United States Patent [19]

Miller

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[45] **Mar. 11, 1975**

[54] **LATCHES**

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[21] Appl. No.: **362,602**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 193,725, Oct. 29, 1971, abandoned.

[52] **U.S. Cl.** **292/37,** 292/170, 292/DIG. 46

[51] **Int. Cl.** **E05c 1/12**

[58] **Field of Search** ..... 292/2 B, 37–39, 292/42, 50, 140, 145, 147, 150, 152, 170, 171, 174, 175, DIG. 4L

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Attorney, Agent, or Firm—Grover A. Frater

[57] **ABSTRACT**

A latching structure for sliding doors and windows in which a sliding panel is movable from an "open" position adjacent a fixed panel to a "closed" position within or next to the frame of an opening. A blot carried by the sliding panel or the fixed one cooperates with a keeper on the other or on the track. The bolt is spring closed and is opened against the spring by remote actuating mechanism that includes a second bolt and keeper.

6 Claims, 21 Drawing Figures

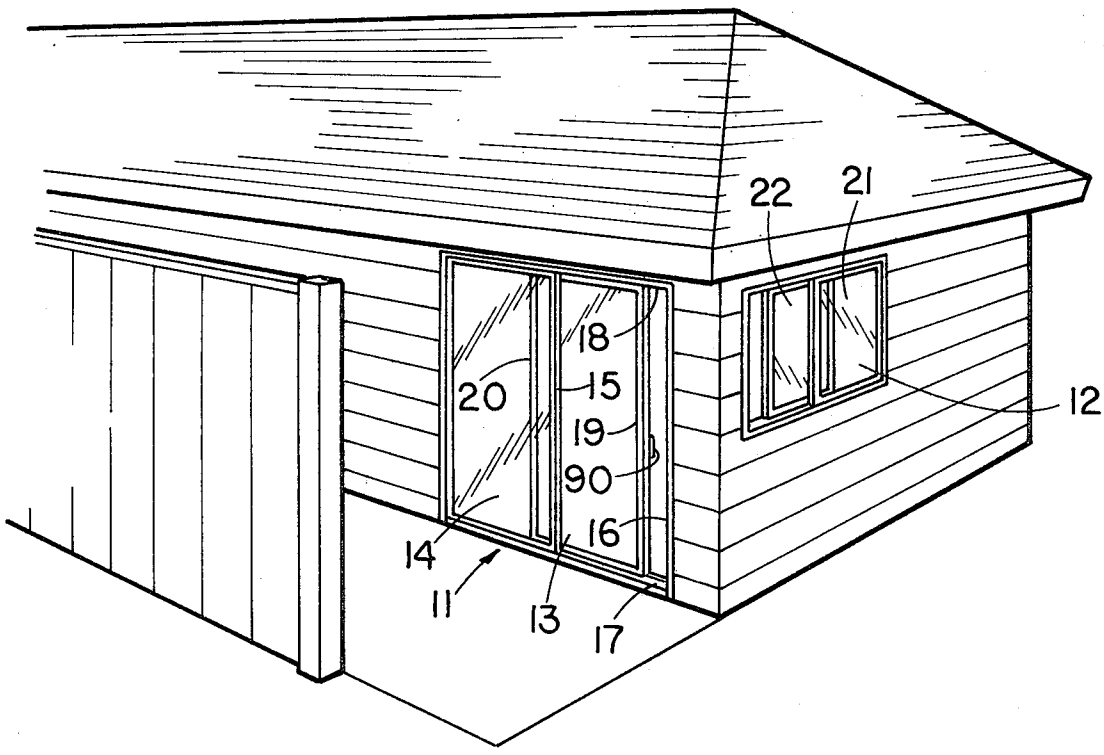


FIG 1

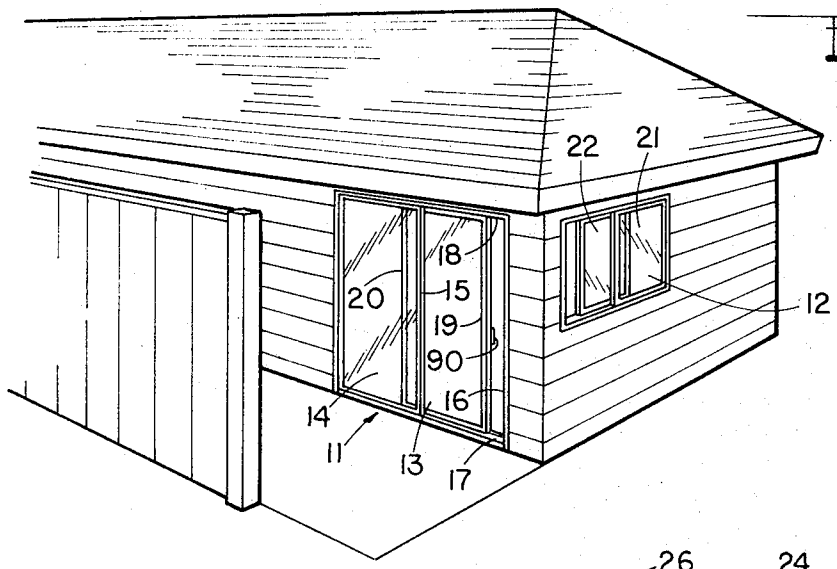
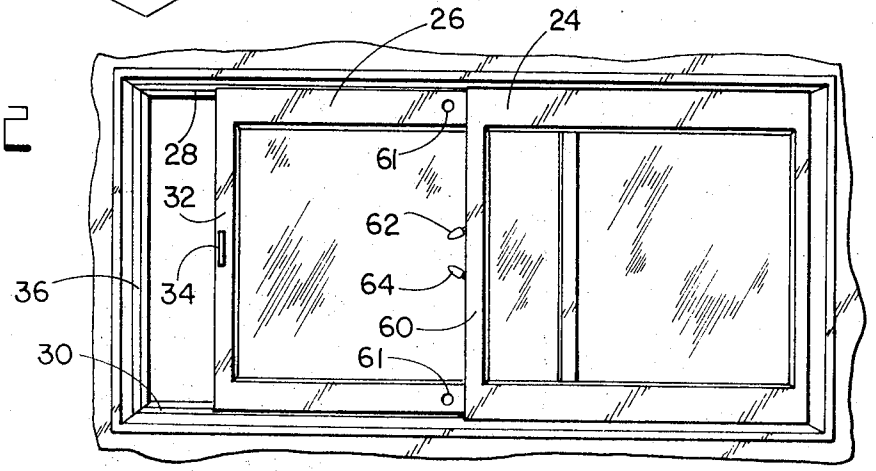


FIG 2



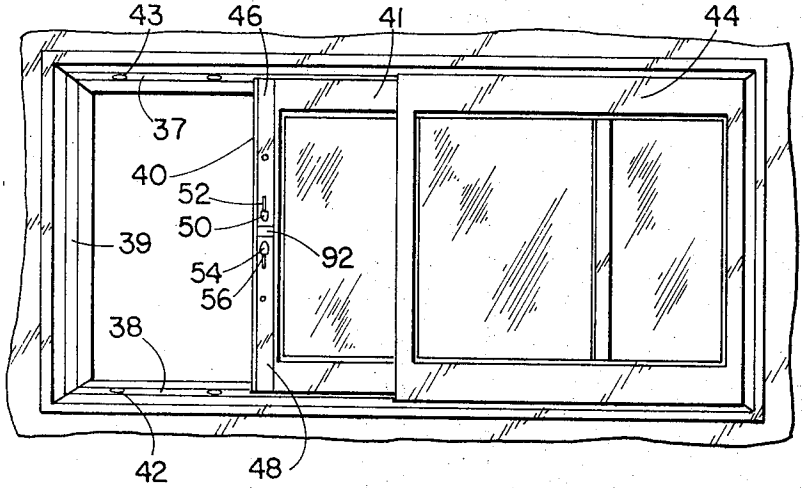


FIG 3

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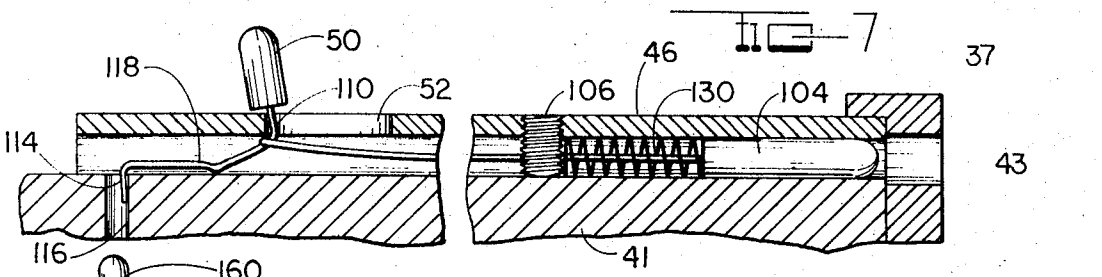


FIG. 7

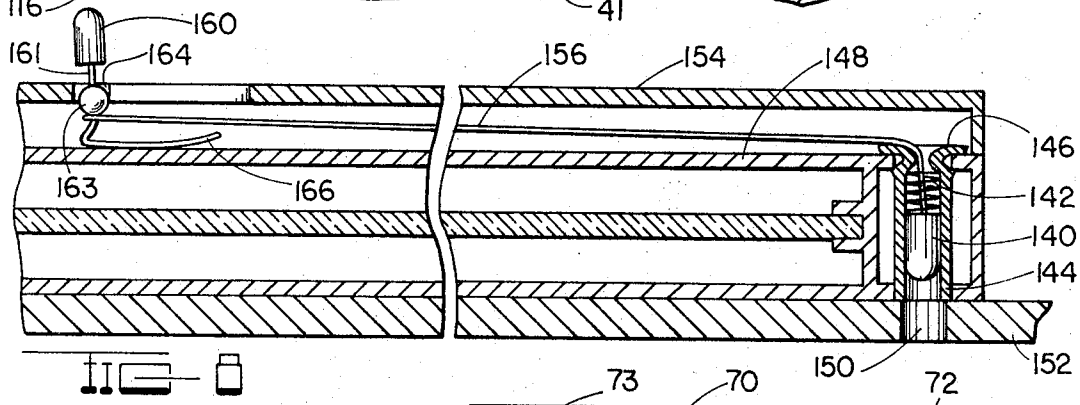


FIG. 8

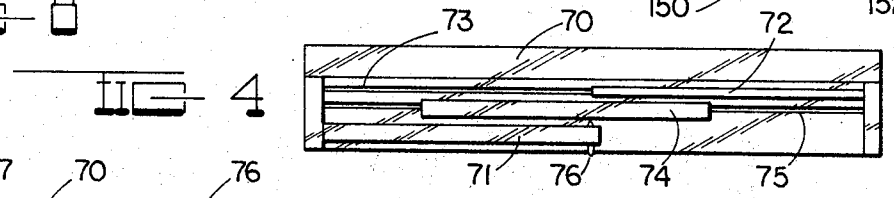


FIG. 4

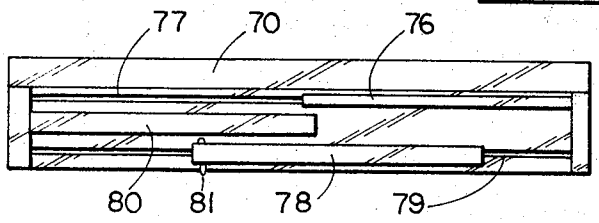


FIG. 5

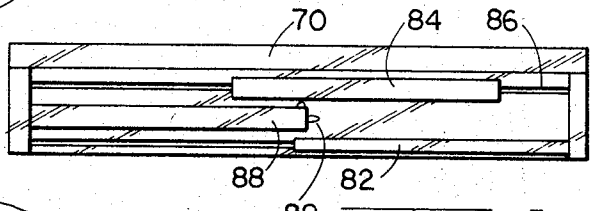


FIG. 6

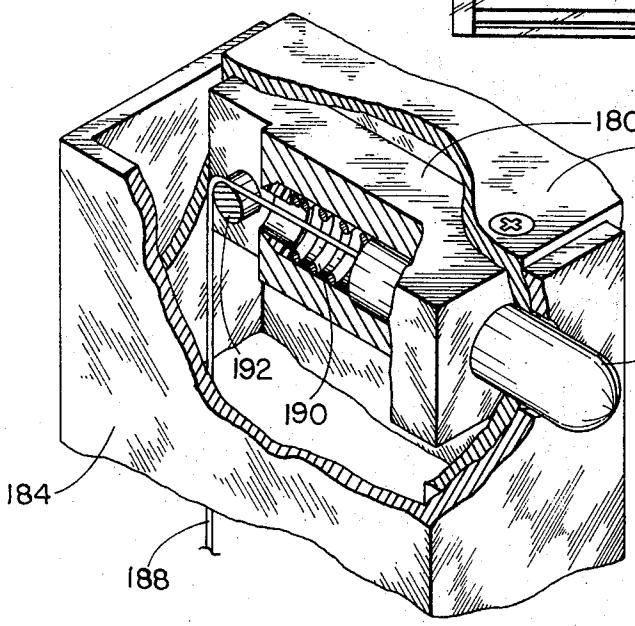


FIG. 9

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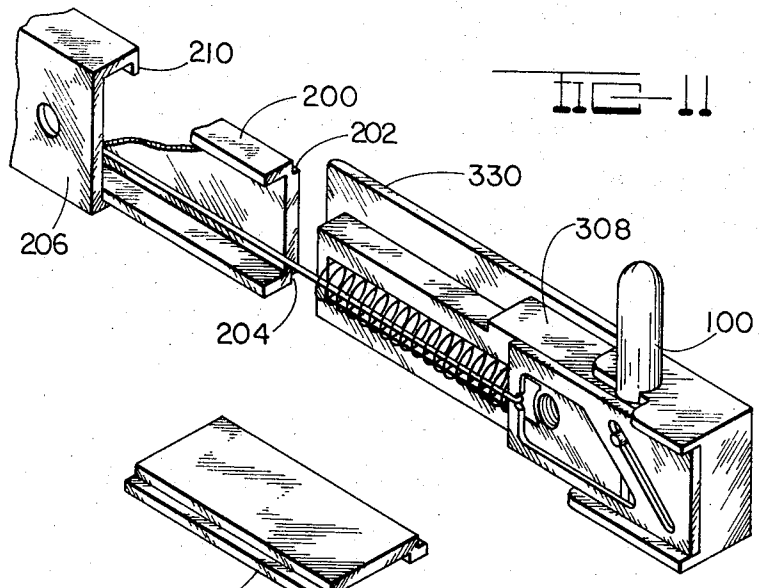


FIG. 11

FIG. 14

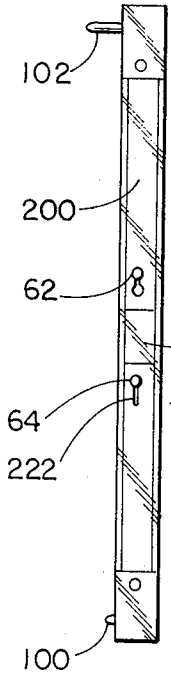


FIG. 10

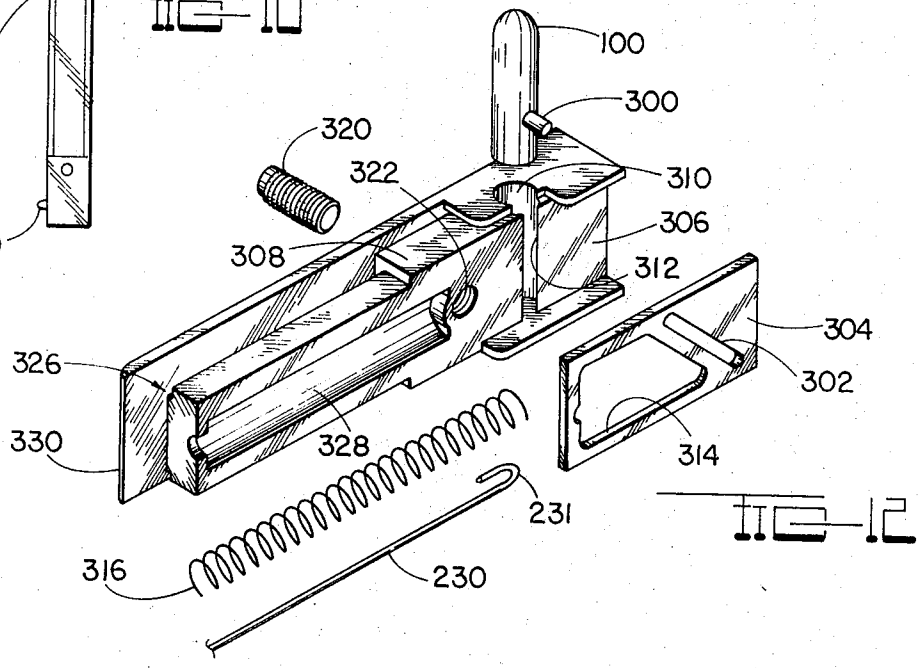


FIG. 12

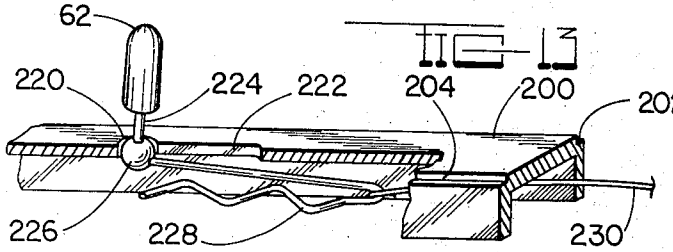


FIG. 13

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FIG.15

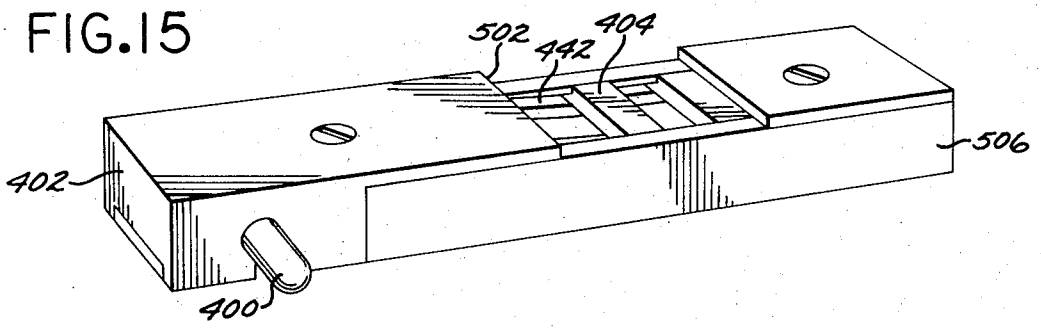


FIG.20

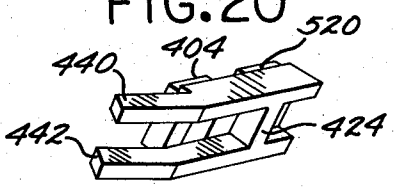


FIG.16

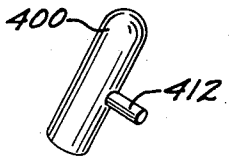


FIG.17

FIG.19

FIG.18

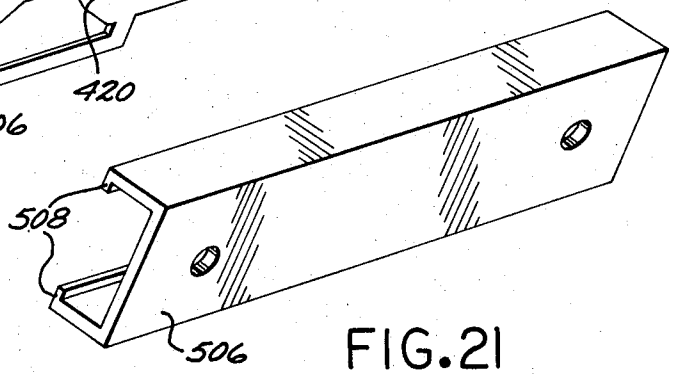


FIG.21

LATCHES

This is a continuation in-part of application Ser. No. 193,725 filed Oct. 29, 1971 and now abandoned.

This invention relates to improvements in latching structures by which to latch sliding doors and windows and other kinds of sliding closure members.

Sliding doors and windows and the like comprise a panel structure that can be moved from a "closed" position overlying or covering a door or window opening to a retracted or "open" position in which the door or window has been slid along a pair of tracks to a position overlying a stationary wall or other flat panel arrangement next to the door or window opening. That stationary wall or panel may be another window or a glass panel. Less often, it is actually a section of opaque wall. The basic structure is generally the same. The forward edge of the stationary panel serves as one side of the frame of the opening. The upper and lower sections of the opening frame include an upper and lower track and the fourth side of the opening is defined by another vertical frame member. Conventionally, the sliding door or window is provided with some kind of latch that interconnects the "forward" edge of the sliding door with that fourth section of the frame. The latch is usually combined with a handle which facilitates opening and closing the door. That association of the latch and handle is logical because it places the door or window operator right at the opening as the door or window is slid back. However, this placement of the latch works to the benefit of an intruder. A latch placed at the fourth section of the frame and forward edge of the door is readily accessible to the intruder who would violate it or force it open.

A latch placed at the opposite end of the door, or on the stationary panel over which the door slides when open or which is associated with the upper or lower track if at the forward edge of the door, is much more difficult for the intruder to open. In recognition of this fact, certain prior art devices have been provided for interlatching the door and the panel on the inward side. However, previous attempts to provide such a latch have been less than entirely satisfactory. In most applications it is not feasible to mount the door or window operating handle anywhere but near the forward edge of the door or window. The operator must place himself at that point to operate the handle and, in the case of the door, he must place himself at that point so that he can move through the opening. Manipulation of a latch on the fixed panel or at the other end of the door or window requires an additional effort. Unless the latching arrangement is easy to operate, it is likely not to be operated. It is likely to be left in the unlatched condition and its function is lost. Some of the prior art devices have been functionally adequate but they have gone unused apparently because they were a bother to operate.

It is an object of the invention to provide an improved latching structure for sliding doors and windows which are arranged for mounting such that they will be inaccessible to potential intruders and which are both simple and convenient to operate.

Another object is to provide a latching structure that has those attributes and which can be incorporated in new sliding door structures but which also can be incorporated in forms which can be readily added to existing sliding doors.

The basic structural arrangement of both doors and windows is essentially the same and, for the sake of clarity, the terms "door" and "door frame" and "stationary panel" are intended to describe not only doors and door frames and panels adjacent to doors per se but they are intended to designate windows and window frames and stationary window panels as well.

Some sliding door sets are arranged so that the sliding door tracks are at the outside of a building or other enclosure. In that case, the door is moved over the outside face of the stationary wall panel when retracted. In other installations, the sliding door track is at the inside of the building so that the sliding door overlies the inner side of the stationary panel when it is retracted. In the first case, the latching structure provided by the invention has its bolt mounted on the forward edge of the stationary panel. On the other hand, when the door is at the inside of the building, then the latching structure is arranged so that the bolt is carried by either the forward or the rearward edge of the door. In each case the keeper is formed in the other member. When the door is at the inside and the bolt is at the forward edge of the door, it is necessary to mount the keeper on the track. When the bolt is at the rear edge of the door the keeper may be mounted on the track or on the stationary panel. It is understood that the keeper may be no more than a hole in the track and, indeed, may be no more than a hole in the fixed panel or the door. However the bolt and keeper are mounted, the bolt moves laterally from either the door or the stationary panel into a keeper carried by the other so that the direction of bolt movement is substantially perpendicular to the direction of door movement.

Also in latching structures according to the invention, the primary latching bolt is associated with an actuating arrangement that includes a second bolt and keeper for latching the primary bolt out of its keeper.

In the drawings:

FIG. **1** is a pictorial view of a portion of a building which includes a sliding door set and a sliding window set;

FIGS. **2** and **3** are pictorial views of alternative forms of window sets embodying the invention and shown disposed in a fragment of a wall;

FIGS. **4, 5** and **6** are diagrams of common sliding door and sliding window arrangements;

FIGS. **7** and **8** are cross-sectional views of fragments of alternative forms of latching structures embodying the invention;

FIG. **9** is a pictorial enlargement, shown partially fragmented, of the end portion of another form of a latch structure embodying the invention;

FIG. **10** is a view in end elevation of a door which incorporates still another embodiment of the invention.

FIG. **11** is a partially exploded pictorial view of still another embodiment of the invention;

FIG. **12** is a pictorial view of part of the structure of FIG. **10,** shown more fully exploded;

FIG. **13** is a pictorial view of a fragment of the second bolt and keeper and second bias spring arrangement in the embodiment of FIG. **10** and **11**;

FIG. **14** is a pictorial view of a length adjustment plate that is employed in the embodiment of FIG. **10.**

FIG. **15** is pictorial view of still another embodiment of the invention; and

FIGS. 16, 17, 18, 19, 20 and 21 are pictorial views of the parts, other than the mounting screws, of the embodiment shown in FIG. 15.

In FIG. 1, the building 10 includes a sliding door set generally designated 11 and a sliding window set generally designated 12. The door set 11 includes a sliding glass door 13 and a panel 14 which, in this case, is transparent. Panel 14 is stationary. Its right edge 15 forms what is here termed the forward edge of the panel 14 and the rear frame member of the door opening. The forward frame member of the door opening is designated 16. The door is slidable in the lower track 17 and upper track 18 from a position in which its forward edge 19 abuts against the forward frame member 16, and in which the rear edge 20 of the door is even with the rear frame member 15 of the door opening, to a position in which the door is retracted to a position overlying the panel 14. When the door is fully retracted it lies parallel to the stationary panel. While it is not essential, it is almost the universal practice to make the door and panel areas substantially equal so the forward edge of the door 19 stands next to the forward edge of 15 of the panel 14 when the door is fully opened. In FIG. 1 the upper and lower tracks 17 and 18 are at the interior of the building 10 so that the door 13 is on the inside adjacent to the inside wall of panel 14 when the door is open. The window 12 is similarly arranged. The stationary panel 21 is at the outside and the sliding window pane 22 is at the inside of the building. This arrangement is sometimes reversed. The window set in FIG. 2 is shown as it appears from the inside of the building on which it is mounted. Panel 24 is stationary and the window 26 is movable. It moves in a pair of tracks, the upper one of which is numbered 28 and the lower of which is numbered 30. The forward edge 32 of the movable window panel is fitted with a handle 34 by which it is conveniently toward and away from the forward window frame member 36.

The construction in FIG. 3 is similar. Here the movable pane is on the outside. It moves back and forth in an upper track 37 and a lower track 38 toward and away from a forward window frame edge 39. Tracks 37 and 38 differ from tracks 28 and 30 of FIG. 2 in that they are drilled at spaced points along their length to form keepers for bolts which are incorporated in latch structures carried by the forward edge 40 of the movable window panel 41. Several keeper holes are visible. The two closest to the forward window frame edge 39 are designated 42 at the bottom and 43 at the top. In this case, no part of the latching structure is mounted on the fixed panel 44. Instead, the latch structure, except the keeper, is mounted at the forward frame member 40 of the movable window 41. Most of its parts are hidden from view.

Two separate structures are employed. The upper structure has a cover plate designated 46 whereas the lower blocking structure has a cover plate 48. Both latching structures include a main bolt which is not shown. The bolt is actuated by mechanism, a part of which is shown. The handle 50 operates the upper latching structure; it is formed integrally with a second bolt which cooperates with a second keeper, part of which is visible at 52. The handle 54 and keeper slot 56 are the corresponding parts of the lower latching structure. Operation of those handles latches and unlatches the main latching mechanism and they serve also to actuate that mechanism in a manner to be described below.

Returning to FIG. 2, in this case the latching structure is mounted on the forward frame member 60 of the stationary panel 24. Bolts incorporated in that latching structure cooperate with keepers (in this case small sleeves that are mounted in the upper and lower frame members of the movable window). Two of the keepers are visible in FIG. 2. They are numbered 61 and are employed when it is desired to latch the movable pane partly open. Other keepers, not visible in FIG. 2 because they are hidden behind the stationary panel 24, are engaged by the primary bolt when the window is latched completely shut. As in FIG. 3, the latching arrangement in FIG. 2 includes two separate latch structures. The handle 62 forms part of one of those structures and the handle 64 forms part of the other structure.

Sliding door and window sets often include screens. The screen is generally fixed in a window set but it is movable in a door set. Three door arrangements are shown in FIGS. 4, 5 and 6. In each case, there is a threshold, a portion 70 of which extends outside of the structure in which the door set is mounted. These diagrams are shown from the top looking down. In FIG. 4 the stationary panel 71 is at the inside. The region to the right of the panel is the door opening. The screen 72 is mounted at the outside and moves in track 73. The door 74 is movable between them on a track 75. In this arrangement it is preferred that the latching structure, including the bolt and the mechanism for actuating the bolt, be mounted on the wall panel 71 and that the keeper for the bolt be mounted on or formed in the door 74. The structure is so arranged although only the operating handle 76 is visible in FIG. 4.

In FIG. 5 the screen 76 is at the outside and reciprocates in a track 77. The door 78 is at the inside. It moves in a track 79. The fixed panel 80 lies between the door and the screen. In this case, the latching structure is mounted on the door. It can be mounted on the rear edge or the forward edge (or any other place for that matter) of the door when the bolt cooperates with the keepers in the track. When the keepers are carried by or mounted in the stationary panel 80, then the latching structure should be mounted as shown at the rearward edge of the door. The latter arrangement is employed in FIG. 5. The operating handle is visible and is designated 81.

The arrangement of FIG. 6 is less common. It has the sliding screen 82 at the inside and the movable door 84 at the outside where it moves in a track 86. In tis case, the latching structure is mounted on the stationary structure 88 which lies between the screen and the door. In this case, the operating handle 89 is mounted so that it is accessible at the forward edge of the stationary panel.

It is customary to incorporate a latch in the handle of sliding windows and doors. In FIG. 1 the door handle 90 will ordinarily include some kind of latch that fastens the forward edge 19 of the door to the forward frame member 16 of the door opening. This is not true in the invention. Of the several arrangements illustrated, only that shown in FIG. 3 envisions the use of a latching structure that is mounted on the forward edge of the door or window. However, the bolts that are incorporated in that latching structure do not cooperate with the forward edge 39 of the opening. Instead,

they cooperate with keepers formed in the upper and lower track. This arrangement has the advantage that the latch is at the place where the door operator must be when he closes the door from the inside. That location makes latching convenient and it is more likely to get done. This arrangement is difficult for the intruder to violate and it works well whether the sliding door or window panel is at the inside or the outside. It is an easy arrangement to design into the sliding panel at either end and it has the advantage that the bolt can move vertically so that the operating structure can have any of a wide variety of relatively simple forms.

Mounting the latching structure at the rear edge of the door or the forward edge of the stationary panel is somewhat less convenient but it provides a very high order of security. If the latching structure is mounted on the rear edge of the door, the bolts can extend into keepers in the track above and below the door or laterally into keepers carried by the stationary panel. In the case of a latch mounted on the stationary panel, the bolts must move laterally into keepers carried by the door. Each of these arrangements provides a high order of security; each of them is advantageous depending upon the construction of the track and stationary panel and depending upon whether the door is mounted inside or outside of the stationary panel.

The frame in which the latching structure is housed can have a variety of forms. It is entirely possible within the invention to employ only one latching structure but the use of two is preferred. Accordingly, the several embodiments illustrated in the drawings are arranged so that two locking structures can be employed. It is preferred that the frame extend substantially over the full height of the door or window that is to be latched. That frame can be built into the edge of a door or window or fixed panel. Alternatively, it can be a separate member, usually channel-shaped, which is attached to the edge of the door or window or fixed panel or is inserted in a recess formed in an edge of those members. In FIG. **3** the cover is divided into upper and lower sections **46** and **48** both to facilitate assembly and to accommodate variations in door and window height. In FIG. **3** the small plate **92** between the upper and lower section is a spacer. That spacer is one that is easily cut to shorter length or, alternatively, is one of several available lengths which make it possible to employ a standard part **46** and **48** for use with any of the heights in which doors are customarily manufactured.

A similar plate **94** is incorporated in the middle of the unit shown in FIG. **10.** This unit also includes separate upper and lower latching mechanisms. In FIG. **10** the upper mechanism is shown to be latched whereas the lower mechanism is shown to be unlatched. The unit of FIG. **10** is like the latching structure that is incorporated in the fixed panel **24** in FIG. **2.** While not visible in FIG. **2,** the left edge of the forward frame member **16** is channel-shaped and a unit like that shown in FIG. **10** is installed in that channel so that the bolts of its upper and lower latching structures move laterally from the retracted position which the lower bolt **100** is shown to occupy to an extended position that the upper bolt **102** is shown to occupy. FIGS. **11, 12** and **13** illustrate the construction of the lower latch structure. The upper one is the mirror image of the lower unit.

The latching structures employed in the apparatus of FIG. **3** includes a bolt that moves vertically up and down. The structure is relatively simple as illustrated in FIG. **7.** The upper track is at the right in that Figure and it is assumed that the window **41** has been moved to a position so that the bolt **104** is opposite the keeper hole **43.** The cover plate **46** is fixed to the window frame by any convenient means, not shown. The cover plate is itself a channel. The channel recess defines a part of a circle in cross-section so that the cylindrical bolt **104** is confined to movement in the direction of its axis. The bolt is cast over the end of a wire **108** which extends from the rear of the bolt along its axis through the recess of the cover to the region of the operating handle **50** where it is twisted around the wire stem **110** to which the handle **50** is attached. Stem **110** extends from the handle through elongate slot **52** into the recess of the cover **46** and rearwardly to a down-turned end **114.** The end **114** serves as a second bolt which cooperates with a second keeper in the form of an opening **116** formed in the frame of the window **41.** The stem **110** is bent at a point **118** along its length to form a fulcrum. If the handle **50** is pushed down in FIG. **7,** the wire stem **110** will pivot on the bend **118** to lift the bolt **114** out of the keeper **116** whereupon the handle **50** and its stem **110** will be urged upwardly in FIG. **3,** and to the right in FIG. **7,** by the bias spring **130.** That spring bears against the rearward or lower end of the latching bolt **104** and against a removable set screw that is threaded into an opening in the cover **46** and extends into the recess of the cover member. The bias spring **130** is trapped between the latching bolt **104** and the set screw **106.** That spring drives the latching bolt **104** into keeper **43** when the wire **108** is permitted to move by unlatching of the secondary latch comprising the second bolt **114** and the second keeper **116.**

An alternative version is shown in FIG. **8** where the latching bolt **140** and the bias spring **142** are housed in a tubular insert **144** which is staked at **146** to a door frame **148** so that the bolt can reciprocate laterally. It moves from the door into a keeper **150** formed in a panel structure, part **152** of which is shown in the drawing. In this case, a cover member **154** is fixed to the side of the frame **148.** A wire **156** is imbedded in the bolt **140** and extends through the bias spring **142** and over the staked region **146** to a connection with a second latch. The second latch incorporates a handle **160** and a stem **161** which has a size small enough so that it will fit within the elongated slot **162.** The stem **161** is connected to a ball **163** which is large enough to fit within an enlarged point **164** of the recess but which is too large to fit in slot **162.** If the handle is pushed inwardly so that the ball **163** is pushed clear of the cover **154,** then the stem **161** will be aligned with the slot and the assembly will be pulled to the right in FIG. **8** as the wire or cable **156** is pulled to the right as an incident to the bolt **140** being urged to extended position by spring **142.** A spring clip **166** fixed to the ball **163** serves to bias the ball **163** into the enlarged part **164** of the slot when the handle has been retracted sufficiently to align the ball with that enlarged part. Thus, like the unit in FIG. **7,** this latching structure incorporates a main latching bolt **144** which cooperates with the keeper **150** on another member. It incorporates a second latch comprising a second bolt and second keeper. The first bolt is held retracted against its bias by the second latch which is held in latched position by its own bias spring. To release the main latching bolt to accomplish its latching function by engagement with the primary

keeper, the second latch is unlatched against the bias of its bias spring.

The unit in FIG. 9 is similar to that shown in FIG. 8 with the exception that the frame structure is slightly different. Here a bolt and spring assembly which includes a small housing 180 is mounted within a cover member 182 and the latter is inserted in a channel-shaped frame 184. The bolt 186 must be retracted to permit assembly of the cover with the U-shaped frame. That is accomplished by pulling on the flexible wire 188. the wire is secured at one end to the bolt. It extends through the bias spring 190 and over a pin 192 down to a handle and second latch structure which is not shown but could be similar to that illustrated in FIG. 7 or FIG. 8, or to the handle structure illustrated in FIG. 13.

In FIG. 13 the element 200 is called the upper cover plate. It is notched along its length at 202 and 204 so that it can be inserted into the frame channel 206 in back of a pair of lips formed at the front of the channel. One of those lips is visible in FIG. 11 where it is designated 210. As best shown in FIG. 10 and FIG. 13, the cover is slotted near one end. That slot includes a circular portion 220 and an elongate portion of lesser width at 222. The handle 62 is mounted on a stem 224 which is imbedded in a ball 226. The ball serves as the second bolt. The ball has diameter to fit within the slot opening 220 but its width is greater than the width of the elongated portion 222 of the slot. Extending from the lower end of the ball is a hairpin spring 228. The spring is zigzagged so that it is prevented from twisting and maintains proper orientation when assembled. That orientation is one in which the handle 62 and the bolt 226 are forced upwardly so that the bolt 226 will move into the opening 220 when it is aligned with it. The hairpin spring is connected to a flexible wire 230 which extends away from the second latch assembly in the same direction as the elongated narrow portion 222 of the slot extends away from the circular portion 220. A bias spring will pull that flexible wire 230 to the right in FIG. 13 if the handle 62 is depressed so that the bolt 226 is freed from its keeper 220 and the assembly is permitted to move forward as the stem 224 moves through the slot 222. To relatch this secondary latch, the handle is retracted to the left until the bolt 226 is opposite the keeper opening 220 and at that time the spring 228 will urge the bolt into the keeper.

Referring to FIG. 12, the primary latching bolt 100 is associated with a means by which it is retracted when the handle 62 is retracted and so that it is permitted to extend when the handle 62 is depressed and the second latching mechanism moves to the right. The preferred means for accomplishing that is shown in FIG. 12. A pin 300 extends laterally from the bolt 100. That pin acts as a cam follower in cooperation with a cam that is formed as a slot 302 in a plate 304. The plate slides over the face 306 of a frame base 308 which, in this case, is a die-cast member that includes a lateral bore 310 in which the bolt 100 is reciprocally movable. That bore 310 is centered so that its wall intersects the surface 306 to form a channel 312 through which the cam follower pin 300 extends. When the plate 304 is placed against the surface 306 that pin 300 extends through the cam slot 302. It will be apparent that as the plat 304 is moved back and forth longitudinally of surface 306, the bolt 100 will be extended and retracted.

The larger opening 314 of the plate has any convenient shape. It serves two purposes. Most importantly it permits the flexible wire 230 to be hooked over and connected to the plate at its end hood 231 after having been threaded through the coiled compression spring 316. The opening 314 also accommodates a set screw 320 which is threaded into the opening 322, extends through opening 314 and seats against the channel 206 when the unit is fully assembled. Conformations or slots in the die-cast part 308, at the point marked 326 in the drawings, accommodate the lips, including lip 210, of the frame channel.

When the unit is assembled, the flexible wire 130 is inserted through the center opening of the compression spring 316. The hook 231 is then hooked ove the end of the plate 304. The plate is assembled flat against the surface 306 and the compression spring is lodged in the semi-cylindrical recess 328 of the die-cast member. Except that the set screw has not been inserted, this subassembly is shown complete in FIG. 11. Assembly is completed by completing insertion of the cover plate 200 into the U'shaped frame 206 and then by fitting the die-cast base member on the end of the channel frame. The second latch and handle assembly is mounted on the cover plate 200 as illustrated in FIG. 13 so assembly is simply a matter of slipping the elements 200 and 308 into the frame channel 206.

The base member 308 has preferred form in the drawings. It includes the transverse slot in which the bolt slides, a longitudinal slot in which the camming member can move in response to handle movement to retract it, a slot or cutout to hold the bias spring for the main bolt, conformations which permit it to be assembled on the main frame, and it even includes a forward section 330 which serves as a trim piece.

In the several embodiments heretofore described, the manual operating means has been a handle which extends from the latching structure. In every case the operation has been that the handle is operated to cock the spring so that the force of the spring is stored until the handle is actuated in the direction to accomplish latching. That releases the force of the spring to do the work of moving the bolt into the keeper opening. In the case of those embodiments in which the bolt is moved sidewardly in the direction perpendicular to the plane of the movable door or window panel, the structure has been arranged so that teh manual actuating mechanism must be moved in the plane of that movable panel to retract the bolt. Employing that arrangement makes it much more difficult for a burglar or prospective intruder to unlatch the mechanism with a tool that he might slide between the sliding and stationary panels. The embodiment shown In FIGS. 16 through 21 adds another degree of difficulty in accomplishing unlatching from the outside without effecting the operation, or the ease of that operation, from the inside.

Like the others, the embodiment of FIGS. 15 through 21 includes a bolt 400 which can be extended into a keeper hole or retracted from the hole. A means is provided by which that bolt may be confined to such movement and by which it may be secured to one of the panels of a door or window set. In this case that means comprises the body 402 of the unit. It will be understood, of course, that the body may form a part of the door or window frame itself.

Like the other embodiments, the embodiment of FIG. 15 through 21 includes a bolt actuating means for

moving the bolt into and out of the keeper hole. It includes a movable, manual operator and it includes a latching means for moving the bolt in response to movement of the manual oprator. As before, that movement is in a direction other than the direction in which the bolt moves. In this embodiment the bolt actuating means includes the manual operator **404** and a latching means in the form of a cam member **406** which is urged to action by a bias spring **408.** The cam surface of cam member **406** is formed by the diagonal slot **410.** The cam follower is the pin **412** which is fixed to and extends sidewardly from bolt **400.**

To assemble the unit, the bolt **400** is inserted into the bore **414** of body **402** so that the cam follower pin **412** extends through the slot **416.** The bottom face **418** of the body is recessed to form a slot in which the cam member **406** is slidable. That member is made of sheet material and is flat except that it has two ears extending perpendicular to the plane of the sheet. One of those ears is designated **420** and its function is to bear against one end, the left end in FIG. **19,** of the bias spring **408.** The other ear **422** hooks behind the crossbar **424** of the manual operator **404.** The cam member or plate **406** is placed in the slot against surface **418** of the body so that pin **412** extends through the slot **410.** Before placing the cam plate in place the spring **408** is inserted in the recess **430** of the body so that its right end bears against the end wall **423** of that recess or cavity. Thereafter, the cam plate is placed against the lower surface of the body with the left end of spring **408** trapped behind the ear **420.** Wall **432** comprises one wall of a divider that separates slot **430** from a similar slot **434.** However, whereas slot **430** is a recess in that it does not extend entirely through the body, the recess **434** is indeed a slot because the body is cut away or notched at **436** to accommodate the manual operator **404.** The ear **422** extends entirely through the slot **434** and hooks behind the crossbar or separator **424** at the lower side of the manual operator **404.**

That portion of the body **402** which lies between its left and right end has narrower width where width is defined as the direction parallel to the axis of movement of the bolt **400.** The manual operator **402** is formed with a pair of forwardly and upwardly extending legs **440** and **442.** These two legs are separated sufficiently so that they can straddle the walls of that part of the body that has been described as having narrower width. Thus, when the manual operator **404** is inserted into the cutout whose walls are numbered **436,** the manual operator may be moved to the left in the drawing so that the leg **440** overlies the surface **450** in FIG. **17** and the leg **442** underlies the opposite side wall **452.**

The spring **408** is sufficiently long so that when it is trapped between the ear **420** and wall **432** it urges the cam plate **406** in a leftward direction, in the drawings. Because the ear **422** rests behind or on the right side of the cross wall **424** of the manual operator in FIG. **20,** the effect of spring **408** is to urge the manual operator **404** to the left. The size of the parts and their dimensions are such that the bolt **400** is retracted by the cam plate **406** when ear **422** is pulled to the right by retraction of the manual operator **404** until its right end engages the face **500** of the body. To move the manual operator **404** to the right, pressure is applied to it at its upper surface which is provided with conformations for that purpose. The ear **402** does not extend much above the lower or inner surface of the manual operator **404.** Thus, the force by which the manual member is moved back is applied at a plane above the plane at which the ear **422** engages the manual operator and a force couple is developed which tends to rotate the manual operator **404** in a direction to raise the ears **440** and **442** so that they engage the rear surface of the upper wall **502** of the body. The perspective in the drawings is such that the rear surface of that upper face is not visible, although the edge on one side is visible and it will be apparent that when the legs **440** and **442** engage the rear surface of that face that the manual operator is prevented from leftward movement. The manual operator **404** is held in place by the covering shown in FIG. **21.** That covering is a channel-shaped member **506** whose side walls are provided with inwardly extending flanges **508.** Those flanges engage two grooves that are formed in the body **402.** There are two of those grooves, one on each side. One of them, groove **510,** is visible in FIG. **17** where it is divided into two sections by the cutout that forms walls **436** and **500.** The upper face of the manual operator **404** is notched at its opposite sides to receive the flange **508.** One of those notches, numbered **520,** is visible in FIG. **20.**

If it is assumed that the assembly is complete and that the manual operator **404** has been retracted to the left whereby its legs **440** and **442** are held behind the rear wall of face **502** acting as a stop, then the latch structure will be cocked and ready for release of the energy stored in the spring **208** to cause the bolts to move sidewardly from the body. It is necessary only to press down on the manual operator **404.** Doing that will force the ends of legs **440** and **442** from engagement with the stop. When they are lowered to clear the stop the manual operator is free to slide forward with its legs straddling the walls **450** and **452.** The spring **408** pushing against the ear **420** pushes the cam plate **406** to the left in the drawing. Ear **422** pulls the manual operator to the left and the cam slot **410** acting on the cam follower pin **412,** to force the bolt **400** to extended position.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art.

I claim:

1. For a sliding panel installation in which a door or window opening adjacent to a fixed wall or window panel is opened and closed by a sliding panel mounted for sliding movement in upper and lower tracks that extend alongside said fixed panel and across the opening, in combination:

a panel capable of being mounted in said tracks for movement between an open position in which it is disposed next to said fixed panel and a closed position in which it covers said opening and which has a rear portion disposed next to said fixed panel; and

a latching structure carried by one of said panels and including a bolt and means for actuating said bolt to and from a keeper opening on the other of said panels, said means for actuating said bolt comprising biasing means for biasing said bolt to extended position and retraction means responsive to forces applied remotely for retracting the bolt against said bias;

said means for actuating said bolt further comprising a cam in the fomr of a slotted member movable

from one position to another and a cam follower fixed to said bolt and positioned in the slot of said slotted member, said bias spring being mounted to move the cam follower toward a position in which said bolt is extended.

2. For a sliding panel installation in which a door or window opening adjacent to a fixed wall or window panel is opened and closed by a sliding panel mounted for sliding movement in upper and lower tracks that extend alongside said fixed panel and across the opening, in combination:

a panel capable of being mounted in said tracks for movement between an open position in which it is disposed next to said fixed panel and a closed position in which it covers said opening and which has a rear portion disposed next to said fixed panel;

a latching structure carried by one of said panels and including a bolt and means for actuating said bolt to and from a keeper opening on the other of said panels, said means for actuating said bolt comprising biasing means for biasing said bolt to extended position and retraction means responsive to forces applied remotely for retracting the bolt against said bias;

said means for actuating said bolt further comprising a cam in the form of a slotted member movable from one position to another and a cam follower fixed to said bolt and positioned in the slot of said slotted member, said bias spring being mounted to move the cam follower toward a position in which said bolt is extended;

a second latching structure, similar to said latching structure first mentioned, both of said latching structures being mounted on the movable panel;

said movable panel being formed with a recess extending along its rear edge, the cam and follower of one of said latching structures being mounted at the upper end of said recess and the cam and follower of the other of said latching structures being mounted at the lower end of said recess, a pair of plates arranged to cover an uppr length and a lower length of said slot, respectively, said cover sections having openings formed therethrough at their adjacent ends, and means disposed in each of said openings for retracting said cams against the bias of their respectively associated springs and for releasing said cams to the biasing action of their respectively associated springs.

3. The invention defined in claim **1** in which the bolt moves in a direction perpendicular to the direction in which said bias spring tends to move said retraction member.

4. The invention defined in claim **3** in which said latching structure further comprises a body on which said bolt and retraction means are carried and a latching means for latching the bolt in retracted position;

said latching means comprising a stop carried on said body, and an element retractable with said means for actuating the bolt for engaging said stop when said bolt is retracted and means comprising said means for biasing the bolt for biasing said element into engagement with said stop.

5. The invention defined in claim **4** in which said element is movable with said retraction means in a direction perpendicular to the direction of movement of said bolt and against the bias of said means for biasing said bolt.

6. The invention defined in claim **5** in which said bolt carries a pin projecting from its side;

in which said retraction means comprises a plate formed with a diagonal slot in which said pin is disposed;

in which said body is formed with guideways for confining said bolt to movement in a second direction generally perpendicular to the direction of movement of the plate;

in which said means for biasing the bolt comprises a compression spring disposed between said plate and said body;

said relation means further comprising a member connected to said plate and capable of movement in the second direction and in a direction perpendicular to that second direction;

said means for biasing the bolt being effective to bias said member in said direction perpendicular to that direction when said bolt is retracted, into engagement with said plate;

whereby said latching structure is latched open by the act of moving said member to retract said bolt.

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