74 with opposite ends of the slots 62.

After members 38 and 40 are assembled, a headed stud 88 is inserted through the bore 50 of member 38, the coil portion 84, and the bore 64 of member 40 and hub 66. As shown best in FIGURE 4, the stud 88 includes an integral annular rib 90 and an integral deflectable lip or flange 92 of the hub 66 snaps over and behind flange 90 to thereby axially locate the members 38 and 40 with respect to each other prior to installation of the slider assembly within the channel 28. A screw 94 is threaded within the internally threaded end of the stud 88 to secure the stud to the plate 24.

Before the slider assembly 30 is inserted within channel 28, the action of the coil portion 84 of the spring holds the flange 92 in engagement with the flange 90 to axially locate the members 38 and 40, and the action of the arms 86 of the spring rotatably biases the members 38 and 40 oppositely with respect to each other until the pins 74 engage diagonally opposite ends of the slots 62.

When the slide assembly 30 is inserted in channel 28, members 38 and 40 are slightly axially compressed and the leading pin 82 is engaged with an edge of the slot in wall 36 to rotate member 40 relative to member 38 so that both members can be inserted between the channel walls 32.

When the slider assembly is inserted within the channel, the corners 54 of the member 38, and corners 72 of the member 40 slidably engage the side walls 32 of the channel under the bias of the arms 86 of the spring, the rib 52 engages wall 34 and the ribs 68 engage wall 36 under the bias of the coil portion 84 of the spring, and the pins 82 do not engage either edge of the slot in wall 36.

With reference to FIGURE 1, it will be noted that pairs of slide assemblies 30 are provided for each of the channels and this is preferable for increased lateral stability of the window and also increased stability of the window longitudinally of the body.

Since the guide channels 26 and 28 are of curvilinear shape, it is difficult to accurately space these channels with respect to each other and also with respect to panel 12 due to the length and shape of the channels and manufacturing tolerances. Since the members 38 and 40 of each slide assembly are rotatable with respect to each other, it can be seen that they permit variation in the spacing between the channels 26 and 28 without any resultant binding of these members with the side walls 32 of their respective channels. Variations in spacing of the channels 26 and 28 laterally of the inner panel 12 are taken up by means of the axial adjustment of the members 38 and 40 with respect to each other.

Thus even though the guide channels 26 and 28 may be of curvilinear shape, the slide assembly 30 will accept variations in the spacing of these members with respect to each other and also with respect to the inner panel of the body and take up these variations without any binding of the slide assemblies in the channels.

FIGURES 6 through 10 of the drawings show another embodiment of the invention which is similar to the first embodiment except that the slide members are not biased rotatably and axially of each other by a spring but, rather, by integral means incorporated in each member. Like parts in these figures of the drawings are indicated by like numerals.

The slide assembly 100 includes a pair of elongated slide members 102 and 104 formed of antifriction plastic material. The side walls 106 of the member 102 each include a bearing surface or rib 108, with these bearing surfaces being located diagonally of each other with respect to a central shouldered bore 110 provided in the member 102 and surrounded by a rib 112. Each side wall further includes a deflectable web 114 which is provided by laterally slotting the slide member at 116. A deflectable tapered abutment or bearing surface 118 extends laterally of the base wall of a recess 119 in the outer base wall 120 of the member 102. Each surface 118 is located adjacent a bearing surface 108 and each recess 119 is extended laterally of wall 120 by a lateral discontinuous cylindrical rib or wall 121. Each member 102 further includes an

arcuate slot **122** having its center at the axis of the bore **110**.

The slide member **104** is of the same shape as the slider member **102** and includes bearing surfaces **124** on the side wall **126** thereof, with these bearing surfaces being located diagonally of each other with respect to a central bore **128** in the member **104** which also extends through an integral hub **130**. The side walls **126** further include deflectable webs **132**, with these webs being located diagonally of each other with respect to bore **128** and being provided by laterally slotting the slide member at **134**. The outer base wall **136** of the member **104** includes bearing surfaces or ribs **138** located diagonally of each other and provided on the outer base wall adjacent the bearing surfaces **124** on the side walls **126**. The inner base wall **140** of the member **104** includes a pair of pins **142** which are received within the slots **122** of the member **102**.

The members **102** and **104** are assembled on the stud **88** in the same manner as the slide members **38** and **40** and the annular rib **90** on the shank of the stud snaps past an integral deflectable rib **144** provided in the bore **128** of the hub **130**.

It will also be noted that the member **104** includes buttons **146** which function in the same manner as the buttons **82** in properly orienting the member **104** with respect to the opening of the channel **28**.

When the members **102** and **104** are inserted in the channel, the webs **114** of member **102** and **132** of member **104** rotatably bias the respective slide members about the stud **88** to hold the respective bearing surfaces **106** of member **102** and **124** of member **104** in engagement with the side walls **32** of the channel **28**. The bearing abutments **118** engage the base wall **34** of the channel to bias the members **102** and **104** together with respect to each other and hold the bearing surfaces **138** of the member **104** in engagement with the base wall **36** of the channel.

