Aug. 11, 1964 R. W. SCHMID 3,144,267

DOOR HOLDER

Filed April 30, 1963

Fig. 1.

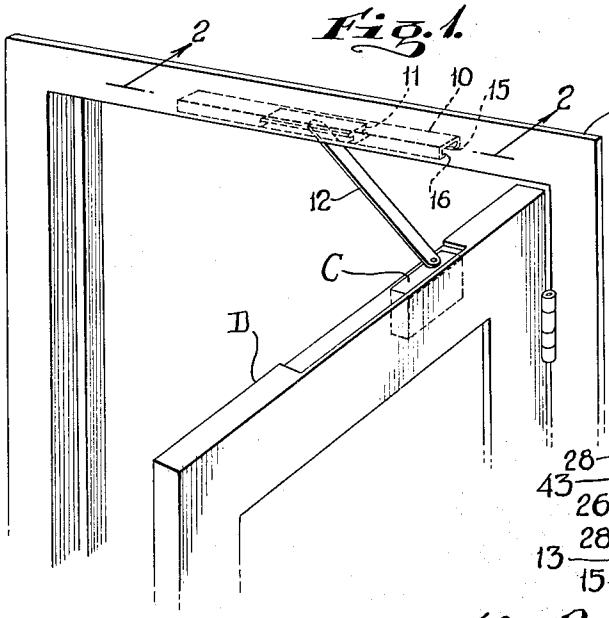


Fig. 6.

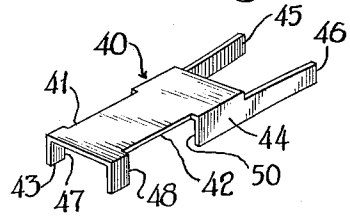


Fig. 5.

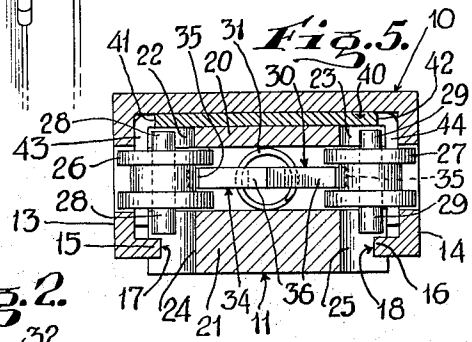


Fig. 2.

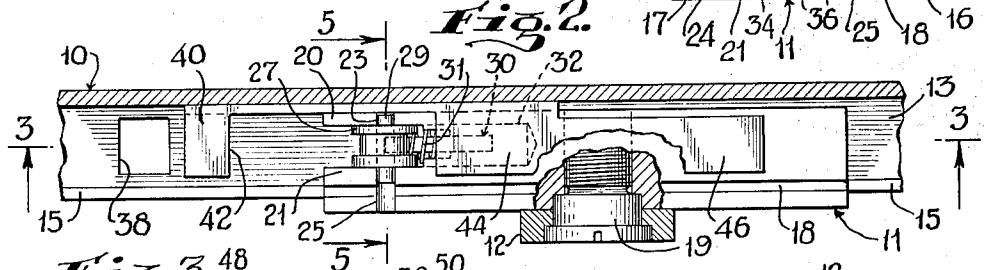


Fig. 3.

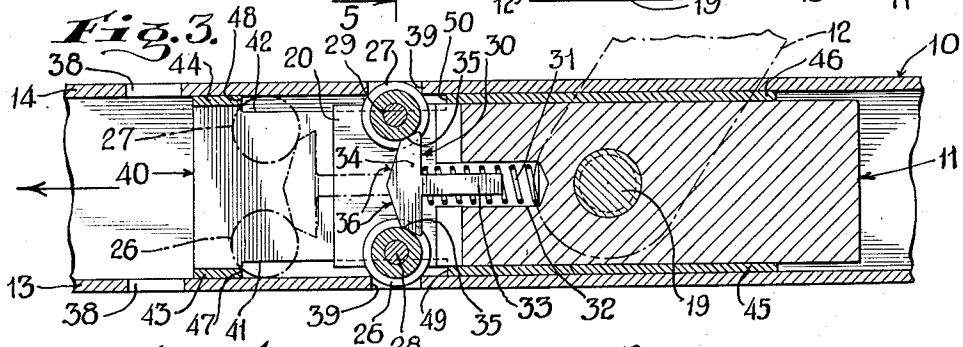
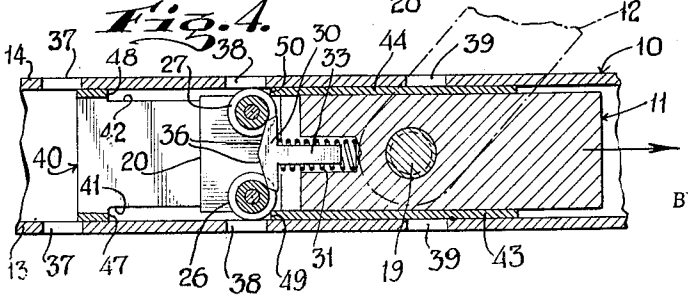


Fig. 4.



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United States Patent Office 3,144,267 Patented Aug. 11, 1964

3,144,267

DOOR HOLDER

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Filed Apr. 30, 1963, Ser. No. 276,962
12 Claims. (Cl. 292—275)

This invention relates to a door holder of the type incorporating a slider movable along a track incidental to the opening and closing of the door, and a detent on the slider engageable in an opening or openings in the track for releasably holding the door in an open position.

The purpose of this invention is to provide a door holder arrangement of this type incorporating novel means which hold the detent against movement into the opening or openings in the track during normal opening and closing of the door, while allowing the detent to be engaged in an opening to hold the door in an open position when such is desired. By this arrangement, the objectionable feel and noise of the detent snapping in and out of the openings in the track during normal opening and closing of the door is eliminated.

As a feature of the invention, the detent is projected by means of a spring pressed cam having two cam surfaces including a first cam surface which presses the detent with a relatively small force toward projected position, so that the detent engages the track with relatively light pressure as the slider moves on the track, and a second cam surface which presses the detent with a relatively strong force when the detent is projected into an opening in the track, to thereby provide a strong force for holding the door in an opened position.

Other objects and advantages of the invention will become apparent from the following description when read in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view showing the manner of assembly of the door holder relatively to the door and door frame;

FIG. 2 is an enlarged sectional view taken on the line 2—2 of FIG. 1 showing the slider and detents in door holding position;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2 showing in solid lines the holder and detents in door holding position, and showing in broken lines the holding of the detents against movement into an opening in the track during closing of the door;

FIG. 4 is a view similar to that of FIG. 3, but showing how the detents are prevented from entering the openings in the track during normal opening of the door;

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 2; and

FIG. 6 is a perspective view of the detent holding member as disassembled from the door holder.

Referring to the drawings and in particular to FIG. 1, the door holder includes a channel shaped track 10 adapted to be mounted in a door frame F, a slider 11 mounted for sliding movement in the track 10, and an operating arm 12 pivotally attached at one end to the slider 11 and at the other end to the door D, so that as the door is opened, the slider 11 can move from the left to the right as viewed in FIG. 1. If it is desired, the operating arm 12 may be pivotally connected to the door through a conventional closer mechanism, generally indicated at C, which applies a torque to the arm 12 in a direction tending to close the door D.

As best shown in FIGS. 2 and 5, the outer ends of flanges 13 and 14 of the track 10 are provided with inturned lips 15 and 16 which engage in opposed slots 17 and 18 formed in the sides of the slider 11, whereby the slider 11 is mounted for sliding movement longitudinally of the track 10 while retained against dropping downwardly out of the track 10. The operating arm 12 is pivotally connected to the slider 11 through a pivot screw 19 which is threaded into the slider 11.

As best shown in FIG. 2, the left-hand end of the slider 11 is bifurcated to provide longitudinally extending legs 20 and 21. As shown in FIG. 5, the leg 20 is provided with transverse slots 22 and 23 which extend inwardly from each side of the leg, and the leg 21 is provided with similar slots 24 and 25, which are vertically aligned with the slots 22 and 23. A pair of flanged detent rollers 26 and 27, having projecting shaft portions 28 and 29 extending from opposite sides thereof, are mounted in the space between the legs 20 and 21 with the shaft portions 28 and 29 extending into the slots 22, 24 and 23, 25 respectively. In this manner, the detent rollers 26 and 27 may rotate and move transversely of the slider 11, while being held against longitudinal movement relatively to the slider.

The detent rollers 26 and 27 are urged toward the flanges 13 and 14 of the track 10 by a T-shaped cam member 30, best shown in FIGS. 3 and 4, which is pressed against the detent rollers 26 and 27 by a compression spring 31. The spring 31 is mounted in a bore 32 which is formed in the slider 11 and communicates with the space between the legs 20 and 21. The spring 31 is mounted on the stem 33 of the T-shaped cam member 30 and bears at one end against the inner end of the bore 32 and at the other end against the cross head 34 of the cam member, whereby the cross head 34 is urged against the detent rollers 26 and 27.

The outer surface of each side of the cross head 34 is provided with two cam surfaces 35 and 36. The cam surfaces 35 are at the outer ends of the cross head 34 and engage the detent rollers 26 and 27 when the rollers are projected into any one of a number of openings 37, 38 and 39 formed in the flanges 13 and 14 of the track 10 to hold the slider 11 against movement relatively to the track 10, and thereby hold the door in an open position. The cam surfaces 36 engage the rollers 26 and 27 when they are in the retracted position in contact with the surfaces of the flanges 13 and 14 between the openings, as shown in broken lines in FIG. 3.

It will be particularly noted that the cam surfaces 35 extend at a comparatively small angle to the longitudinal axis of the spring 31, whereby maximum force is applied to the detent rollers 26 and 27 by the spring 31 through the cam member 30 when the rollers 26 and 27 are engaged in the openings in the track. Thus maximum force is applied to the detent rollers 26 and 27 by the spring 31 to hold the door D open against the force of the closing mechanism C. On the other hand, cam surfaces 36 extend at a substantially greater angle to the longitudinal axis of the spring 31. A smaller force therefore is applied to the detent rollers by the spring 31 when the rollers are in the retracted position and engaging the inner surfaces of the flanges 13 and 14 of the track, whereby the rollers 26 and 27 roll with relatively light pressure on the track 10 as the slider 11 moves on the track 10. While this force is small, it is sufficient to project the rollers into the openings when such is desired.

It will be appreciated that, as so far described, the detent rollers 26 and 27 under the influence of the spring pressed cam member 30 would snap in and out of the openings 37, 38 and 39 as the rollers are moved past the openings during normal opening and closing of the door, with resulting objectionable noise and feel. In accordance with this invention, control means are provided for preventing the detent rollers from so snapping into and out of the openings in the track during normal opening and closing of the door.

In the form of the invention illustrated, this control means comprises a channel-shaped member 40 having

cut-outs 41 and 42 in each flange 43 and 44 thereof, and diverging spring fingers 45 and 46 formed as integral extensions of the flanges 43 and 44 at one end of the member. The member 40 is dimensioned to fit loosely over the slider 11, with the flanges 43, 44 extending down the opposite sides of the slider and the detent rollers 26 and 27 projecting through the cut-outs 41 and 42.

The spacing between the outer ends of the spring fingers 45 and 46, when the member 40 is disassembled from the closer, is slightly greater than the distance between the inner surfaces of the flanges 13 and 14 of the track 10, so that when the member 40 is assembled on the slider 11 within the track 10, the fingers 45 and 46 press outwardly to frictionally engage the inner surfaces of the flanges 13 and 14 and resist movement of the member 40 with the slider 11.

As best shown in FIG. 2, the cut-outs 41 and 42 in the flanges 43 and 44 of the member 40 are substantially longer than the diameters of hte rollers 26 and 27. Thus, a lost motion connection is provided between the member 40 and the slider 11 which allows the slider 11 to move relatively to the member 40 until the detent rollers engage with one edge or the other of the cut-outs 41 and 42.

The operation of the member 40 in preventing the detent rollers from snapping in and out of the openings in the track 10 as the door is closed from the full opened position, shown in FIG. 1, will be first described. Assuming that the door is being held in the open position by engagement of the detent rollers 26 and 27, in the openings 39 of the flanges 13 and 14 of the track 10, as shown in FIGS. 2 and 3, the door may be closed by exerting sufficient force to the door to cam the rollers out of the openings 39 against the force of the spring pressed cam member 30. This results in movement of the slider 11 in the direction of the arrow in FIG. 3, with the member 40 remaining stationary due to the frictional engagement of the fingers 45 and 46 with the inside surfaces of the flanges 13 and 14 of the track 10, until the rollers engage the edges 47 and 48 of the cut-outs 41 and 42, as shown in broken lines in FIG. 3. Thereafter, as the slider 11 is moved in the direction of the arrow in FIG. 3, the member 40 is moved by the slider 11 through engagement of the detent rollers 26 and 27 with the edges 47 and 48 of the cut-outs 41 and 42 of the member 40. As the detent rollers 26 and 27 pass the openings 38 and 37, formed in the flanges 13 and 14 of the track 10, the forces exerted by the edges 47 and 48 on the rollers 26 and 27 hold the detent rollers 26 and 27 against movement into the openings 38 and 37 by the small force exerted on the rollers by the spring 31 acting through the cam surfaces 36 of the cam member 30. The objectionable feel and noise of the rollers snapping in and out of these openings is thus eliminated.

During opening movement of the door D, the slider 11 moves in the direction of the arrow in FIG. 4, with the member 40 remaining stationary until the detent rollers 26 and 27 engage the opposite edges 49 and 50 of the cut-outs 41 and 42. The member 40 is thereafter moved with the slider 11 in the direction of the arrow in FIG. 4, through engagement o fthe detent rollers 26 and 27 with the edges 49 and 50 of the cam member 40. As the rollers 26 and 27 pass the openings 37, 38 and 39, the forces exerted by the edges 49 and 50 of the member 40 on the rollers 26 and 27 prevent the rollers from snapping into the openings.

If it is desired to hold the door in an open position by engagement of the rollers 26 and 27 in one of the openings in the track, for example the opening 39, the door is first opened a distance to move the detent rollers 26 and 27 a slight distance beyond the openings 39 and the door then moved back a slight distance in the door closing direction. During this slight movement in the door closing direction, the member 40 remains stationary due to the frictional engagement of the fingers 45 and 46 with the track 10, while the slider 11 moves to the left, as viewed

in FIG. 4. As the slider 11 moves to the left relatively to the member 40, the detent rollers 26 and 27 are moved away from the edges 49 and 50 of the member 40, allowing the spring pressed cam member 30 to snap the detent rollers into the openings 39 to hold the door in the open position.

From the preceding description, it can be seen that the invention provides a novel door holder construction which eliminates the objectionable noise and feel of spring pressed detents snapping into and out of openings in the track during normal opening and closing of the door, while allowing the detents to be engaged in the openings to hold the door in an open position when such is desired. It can also be seen that the invention further provides a novel spring pressed cam arrangement for projecting the detents, whereby a relatively small force is applied to the detents during normal opening and closing of the door, so that the detents present little resistance to such movement of the door. At the same time, a relatively larger force is applied to the detents when they are engaged in openings in the track to hold the door open and maximum holding force is desired.

While one embodiment of the invention has been shown and described, it will be appreciated that this is for the purpose of explanation and illustration, and that changes and modifications may be made therein without departing from the spirit and scope of the invention. It will also be appreciated that the holder may be assembled to the door and door frame in a reversed position from that shown in the drawings, in which the track 10 would be secured to the door D and the closer C mounted in the door frame F.

I now claim:

1. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between opened and closed positions, a spring presesd detent mounted on the slider and engaging said track member as the slider moves on said track member, said detent moving into an opening in said track member to hold the slider yieldingly against movement relatively to said track member, a control member in lost motion relation to the slider and frictionally engaging the track member, a part of said control member engageable by said spring pressed detent to cause said control member to be moved with said slider and detent while holding said detent against holding entry into said opening, said detent entering said opeing upon relief of pressure between said detent and said control member incidental to reversal of the direction of movement of said slider.

2. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between closed and opened positions, a spring pressed detent mounted on said slider and rolling on the track member as said slider moves on said track member, said detent moving into an opening in said track member to hold the slider yieldingly against movement relatively to said track member, a control member in lost motion relation to the slider and frictionally engaging the track member, parts on said control member engaged by said spring pressed detent after predetermined lost motion of said slider relatively to said control member in either direction of movement of said slider whereby said control member is moved with said slider after said lost motion while said detent is held against entry into said opening by said control member, said detent entering said opening upon relief of pressure between said detent and said control member incidental to reversal of the direction of movement of said slider.

3. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between closed and opened positions, a spring pressed roller mounted on the slider and rolling on the track member as said slider moves on said track member, said roller moving into an opening in said track member to hold the slider yieldingly against move-

ment relatively to said track member, a control member in lost motion relation to the slider and frictionally engaging the track member, a part on said control member engaged by said spring pressed roller to cause said control member to be moved with said slider and roller while holding said roller against holding entry into said opening, said roller entering said opening upon relief of pressure between said roller and control member incidental to reversal of the direction of movement of said slider.

4. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between closed and opened positions, a spring pressed roller mounted on said slider and rolling on the track member as said slider moves on said track member, said roller moving into an opening in said track member to hold the slider yieldingly against movement relatively to said track member, a control member in lost motion relation to the slider and frictionally engaging the track member, parts on said control member engaged by said spring pressed roller after predetermined lost motion of said slider relatively to said control member in either direction of movement of said slider whereby said control member is moved with said slider after said lost motion while said roller is held against entry into said opening by said control member, said roller entering said opening upon relief of pressure between said roller and said control member incidental to reversal of the direction of movement of said slider.

5. In a door holder of the class described having a track member and a slider moving longitudinally on said track member as the door moves between closed and opened positions, a detent mounted for projecting and retracting movement relatively to a side of said slider, a spring pressed cam coacting with the detent on said slider, a first cam surface on said cam pressing the detent with a relatively small force toward projected position so that said detent will engage with relatively light pressure on a surface of the track member as the slider moves on said track member, said surface of the track member having an opening into which the detent may be projected by said spring pressed cam, and a second cam surface on said cam pressing said detent rolling with a relatively strong force when the detent is projected into said opening so that the detent will hold the slider against movement and the door in a predetermined open position.

6. In a door holder of the class described having a track member and a slider moving longitudinally on said track member as the door moves between closed and opened position, a roller mounted for projecting and retracting movement relatively to a side of said slider, a spring pressed cam coacting with the roller on said slider, a first cam surface on said cam pressing the roller with a relatively small force toward projected position so that said roller will roll with relatively light pressure on a surface of the track member as the slider moves on said track member, said surface of the track member having an opening into which the roller may be projected by said spring pressed cam, and a second cam surface on said cam pressing said roller with a relatively strong force when the roller is projected into said opening so that the roller will hold the slider against movement and the door in a predetermined open position.

7. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between opened and closed positions, a spring pressed detent mounted on the slider and engaging said track member as the slider moves on said track member, a plurality of longitudinally spaced openings in said track member into which said detent may move to hold the slider yieldingly against movement relatively to said track member, a control member in lost motion relation to the slider and frictionally engaging the track member, a part of said control member engaged by said spring pressed detent to be moved with said slider and detent while holding said detent against holding entry into said openings, said detent entering into one of said openings upon relief of pressure between said detent and said control member incidental to reversal of the direction of movement of said slider.

8. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between the closed and opened positions, a detent mounted for projecting and retracted movement relatively to a side of said slider, a spring pressed cam coacting with said detent on said slider, a first cam surface on said cam pressing said detent with a relatively small force toward projected position so that said detent will engage with relatively light pressure a surface of the track member as the slider moves on said track member, said surface of the said track member having an opening into which said detent may be projected by said spring pressed cam, a second cam surface on said cam pressing said detent with a relatively strong force when said detent is projected into said opening so that said detent will hold the slider against movement and the door in a predetermined open position, a control member in lost motion relation to the slider and frictionally engaging the track member, a part of said control member engageable by said detent to cause said control member to move with said slider and detent while holding said detent against holding entry into said opening, said detent entering said opening upon relief of pressure between said detent and said control member incidental to reversal of the direction of movement of said slider.

9. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between the opened and closed positions, a pair of detents mounted for projecting and retracted movement relatively to opposite sides of said slider, a spring pressed cam coacting with both said detents on said slider, first cam surfaces on said cam pressing both said detents with a relatively small force toward projected positions so that said detents will engage with relative light pressure surfaces of the track member as the slider moves on said track member, said surfaces of the said track member having openings into which said detents may be projected by said spring pressed cam, second cam surfaces on said cam pressing both said detents with a relatively strong force when said detents are projected into said openings so that said detents will hold the slider against movement and the door in a predetermined open position, a control in lost motion relation to the slider and frictionally engaging the track member, parts of said control member engageable by both said detents to cause said control member to move with said slider and detents while holding said detents against holding entry into said openings, said detents entering said openings upon relief of pressure between said detents and said control member incidental to reversal of the direction of movement of said slider.

10. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between the closed and opened positions, a roller mounted for projecting and retracted movement relatively to a side of said slider, a spring pressed cam coacting with said roller on said slider, a first cam surface on said cam pressing said roller with a relatively small force toward projected position so that said roller will engage with relatively light pressure a surface of the track member as the slider moves on said track member, said surface of the said track member having an opening into which said roller may be projected by said spring pressed cam, a second cam surface on said cam pressing said roller with a relatively strong force when said roller is projected into said opening so that said roller will hold the slider against movement and the door in a predetermined open position, a control member in lost motion relation to the slider and frictionally engaging the track member, a part of said control member engageable by said roller to cause said

control member to move with said slider and roller while holding said roller against holding entry into said opening, said roller entering said opening upon relief of pressure between said roller and said control member incidental to reversal of direction of movement of said slider.

11. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between the opened and closed positions, a pair of rollers mounted for projecting and retracted movement relatively to opposite sides of said slider, a spring pressed cam coacting with both said rollers on said slider, first cam surfaces on said cam pressing both said rollers with a relatively small force toward projected positions so that said rollers will engage with relatively light pressure surfaces of the track member as the slider moves on said track member, said surfaces of the said track member having openings into which said rollers may be projected by said spring pressed cam, second cam surfaces on said cam pressing both said rollers with a relatively strong force when said rollers are projected into said openings so that said rollers will hold the slider against movement and the door in a predetermined open position, a control in lost motion relation to the slider and frictionally engaging the track member, parts of said control member engageable by both said rollers to cause said control member to move with said slider and rollers while holding said rollers against holding entry into said openings, said rollers entering said openings upon relief of pressure between said rollers and said control member incidental to reversal of the direction of movement of said slider.

12. In a door holder of the class described, a track member, a slider moving longitudinally on said track member as the door moves between the opened and closed positions, a pair of detent rollers mounted for projecting and retracted movement relatively to opposite sides of said

slider, a spring pressed cam coacting with both said detent rollers on said slider, first cam surfaces on said cam pressing both said detent rollers with a relatively small force toward projected positions so that both said detent rollers will engage with relatively light pressure surfaces of said track member as the slider moves on said track member, said surfaces of the said track member having a plurality of longitudinally spaced openings into which said detent rollers may be projected by said spring pressed cam, second cam surfaces on said cam pressing both said detent rollers with a relatively strong force when said detent rollers are projected into said openings so that both said detent rollers will hold the slider against movement and the door in a predetermined open position, a channel shaped control member loosely mounted on said slider and having cut-away portions through which said detent rollers extend, spring legs on said control member frictionally engaging said track member, said cut-away portions being longer than the diameter of said detent rollers whereby a lost motion connection is provided between said slider and said control member, the ends of said cut-away portions being engageable by said detent rollers to cause said control member to move with said slider and detent rollers while holding said detent rollers against holding entry into said openings, said detent rollers entering said openings upon relief of pressure between said detent rollers and said control member incidental to reversal of the direction of movement of said slider.

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