It will be noted that the slide assembly of each embodiment of the invention includes the elongated slider members which are rotatably biased about the support stud so as to resiliently hold diagonally opposite bearing surfaces of the side walls of these members in engagement with the side walls of the channel. Likewise bearing surfaces in the outer base walls of the members are resiliently biased into engagement with the base walls of the channel. Thus the slide assemblies and window can shift as a unit relative to the channels **28** and **30** as required during movement of the window and each slide assembly or pair of slide assemblies can also likewise adjust for variations in spacing between the channels **28** and **30** at any area along the length of the channel.

Thus this invention provides an improved slide and guide assembly for vehicle bodies.

We claim:

1. A slide and guide arrangement for guiding movement of a vehicle body window comprising, in combination, an elongated guide channel having a pair of spaced side walls and a pair of spaced base walls joined to the side walls, a pair of generally trapezoidal shaped slide members received within the channel and having their inner base walls juxtaposed, the slide members having an extent between their side walls less than the extent between the channel side walls and an extent between their outer base walls less than the extent between the channel base walls, each side wall having an extent greater than the extent between the channel side walls, means oppositely rotatably biasing the members relative to each other to locate diagonally opposite portions of the side walls in engagement with the side walls of the channel, and means biasing the juxtaposed inner base walls of the slide members apart relative to each other to bias the outer base walls thereof into engagement with the base walls of the channel.

2. A slide and guide arrangement for guiding movement of a vehicle body window comprising, in combination, an elongated guide channel having a pair of spaced side walls and a pair of spaced base walls joined to the side walls, one base wall having a slot therein, a pair of generally trapezoidal shaped coaxially apertured slide members received within the channel and having their inner base walls juxtaposed, the slide members having an extent between their side walls less than the extent between the channel side walls and an extent between their outer base walls less than the extent between the channel base walls, each side wall having an extent greater than the extent between the channel side walls, shaft means extending through the base wall slot and rotatably received within the slide member apertures, means rotatably biasing the members about the shaft means to locate diagonally opposite portions of the side walls thereof in engagement with the side walls of the channel, and means axially biasing the outer base walls of the slide members into engagement with the base walls of the channel.

3. A slide and guide arrangement for guiding movement of a vehicle body window comprising, in combination, an elongated guide channel having a pair of spaced side walls and a pair of spaced base walls joined to the side walls, one base wall having a slot therein, shaft means extending through the base wall slot, a pair of generally trapezoidal shaped coaxially apertured slide members freely axially and rotatably mounted on the shaft means with their inner base walls juxtaposed, the slide members being located within the channel and having an extent between their side walls less than the extent between the channel side walls and an extent between their outer base walls less than the extent between the channel base walls, each side wall having an extent greater than the extent between the channel side walls, and a combined compression and torsion spring on the shaft means between the juxtaposed inner base walls biasing the slide members relative to each other to locate diagonally opposite portions of the side walls in engagement with the side walls of the channel and axially biasing the juxtaposed inner base walls of the slide members apart relative to each other to bias the outer base walls thereof into engagement with the base walls of the channel.

4. A slide and guide arrangement for guiding movement of a vehicle body window comprising, in combination, an elongated guide channel having a pair of spaced side walls and a pair of spaced base walls joined to the side walls, one base wall having a slot therein, a pair of elongated coaxially apertured slide members received within the channel each having spaced side walls juxtaposed to the channel side walls and including diagonal bearing surfaces on the side walls, the extent between the side walls of each member being less than the extent between the channel side walls, the outer base walls of the slide members being juxtaposed to the channel base walls and each including at least one bearing surface, shaft means extending through the base wall slot and freely axially and rotatably mounting the slide members thereon, means rotatably biasing each slide member about the shaft means to locate the diagonal bearing surfaces of the side walls thereof in engagement with the side walls of the channel, and means biasing the bearing surfaces outer base walls of the slide members into engagement with the base walls of the channel.

5. A slide and guide arrangement for guiding movement of a vehicle body window comprising, in combination, an elongated guide channel having a pair of spaced side walls and a pair of spaced base balls jointed to the side walls, one base wall being slotted, a pair of elongated coaxially apertured slide members received within the channel and having their inner base walls juxtaposed, each slide member having side walls juxtaposed to the channel side walls and provided with diagonally positioned bearing surfaces on the side walls, the outer base walls of the slide members having diagonal bearing sur-

faces juxtaposed to the channel base walls, shaft means extending through the slotted base wall and freely axially and rotatably mounting the slide members thereon, a thin flexible resilient web on each side wall adjacent the bearing surface thereon, the webs being diagonally positioned and engageable with the channel side walls to rotatably bias the members relative to the shaft means and locate the diagonal bearing surfaces of the side walls in engagement with the side walls of the channel, and means biasing the bearing surfaces on the outer base walls of the slide members into engagement with the base walls of the channel.

References Cited

UNITED STATES PATENTS

3,141,664	7/1964	Chupick	49—350 X
3,162,281	12/1964	Kraska et al.	49—441 X
3,333,363	8/1967	Garvey	49—374 X
3,383,800	5/1968	Sturtevant	49—428
3,385,000	5/1968	Sturtevant et al.	49—428 X

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U.S. Cl. X.R.

49—374, 417, 440

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,466,802 Dated September 16, 1969

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It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

line 68, column 6, "balls" should read -- walls --;

"jointed" should read -- joined --.

SIGNED AND
SEALED
FEB 24 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents