April 16, 1963 H. S. CARLSTON 3,085,300

UNIDIRECTIONAL CONTROL MECHANISM FOR A SLIDING CLOSURE MEMBER

Filed Jan. 18, 1960

4 Sheets-Sheet 1

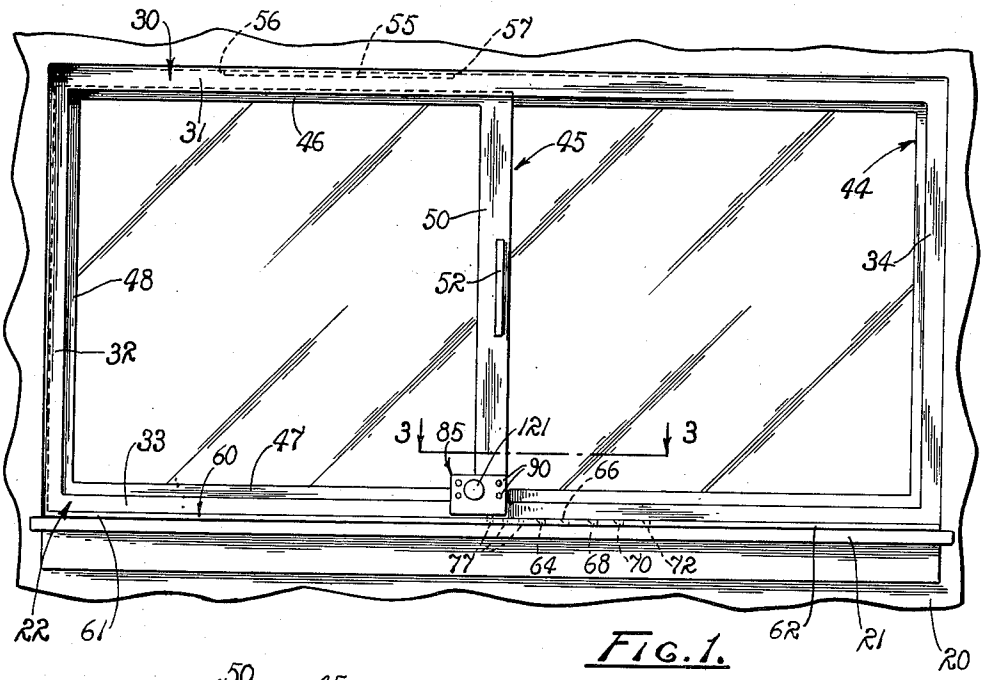


FIG. 1.

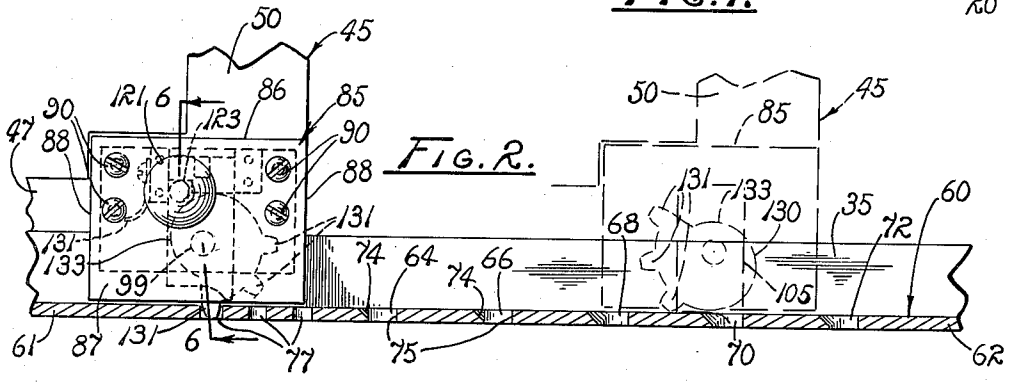


FIG. 2.

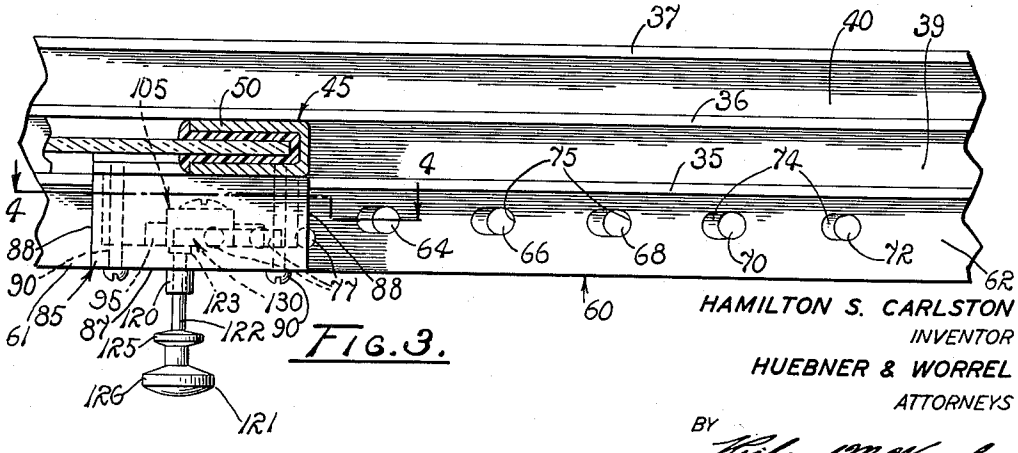


FIG. 3.

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4 Sheets-Sheet 2

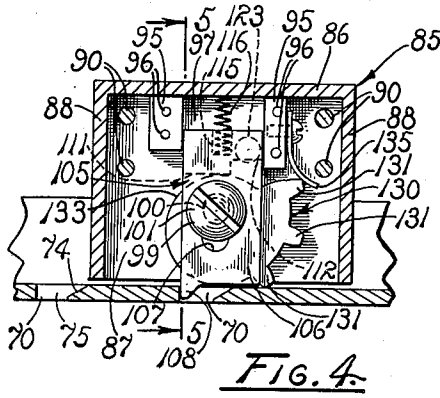


FIG. 4.

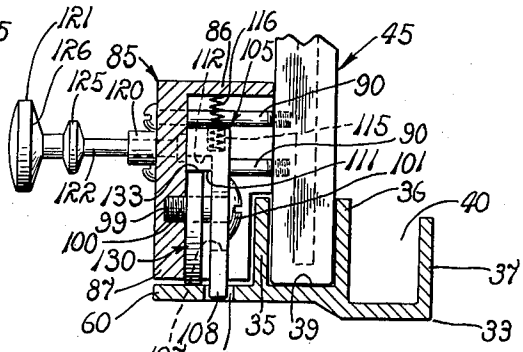


FIG. 5.

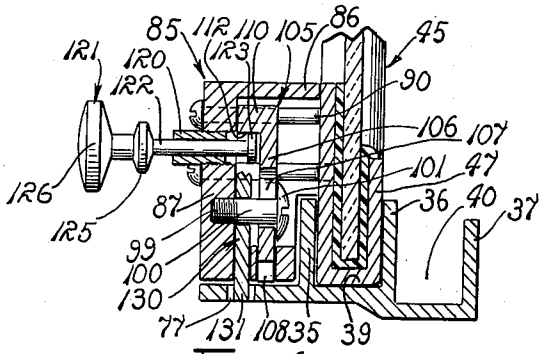


FIG. 6.

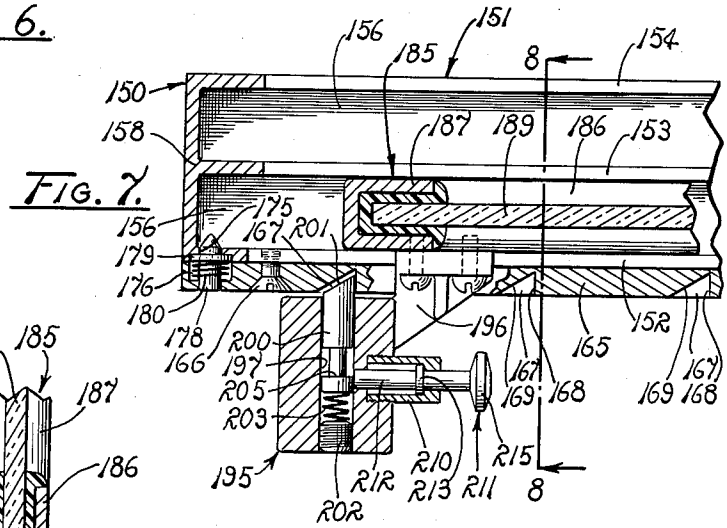


FIG. 7.

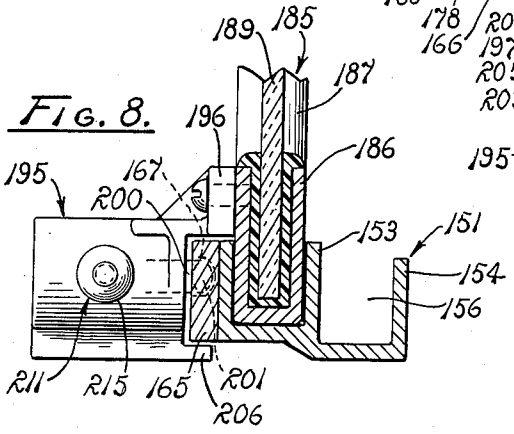


FIG. 8.

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4 Sheets-Sheet 3

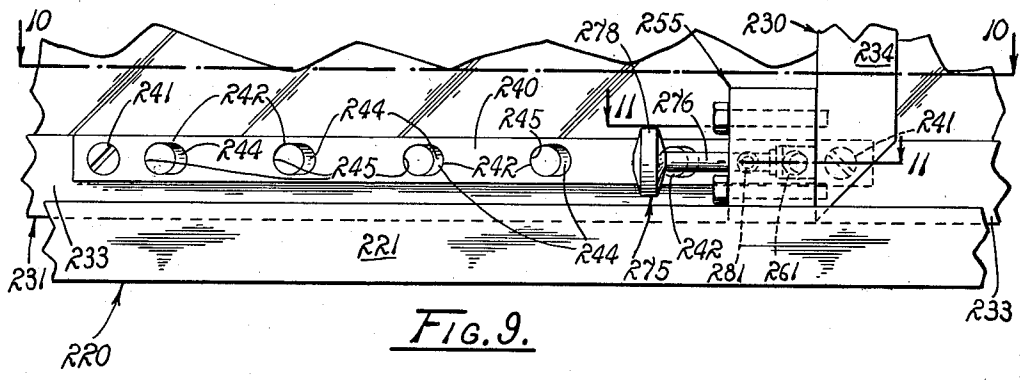


FIG. 9.

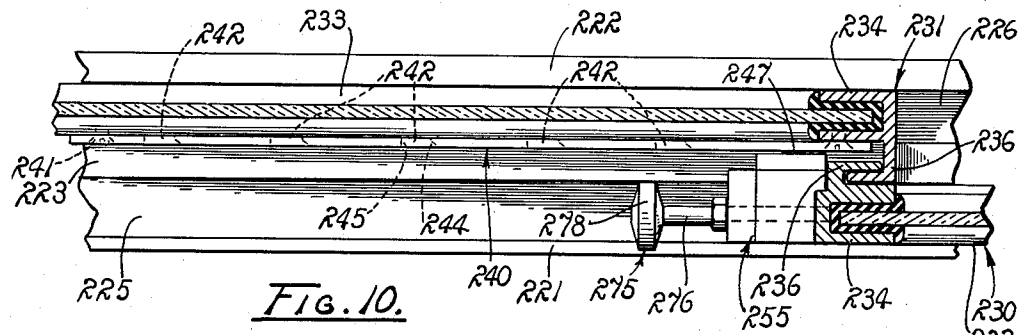


FIG. 10.

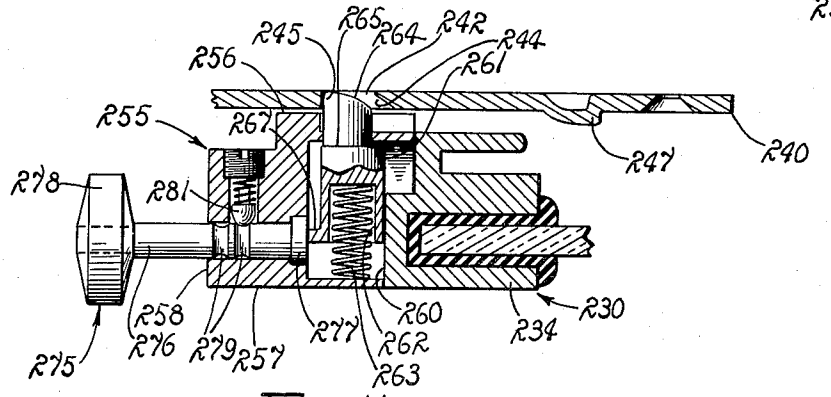


FIG. 11.

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UNIDIRECTIONAL CONTROL MECHANISM FOR A SLIDING CLOSURE MEMBER

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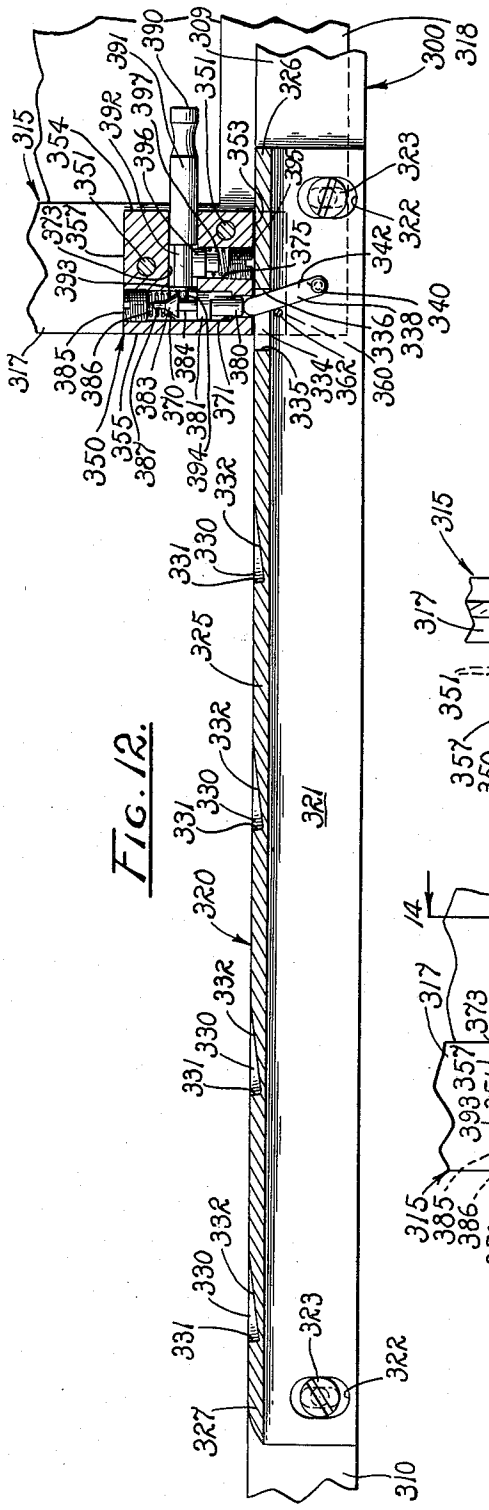


FIG. 12.

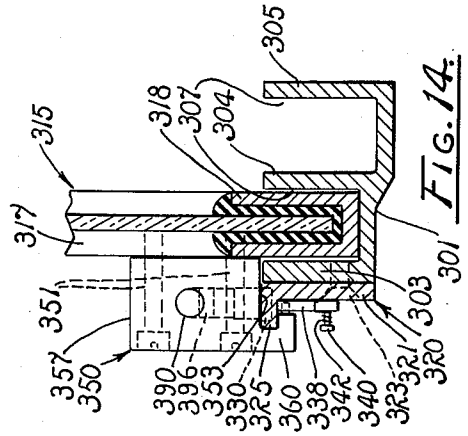


FIG. 14.

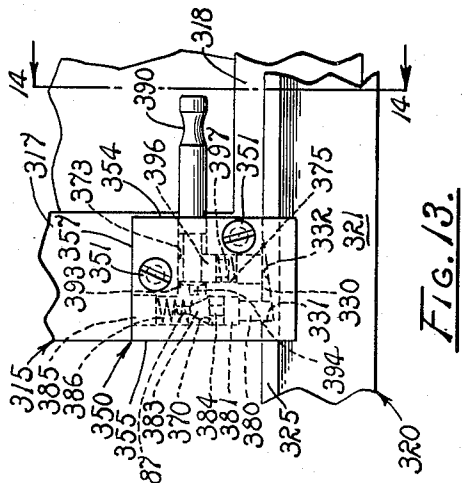


FIG. 13.

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United States Patent Office 3,085,300 Patented Apr. 16, 1963

3,085,300

UNIDIRECTIONAL CONTROL MECHANISM FOR A SLIDING CLOSURE MEMBER

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Filed Jan. 18, 1960, Ser. No. 2,879
20 Claims. (Cl. 20—52)

The present invention relates to a unidirectional control mechanism for a sliding closure member and more particularly to such a mechanism selectively operable in an open position of such a member to limit further opening of the member until after movement thereof into closed position.

The mechanism of the subject invention is especially adapted for sliding windows, doors, and like closures. For example, such a closure is typified by a rectangular, horizontally slidable window employing a metal sash. It is quite common to leave these, and other types of sliding windows, open at various times, to provide controlled extent of ventilation.

While such conventional slide windows or doors can be locked in closed position, when they are slightly ajar, they can usually be opened farther by manipulation from the outside. Thus, they afford a convenient means of entrance into a building by intruders. The essence of the subject invention resides in the provision of a closure control mechanism which precludes or inhibits unauthorized opening of closures with which it is associated but facilitates authorized opening and closing operations.

Accordingly, it is an object of the present invention to provide a unidirectional control mechanism for sliding closures, and the like.

Another object is to provide a closure control mechanism which is selectively operable to open and to close closure members but which precludes opening such closure members by other means when partially opened unless first moved to fully closed position.

Another object is to minimize the opportunities for unauthorized intrusion into buildings by external manipulation of closure members for the buildings.

Another object is to allow a sliding closure to be left partially open for ventilation purposes without fear that the closure will be further opened by an unauthorized intruder, such as a burglar, for gaining entrance to the building.

Another object is to provide a unidirectional control mechanism which is easily incorporated in conventional sliding closures of the type described.

Another object is to provide such a control mechanism which is adaptable for use with a sliding closure member, including both doors and windows, and irrespective of the attitude or orientation of such a member.

Another object is to preclude removal of a sliding sash from a frame for the sash when the sash is in a closed or partly closed position.

Another object is to enable removal of a sliding sash from a frame therefor when the sash is in predetermined open position.

Another object is to provide a unidirectional control mechanism of the character described which is simple and economical to make and use, dependable in action, durable in construction, and highly effective for accomplishing its intended purposes.

These, together with other objects, will become more fully apparent upon reference to the following description and accompanying drawings.

In the drawings:

FIG. 1 is a fragmentary side elevation of a building wall in which is mounted a sliding window having inner and outer sashes and incorporating a control mechanism embodying the principles of the present invention.

FIG. 2 is a fragmentary, somewhat enlarged, vertical longitudinal section of the window of FIG. 1, showing in full lines a side elevation of the subject mechanism with the inner sash in fully closed position, and showing in dashed lines a side elevation of said mechanism with the inner sash partially open.

FIG. 3 is a fragmentary, somewhat enlarged, horizontal section taken on line 3—3 of FIG. 1.

FIG. 4 is a fragmentary, longitudinal, vertical section taken on line 4—4 in FIG. 3.

FIG. 5 is a fragmentary, transverse, vertical section taken on a plane at a position represented by line 5—5 in FIG. 4 showing a latching pin in unlatched position.

FIG. 6 is a fragmentary, transverse vertical section taken on line 6—6 of FIG. 2 but showing the latching pin in latching position.

FIG. 7 is a horizontal, fragmentary section of a sliding window incorporating a unidirectional control mechanism embodying a second form of the present invention.

FIG. 8 is a transverse, fragmentary, vertical section taken on a plane at a position represented by line 8—8 in FIG. 7.

FIG. 9 is a fragmentary side elevation of a sliding window incorporating a unidirectional control mechanism embodying a third form of the present invention.

FIG. 10 is a fragmentary, horizontal section taken on line 10—10 in FIG. 9.

FIG. 11 is a somewhat enlarged, fragmentary, horizontal section taken on line 11—11 in FIG. 9.

FIG. 12 is a fragmentary, vertical longitudinal section of a window incorporating a fourth form of the subject invention.

FIG. 13 is a fragmentary side elevation of a portion of the structure illustrated in FIG. 12 and showing the sash of the window thereof in an open position.

FIG. 14 is a fragmentary, transverse section taken on line 14—14 in FIG. 13.

Referring more particularly to the drawings, a wall of a building is partially illustrated in FIG. 1 and is identified by the numeral 20. A sill 21 is connected to the wall and is outwardly extended therefrom into a room, not shown, of the building. The wall provides a window opening in which a sliding window, generally indicated by the numeral 22, is mounted.

The window 22 includes a substantially rectangular frame 30 of channel-shaped cross-section. The frame provides a longitudinal upper frame portion 31, a front transverse or side frame portion 32, a bottom longitudinal frame portion 33, and a back transverse or side frame portion 34. As seen in FIGS. 2 and 3, the frame includes inside, intermediate, and outside flanges, 35, 36 and 37 defining circumferentially extended inside and outside grooves 39 and 40.

The window 22 also provides outer and inner, rectangular sashes 44 and 45 individually fitted in the outside and inside grooves 40 and 39, respectively, of the frame 30. The inner sash provides spaced, parallel, upper and lower longitudinal sash portions 46 and 47 and spaced, parallel, vertical, front and back side or transverse sash portions 48 and 50 interconnecting the upper and lower sash portions. The inner sash is longitudinally slidable in the frame along a rectilinear path. A handle 52 is mounted on the inside flange 35 of the back sash portion for sliding the inner sash between a forward fully closed position with the front frame and sash portions in engagement, as viewed in FIG. 1, and a rear fully open position, not shown, but with the front sash portion 48 longitudinally spaced from the front frame portion 32 by a distance equal to the spacing between the back frame and sash portions 34 and 50 when the sash is in fully closed posi-

tion, as is believed evident and well-known in sliding windows of this type.

The inner sash 45 has a transverse dimension measured between the upper and lower sash portions 46 and 47 which is less than the transverse distance between the upper and lower frame portions 31 and 33. Therefore, limited movement of the inner sash transversely of the path of movement thereof is permitted within the frame. An elongated retaining plate 55 is connected to the upper frame portion 31 within the inside groove 39 and is extended longitudinally of the path of movement of the inner sash. The retaining plate has a forward end 56 which is in rearwardly spaced relation to the front frame portion 32 and a rear end 57 in forwardly spaced relation to the back sash portion 50 even when the inner sash is in its fully closed position, as shown in FIG. 1. It is evident, therefore, that the rear end of the retaining plate is also in forwardly spaced relation to the front sash portion 48 when the inner sash is in its fully open position, as described above. When the inner sash is in fully open position, it is removed from the frame 30 by lifting it upwardly within the frame until the lower sash portion 47 is above the bottom frame portion 33. The lower sash portion is then moved transversely outwardly of the frame to incline the inner sash with respect to the outer sash 44. In this manner the inner sash can be readily removed from the frame. However, when any part of the inner sash is underneath the retaining plate 55, the inner sash cannot be moved upwardly within the frame a sufficient distance to bring the lower sash portion above the bottom frame portion. Thus, when the front sash portion moves forwardly underneath the rear edge 57 of the retaining plate, the inner sash cannot be lifted out of the frame. It is only when the inner sash is moved into fully open position that the inner sash can be removed as described.

An elongated ratchet plate 60 is secured to the inside flange 35 of the bottom portion 33 of the window frame 30 and is extended outwardly therefrom in a substantially horizontal plane below the upper edge of the inside flange. The ratchet plate preferably extends the full length of the window and has opposite end portions 61 and 62 respectively adjacent to the opposite side portions 32 of the frame. The ratchet plate provides a plurality of longitudinally spaced, longitudinally aligned, locking notches 64, 66, 68, 70 and 72 positioned in a row intermediate the opposite end portions of the plate. Each locking notch has a forward upwardly inclined slant edge or ramp 74 and a rear vertical edge 75. Further, the ratchet plate includes a plurality of detent apertures 77 also positioned in a row in off-set relation to the row of locking notches. The detent apertures are in longitudinally spaced, aligned relation in their row. Further, the detent apertures are located in forwardly spaced relation to the forwardmost locking notch 64.

A generally rectangular housing 85 includes a top wall 86, and outer wall 87, and a pair of side walls 88 in spaced relation to each other and connected both to the top wall and to the outer wall. The housing is connected interiorly of the inner sash 45 at the intersection of the lower portion 47 and the back portion 50 at the lower-rear corner of the inner sash, as illustrated in FIGS. 1, 2, and 3. Preferably, elongated screws 90 are extended through the outer wall and into the back and lower portions of the sash thereby releasably but dependably mounting the housing on the inner sash. The housing has a downwardly disposed opening, best seen in FIG. 4, but the outer and side walls of the housing are in closely adjacent, upwardly spaced relation to the ratchet plate 60.

With particular reference to FIG. 4, a pair of blocks 95 are connected to the outer wall 87 within the housing 85 by screws 86. These blocks are in longitudinally spaced relation to each other, with respect to the path of motion of the sash 45, and define a vertically disposed channel 97. A guide bolt 99 includes a shank 100 screw-threaded in the outer wall of the housing and extended into the housing below the blocks in vertical alignment with the channel and has a head 101 in spaced relation to the outer wall of the housing.

A locking pawl 105 includes a pendent flange 106 having an elongated, longitudinally extended slot 107 therein longitudinally slidably fitted on the shank 100 of the guide bolt 99. The flange provides a locking tooth 108 downwardly extended therefrom. The locking pawl also has an upper shoulder 110 slidably fitted in the channel 97 and includes lower camming and latching surfaces 111 and 112 in elevationally offset relation to each other as well as being laterally outwardly extended from the flange 106. The camming and latching surfaces are also in upwardly spaced, substantially parallel relation to the ratchet plate 60. It is also to be noted that the pendent flange 106 and therefore the locking tooth 108 are in a common vertical plane, disposed longitudinally of the plate 60, with the locking notches 64, 66, 68, 70, and 72. The locking pawl is thus mounted for vertical movement between a retracted position with the tooth disengaged from the ratchet plate 60, as illustrated in FIGS. 2 and 6, and a locking position, as illustrated in FIGS. 4 and 5, with the locking tooth slidably engaging the plate and adapted to extend into the locking notches when the same are in individual vertical alignment with the tooth. The locking pawl has an upwardly opening bore 115, and a pawl depressing, compression spring 116 is fitted in the bore and bears against the top wall 86 of the housing 85 for resiliently, yieldably urging the pawl into its locking position. When the locking tooth is not in alignment with any one of the locking notches, the spring thus urges the tooth against the ratchet plate and the tooth simply slides over the plate during movement of the sash 45 longitudinally in the groove 39.

It is to be observed in dashed line in FIG. 2, for example, that when the locking pawl 105 is in locking position, and when the tooth 108 is in alignment with one of the locking notches, as 64, the rear vertical edge of the tooth in abutting the rear vertical edge 75 of the notch precludes rearward movement of the sash 45 toward the next adjacent notch 66. However, the locking tooth has a forward bevelled edge which slides over and upwardly along the forward slant edge 74 of each locking notch to permit movement of the sash toward closing position.

An elongated bushing sleeve 120 is connected in the outer wall 87 of the housing 85 in a vertical plane which intersects the latching surface 112 of the locking pawl 105 transversely of the grooves 39 and 40. The sleeve is substantially the same distance from the ratchet plate 60 as said latching surface when the pawl is in fully retracted position. A latch pin 121 includes an elongated shank 122 longitudinally slidably fitted in the sleeve, an inner head 123 connected to the shank and located within the housing, an intermediate disk 125 also connected to the shank but located outside of the housing, and an outer manipulating knob 126 connected to the shank in longitudinally endwardly spaced relation to the intermediate disk. The latch pin is slidable inwardly into an inner latched position when the pawl 105 is in fully retracted position to allow the inner head of the pin to extend underneath the latching surface 112. Thus, the latch pin holds the pawl in retracted position against the depressing urgency of the spring 116. The latch pin is also slidable outwardly into an unlatched position, as illustrated in FIG. 5, with the inner head against the sleeve and out from under the latching surface to permit the spring 116 to depress the pawl.

A camming wheel 130 is rotatably mounted on the shank 100 of the guide bolt 99 between the pawl 105 and the outer wall 87 of the housing 85, as best illustrated in FIGS. 4, 5, and 6. This wheel is located in a vertical plane disposed longitudinally of the plate 60 and passing through the detent apertures 77 in the ratchet plate. The camming wheel includes a plurality of circumferentially

spaced, substantially radially extended detents **131** individually adapted to fit into the detent apertures upon movement of the sash **45** into a position with the housing **85** over the detent apertures, in a manner to be explained. The wheel also has a camming edge **133** extended circumferentailly of the wheel, eccentrically of the shank **100**, and between the outermost detents **131**. This camming edge slidably engages the camming surface **111** of the upper shoulder **110** of the locking pawl **105** when the locking pawl is urged into its locking position by means of the spring **116**. The wheel is rotatable in opposite directions between angularly related releasing and retracting positions with the detents extended generally forwardly and rearwardly, respectively, as illustrated in FIG. 2. In the retracting position of the wheel, the camming edge holds the pawl upwardly in its fully retracted position while in the releasing position, the camming edge allows the spring to urge the pawl into its locking position. When the inner sash is in fully closed position, as viewed in FIG. 2, an endmost detent is extended into the forwardmost detent aperture **77**. The spacing between adjacent detents is related to the spacing between the detent apertures so that as said sash is opened, the intermediate detent fits into the intermediate detent aperture, and so on, so as to rotate the camming wheel in response to sliding movement of the sash. As the sash moves toward open position, therefore, the camming wheel gradually lowers the pawl **105** into its locking position. The detent last to fit into and emerge from the rearwardmost aperture slides along the ratchet plate **60** and is urged thereagainst by a cam depressing leaf spring **135** connected to the forward block **95** within the housing **85** and bearing against the uppermost detent in the releasing position of the wheel, as viewed in FIG. 4. The number and spacing of the apertures and detents can be varied, if desired, as long as there is a corresponding relation therebetween.

Operation

The operation of the described embodiment of the subject invention is believed to be readily apparent and is briefly summarized at this point.

Assuming that ventilation is desired through the window opening in the wall **20**, without the intrusion of unauthorized persons, the inner sash **45** is slid a slight distance to the right, as viewed in FIG. 1, so as to provide a space between the front sash portion **48** and the front frame portion **32**. The rear sash portion **50** might then be in a position such as is illustrated in dashed lines in FIG. 2. The opening provided is too small to permit an intruder to enter but is sufficient to provide ventilation. With the window in partially open position, as described, the latch pin **121** is pulled outwardly into unlatched position, as viewed in FIG. 5. This allows the spring **116** to urge the locking pawl **105** downwardly against the ratchet plate **60** into its locking position.

Continuing the assumption that the inner sash **45** is opened to the positon illustrated in dashed lines in FIG. 2, the spring **116** urges the locking tooth **108** into the locking notch **70**. Thereafter, further opening of said sash is precluded because of the engagement of the rear edge of the locking tooth with the rear vertical edge **75** of said locking notch. Since the space provided between the front sash portion **48** and the front frame portion **32**, even when the locking tooth is extended into the rearwardmost locking notch **72**, is inadequate to allow an intruder to pass therethrough, it is evident that the subject mechanism precludes unauthorized entry.

However, the sash **45** may be moved from the dashed line position of FIG. 2 toward fully closed position inasmuch as the forward edge of the locking tooth **108** can slide upwardly out of each locking notch **64**, **66**, **68** and **70** along the forward slant edge **74** of each notch. When the sash has been closed sufficiently to bring the downwardmost detent **131**, in the releasing position of the cam wheel **130**, into alignment with the rear detent aperture **77**, the cam wheel is turned in a counterclockwise direction, as viewed in FIG. 2. Subsequent fitting of the other detents into the successive apertures completes the movement of the camming wheel into pawl retracting position wherein the camming edge **133** raises the pawl out of engagement from the ratchet plate **60** and moves the latching surface **112** above the inner head **123** on the latch pin **121**. However, this does not occur until the sash is completely closed. Thereafter, the latch pin **121** can be moved inwardly into latched position with the inner head under the latching surface **112** to hold the locking pawl **105** in its retracted position and to allow the sash to be freely moved into any open position desired. While any one attempting entry through the partially open sash **45** could close the inner sash, such person could not thereafter move the latch pin into latched position because the pin is on the inside of the window. Therefore, mere closing of said sash is insufficient to release the locking mechanism. Unless the latch pin is thrust inwardly when the sash is fully closed, the locking tooth is still urged into the forwardmost notch upon opening of the sash.

Second Form

The second form of the subject invention is illustrated in FIGS. 7 and 8 and is embodied in a partially illustrated window frame **150** including a horizontal bottom portion **151** providing inside, intermediate, and outside flanges **152**, **153**, and **154**, which flanges provide elongated, longitudinally extended, inside and outside grooves **156**. An upstanding front transverse or side portion **158** of the frame is also illustrated.

An elongated ratchet plate **165** is mounted longitudinally on the inside flange **152** by means of screws **166** in transversely vertical position. As with the first form of the subject invention, this ratchet plate has a plurality of longitudinally spaced, longitudinally aligned locking notches **167** each of which has a rear edge **168** perpendicular to the inside flange and a forwardly outwardly extended slant edge **169** obliquely related to said inside flange.

The inside flange **152** of the frame **150** and the ratchet plate **165** adjacent to the front frame portion **158** respectively provide an opening **175** and a socket **176** in alignment with each other. A camming stud **178** is fitted in the opening and the socket for axial sliding movement transversely of the ratchet plate and inside flange between a retracted position extended into the inside groove and flush with the ratchet plate, as viewed in FIG. 7, and a camming position extended outwardly from the ratchet plate **165** and internally flush with the flange **152**, not shown but believed evident by reference to FIG. 7. A disk **179** is connected to the stud and engages the inside flange of the frame in the retracted position of the stud. A coiled compression spring **180** circumscribes the stud and bears against the disk and the ratchet plate for yieldably, resiliently urging the stud into said retracted position.

A window sash **185** is partially shown in FIGS. 7 and 8 and includes a lower portion **186**, and a front side or transverse portion **187**. The sash is slidable in the inside groove **156** of the frame **150** between a completely closed position with said front sash portion engaging the front frame portion **158** of the frame and a plurality of open positions wherein said side portions are spaced from each other, as illustrated in FIG. 7. The sash, of course, mounts a window pane **189**. It will be evident that when the camming stud **178** is extended into the inside groove **156** in retracted position, it is in the path of travel of the front side portion of the sash as it moves towards closed position.

A cylindrical housing **195** is rigidly mounted on the lower portion **186** of the sash **185** adjacent to the front portion **187** by means of a bracket **196**. The housing is supported in outwardly closely spaced relation to the ratchet plate **165** and has an elongated substantially concentric bore **197** substantially normal to the plate. The

bore opens at opposite ends of the housing and is alignable with the notches 167 upon longitudinal movement of the sash in the inside groove 156.

An elongated cylindrical locking pawl 200 is longitudinally slidably fitted in the bore 197 and has an inner forward, bevelled edge 201 obliquely related to the plate and adapted to extend individually into the notches 167 of the ratchet plate 165 when the bore is in alignment with such notches. The pawl also has a rear edge normal to the plate. Also, it is to be observed that the pawl and the stud 178 are in a substantially common horizontal plane. A plug 202 is screw-threaded in the outer end of the bore, and a coiled compression spring 203 is interposed the plug and the pawl for yieldably resiliently urging the pawl into a locking position in engagement with the ratchet plate when the pawl is not in alignment with one of the notches, or into such notches when such alignment exists. The pawl has an annular latching recess 205 intermediate its opposite ends, for a purpose to be described. Also, the housing 195 has a flange 206 extended under the ratchet plate to limit elevational adjustment of the sash 185 and to preclude its removal from the frame 151, in the manner described in connection with the inner sash 45, except by removing the screws 166.

An elongated bushing sleeve 210 is connected in the housing 195 and extends diametrically outwardly therefrom. A latch pin 211 is slidably mounted in the sleeve and includes a shank 212 adapted for extension transversely into the bore 197 of the housing. A disk 213 is connected to the shank for limiting outward movement of the pin by engagement with the sleeve, as illustrated in FIG. 7. The pin also has an outer knob 215 for convenience in adjustment of the pin. When the pawl 200 is in fully retracted position within the housing, the recess 205 is in alignment with the shank of the pin so that if the pin is moved inwardly of the sleeve, the shank fits into the recess and holds the pawl in a retracted position.

In the operation of the second form of the subject invention, the control mechanism may be actuated by pulling the latch pin 211 outwardly into an unlatched position thereby allowing the spring 203 to urge the pawl 200 into locking position in engagement with the ratchet plate 165. It will be evident that opening movement of the sash 185 is limited since upon alignment of the bore 197 and any one of the notches 167, the pawl 200 is urged into the notch whereby the rear edge of the pawl engages the rear edge 168 of the notch to preclude further opening movement of the sash. However, as before, closing movement of the sash is allowed because the bevelled edge 201 of the pawl slides over the slant edges 169 of the locking notches.

In order to release the pawl 200, it is necessary to move the sash 185 into completely closed position. When the sash is so moved, the front sash portion 187 engages the inwardly extending camming stud 178 and urges the same into its camming position. Simultaneously, the bore 197 is aligned with the stud so that the sash urges the stud into engagement with the pawl 200 and forces the pawl into retracted position into the housing 195. With the pawl in fully retracted position, the recess 205 is in alignment with the latch pin 211. By moving the latch pin into latched position, the pawl is held in retracted position, and the sash may be freely moved into any open position desired.

Third Form

The third form of the subject invention is illustrated in FIGS. 9, 10, and 11. A window frame is partially illustrated in FIGS. 9 and 10 and is identified generally by the number 220. This frame, as best illustrated in FIG. 10, includes transversely spaced inner, outer, and intermediate flanges 221, 222, and 223. As before, these flanges provide inner and outer grooves 225 and 226.

Inner and outer sashes 230 and 231, each having window panes 232, are individually slidably mounted in the inner and outer grooves 225 and 226, respectively. Each sash has a lower portion 233, and a rear vertical side portion 234. The adjacent side portions of the sashes have opposed L-shaped flanges 236 in interfitted engagement, as illustrated in FIG. 10, when both sashes are in fully closed positions in the window opening.

An elongated ratchet plate 240 is connected by means of screws 241 to the lower portion 233 of the outer sash 231 in a vertical position. The ratchet plate is, of course, on the inside of the sash and is extended longitudinally of the lower portion slightly above the upper edge of the flanges 221 and 223. This plate has a plurality of longitudinally spaced, longitudinally aligned, generally sawtoothed, locking notches 242 each of which has a rear slant edge 244 and a forward normal edge 245. Also, as best seen in FIGS. 10 and 11, the ratchet plate has a camming tongue 247 extended outwardly therefrom toward the inner sash 230 and adjacent to the L-shaped flange 236 on the side portion 234 of the outer sash. Otherwise stated, this tongue is in alignment with the notches in rearwardly spaced relation to the rearwardmost notch.

A housing 255 is secured to the rear portion 234 of the inner sash 230 and is slidably movable in the inner groove 225 along with the inner sash. The housing has a longitudinally extended inner wall 256, an outer wall 257, and a rear transverse wall 258 connecting the longitudinal walls.

The housing 255 provides a cavity 260 partially defined by the rear side portion 234 of the inner sash 230 and opening outwardly of the housing toward the ratchet plate 240. A generally cylindrical pawl 261 is slidably fitted in the cavity for movement transversely of the path of travel of the sash between a fully retracted position within the housing and a locking position extended outwardly of the housing into engagement with the ratchet plate or extension into the locking notches 242 depending on whether the pawl is in alignment with the notches or not, as is believed understood. The pawl has a endward bore 262, and a pawl depressing spring 263 bears against the outer wall 257 of the housing and extends into the bore yieldably, resiliently urging the pawl into locking position. The pawl also has a forward bevelled edge 264, a rear normal edge, an annular shoulder 265 adapted for engagement with the outer wall 257 of the housing to limit outward movement of the pawl in locking position, and a lug 267.

An elongated latching pin 275 includes a shank 276 slidably extended through the transverse wall 258 of the housing 255 and movable into the cavity 260. The pin also includes a head 277 connected to the shank, an outer manipulating knob 278, and a pair of axially spaced, annular recesses 279. A spring pressed detent 281 is provided in the housing for individual releasable reception in the recesses in the shank for holding the latch pin in either a fully unlatched position, as illustrated in FIG. 11, or a latched position, not shown, but described below.

In the operation of the third form of the subject invention, it is first assumed that the L-shaped flanges 236 are separated so that the inner and outer sashes 230 and 231 are respectively moved toward the left and right in FIG. 10. Thus, the sashes would both be in a partially open position. In order to actuate the locking mechanism of the third form of the invention, the latch pin 275 is pulled outwardly until the detent 281 engages the innermost recess 279. This frees the pawl 261 for movement into engagement with the ratchet plate 240.

When, for example, the sash 230 is moved to provide a wider opening at its respective side of the window, the pawl eventually aligns with one of the notches 242. Thereupon, the springs 263 press the pawl into the notch. Further opening movement of said sash 230 is

precluded because of abutment of the rear edge of the pawl with the forward edge 245 of the notch, as illustrated in FIG. 11. The other sash 231 could be opened a similar amount by completely closing the sash 230 but this would be of no aid to an intruder.

In order to release the pawl 261, it is necessary to close both the sashes 230 and 231 so that their L-shaped flanges 236 are once again interlocked, as illustrated in FIG. 10. Upon closing the sashes, the bevelled edge 264 of the pawl slides over the slant edges 244 of the notches 242. When the pawl engages the tongue 247 on the ratchet plate 240, the pawl is urged into retracted position in the housing 255. With the tongue still engaging the pawl, the latching pin 275 is moved into its latched position with the head 277 inwardly of the lug 267, toward the ratchet plate, so that the pawl is held in retracted position against the urgence of the spring 263. Thereafter, the sashes 230 and 231 may be opened or closed individually, as desired.

Fourth Form

With particular reference to FIGS. 12, 13, and 14, a window frame is illustrated and generally indicated by the numeral 300. Although only part of the frame is shown, it is to be understood that it is substantially rectangular like the frame 30 in the first form of the subject invention. Insofar as the fourth form is concerned, however, the frame therefor has a lower elongated, longitudinal frame portion 301 including inside, intermediate, and outside flanges 303, 304, and 305, with said flanges providing inside and outside grooves 307, as before. For purposes of reference, the lower portion of the frame has a front end portion 309 and a rear end portion 310.

A substantially rectangular sash 315 is fitted in the inside groove 307 of the frame 300 for longitudinal slidable movement therein and includes a back, upright transverse portion 317 and a bottom longitudinal portion 318. Once again, it is to be understood that the sash 315 is constructed like the sash 45 of the first form of the present invention. The sash is movable longitudinally of the frame between a fully closed position in the opening provided by the frame, as illustrated in FIG. 12, and a fully open position, not shown, but with the back sash portion rearwardly spaced from its position in FIG. 12.

An elongated ratchet plate 320 includes a vertical mounting flange 321 fitted against the inside flange 303 of the frame 300 and providing vertically extended, elliptical openings 322. Screws 323 are individually extended through the openings and into the frame for securing the ratchet plate to the frame. The plate also has a horizontal elongated flange 325 extended substantially perpendicularly outwardly from the inside flange of the frame and providing a forward end 326 and a rear end 327 respectively relatively adjacent to the front and rear ends 309 and 310 of the lower longitudinal portion 301 of the frame. It is also to be noted that the horizontal flange provides an upper surface which is smoothly, arcuately, downwardly curved at the rear end thereof.

The horizontal flange 325 is provided with a row of longitudinally spaced, saw-tooth, locking notches 330 in its upper surface, each notch having a rear upright edge 331 substantially normal to the upper surface of the horizontal flange and a forward slant edge 332 forwardly upwardly inclined from its respective upright edge. The horizontal flange also includes a forward elongated slot 334 longitudinally extended in the horizontal flange and having a rear edge 335 and a front edge 336. A camming arm 338 is pivotally mounted on the mounting flange 321 by means of a horizontal pivot member 340 for pivotal movement of the arm in a vertical plane. The arm is upwardly extended within the slot and is movable between a retracted position against the rear edge of the slot and a camming position toward the front edge of the slot. Although the arm is gravitationally urged into retracted position in the illustrated embodiment in FIG. 12, a coiled spring 342 can be provided on the pivot member in engagement with the arm for yieldably urging the arm into retracted position. For example, the coiled spring would be required if the sash 315 and thus the ratchet plate 320 were mounted in an upright position.

A housing 350 is secured to the back portion 317 of the sash 315 by means of bolts 351. The housing has a lower surface 353 in closely adjacent, opposed relation to the upper surface of the horizontal flange 325, front and rear vertical surfaces 354 and 355, and a top surface 357.

An L-shaped flange 360 is extended downwardly from the lower surface 353 of the housing 350 and thence horizontally inwardly toward the mounting flange 321 and under the horizontal flange 325 of the ratchet plate 320, as best illustrated in FIG. 14. While the lower surface of the housing and the L-shaped flange slidably receive the mounting flange therebetween, the L-shaped flange limits elevational or transverse movement of the sash 315 with respect to the frame 300, as will be understood more fully hereinafter. Further, a finger 362 is rigidly inwardly extended from the L-shaped flange toward the mounting flange and thus underneath the horizontal flange of the ratchet plate. The finger is movable with the sash in a longitudinal path which intersects the camming arm 338 so that when the sash is substantially in fully closed position, the finger engages the arm and urges the same in a clockwise direction from its retracted position into its camming position.

The housing 350 has a vertical bore 370 therein opening through the lower surface 353, in substantial alignment with the finger 362, and registrable with the slot 334 in the substantially fully closed position of the sash 315. The housing has an internal annular shoulder 371 circumscribing the vertical bore. The housing also provides a substantially horizontal bore 373 opening into the vertical bore and outwardly of the housing through the front surface 354. Furthermore, the housing provides an upright socket 375 offset from the vertical bore and opening into the horizontal bore.

A ratchet pawl 380 is longitudinally slidably fitted in the vertical bore 370 for movement between a locking position extended outwardly below the lower surface 353 of the housing 350 in engagement with the horizontal flange 325 of the ratchet plate 320, and a retracted position inwardly spaced in the bore from the lower surface of the housing. It is to be noted that the pawl has a collar 381 engaging the shoulder 371 in said locking position for limiting outward movement of the pawl relative to the housing. The pawl also has an inner, inwardly tapered, conical head 383 with the base of the head in longitudinally spaced relation to the collar and defining an annular recess 384 therebetween. A plug 358 is screw-threaded in the bore from the top surface 357, and a coiled compression spring 386 is interposed the plug and the head for yieldably urging the pawl into locking position. It is to be noted, however that the maximum diameter of the spring is substantially equal to the minimum diameter of the head so that the spring engages the head adjacent to its apex. A spring guiding stud 387 is endwardly concentrically extended from the apex of the head 383 and is positioned within the spring.

An elongated latch pin 390 has a major shank 391 axially slidably fitted in the horizontal bore 373, a minor shank 392 axially extended from the major shank in concentric, circumferentially spaced relation within the bore 373, an inner disk 393 connected to the minor shank in axially spaced relation to and of the same diameter as the major shank, and a camming peg 394 inwardly axially extended from the disk.

A screw 395 is threaded into the socket 375 from the lower surface 353 of the housing 350. A block 396 is also fitted in the socket for axial movement therein. A coiled compression spring 397 is interposed the block and the screw for yieldably urging the block into the horizontal bore between the major shank 391 and the disk and

into engagement with the minor shank 392 of the latch pin 390. When the pawl 380 is in fully retracted position, so that the recess 384 is in alignment with the horizontal bore 373, the latch pin is movable between a latching position, with the peg 394 extended into the recess between the head 383 and the collar 381, as viewed in FIG. 12, and a retracted position with the peg laterally outwardly spaced from the base of the head, as viewed in FIG. 13. In the latching position, the peg is engageable with the base of the head and precludes movement of the pawl into locking position. Engagement of the disk with the block precludes removal of the pin from the horizontal bore in the retracted position of the pin.

In order to actuate the latching mechanism, the latch pin 390 is pulled outwardly into its retracted position, illustrated in FIG. 13. This allows the spring 386 yieldably to urge the pawl 380 downwardly into engagement with the flange 325. In this intermediate position of the pawl, referred to hereinafter, the peg 394 is opposite to the head 383 between its apex and base and also between said base and the spring. Therefore, if the sash 315 is moved rearwardly into open position, and the pawl is aligned with one of the locking notches 330, as illustrated in FIG. 13, the pawl is extended downwardly into the notch and into engagement with the rear upright edge 331. This precludes further opening of the sash, in the same manner as described in connection with the other forms of the present invention. However, as before, the sash can be moved toward closed position since the pawl simply rides upwardly along the inclined edge or edges 332 onto the upper surface of the mounting flange. If the peg happens to be in engagement with the side of the head, it does not resist movement of the pawl into locking position and, in fact, pressure applied axially inwardly on the pin tends to urge the pawl into locking position because of camming engagement of the peg with the head.

As the sash 315 approaches fully closed position, the finger 362 engages the arm 338 and pivots the same upwardly into camming position. Simultaneously therewith, the vertical bore 370 is brought into registration with the slot 334 so that the arm is extended upwardly into engagement with the pawl to force the same into retracted position. It is to be understood that the arm extends upwardly into the vertical bore, as illustrated in FIG. 12, to press the pawl inwardly of the lower surface 353 of the housing 350 and to bring the recess 384 into alignment with the horizontal bore 373. Of course, to retain the pawl in retracted position, the latch pin 390 is then pressed inwardly into its latching position, as illustrated in FIG. 12. Thereafter, the sash can be moved into any open position desired.

While it is described above that the latch pin 390 is moved into retracted position in the fully closed position of the sash 315, it is evident that said latch pin can be retracted in any open position of the sash. If the latch pin is retracted when the vertical bore 370 is rearwardly spaced from the rear end 327 of the ratchet plate 320, the pawl 380 is, of course, moved downwardly into its locking position. Upon subsequent movement of the sash toward closed position, the pawl rides upwardly over the rear rounded off edge 327 of the horizontal flange 325 and onto the upper surface thereof. As soon as the pawl aligns with the rearwardmost locking notch 330, it is urged downwardly thereinto for locking the sash against movement rearwardly of such position.

The advantage of the fourth form of the subject invention is that it prevents picking of the latching mechanism by insertion of a thin blade, or other member, not shown, between the lower surface 353 of the housing 350 and the mounting flange 321 thereby to press the pawl 380 upwardly into the housing in an effort to bring the recess 384 into alignment with the horizontal bore 373. That is, even if such a thin member were so inserted, it would be ineffective to push the pawl inwardly of the lower surface of the housing. It is of course understood that such inward movement of the pawl is necessary to bring the recess into alignment with the bore and thereby to allow latching insertion of the latch pin 390. Also, assuming the pawl is in said intermediate position spring-urged into engagement with the flange 325 and is between a pair of adjacent notches 330, and thus the window is open, an intruder cannot hold the pawl in said intermediate position by reaching through the opening and pressing in on the pin. Such pressing would tend to cam the pawl into locking position, as explained above, so that it would be forced into a notch upon alignment therewith.

The fourth form of the present invention also incorporates means for controlling removal of the sash 315 from the frame 300. Thus, as long as the L-shaped flange 360 is extended underneath the horizontal flange 325, the sash cannot be lifted upwardly in the frame for removal thereof, as described in connection with the first form of the present invention. However, when the L-shaped flange is offset in rearwardly spaced relation from the horizontal flange of the ratchet plate, the sash may be lifted with respect to the frame and removed therefrom in a manner believed evident. As with the first form of the invention, the interengaging flanges 360 and 325 insure locking engagement of the pawl 380 with the ratchet plate 320. After the pawl has moved rearwardly of the rearwardmost locking notch 330, there is no necessity of precluding removal of the sash from the frame by manipulation from within. In fact, when the sash is in such position, it is desirable to be able to remove the sash from the frame for repair, re-glazing and the like.

The first, second, and fourth forms of the invention are best suited for use with either a single sliding window sash or with a window within which there is a stationary sash and a sliding sash. As is believed evident, the third form of the invention is especially adapted for use with a sliding window having a pair of movable sashes. The third form of the invention has the advantage of preventing an attempted intrusion through the window by insertion of a long tool, not shown, through a small opening at one end of the window, which tool could have means for grasping the latching pin 275 and sliding it into latching position. Since it is necessary for both sashes to be closed before the pin 275 can be moved into latching position, a tool of the described type could not be employed. If the type of mechanism disclosed in the second form of the present invention were employed on each of two movable sashes in a common frame, as illustrated in FIG. 10, so that each mechanism and sash operated independently of the other, it would be possible for an intruder to extend such a tool through a small opening provided by one of the sashes, to grasp the latching pin 211 associated with the other closed sash with such a tool, and to move the pin into latched position. Thereafter, said other sash could be opened without restriction.

From the foregoing, it will be evident that a unidirectional control mechanism for sliding closures has been provided. While several forms of the mechanism have been disclosed, it is evident that a common principle governs operation of all of the mechanisms. Essentially, each mechanism is selectively operable in an open position of the closure thereby to limit further opening of the closure until after the closure has first been moved to fully closed position. The mechanisms are easily attached to conventional structures, are easy to operate, and are dependable in action.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a sliding closure including a support providing an

opening and a sash slidably fitted in the support for movement in opposite directions along a predetermined path between open and closed positions in the opening, a mechanism for limiting opening of the sash comprising a first ratchet member borne by the support; a second ratchet member mounted on the sash and movable between a locking position engaging the first ratchet member to preclude opening of the sash beyond a predetermined open position, and a position retracted therefrom permitting unrestricted sliding of the sash into fully open position, said second ratchet member being yieldably urged into locking position; control means engageable with said second ratchet member and operably associated with the first ratchet member to move the second ratchet member into retracted position only when the sash is in fully closed position; and a latch releasably engageable with the second ratchet member to hold it in retracted position.

2. In a support member, a controlled member mounted on the support member for reciprocal movement in opposite directions along a predetermined path, a unidirectional control mechanism for limiting movement of the controlled member in one direction until the controlled member is moved a predetermined distance in the opposite direction comprising a ratchet including an elongated ratchet plate having a notch therein, a housing, and a pawl mounted in the housing; means connecting the ratchet plate to one of the members; means connecting the housing to the other of the members, the pawl being movable in the housing transversely of said path between a locking position slidably engaging the plate and adapted for extension into the notch upon registration therewith, and a position retracted therefrom; resilient means in the housing yieldably urging the pawl into said locking position; latch means mounted in the housing for movement between a locking position engaging the pawl and holding it in its retracted position and an unlatched position permitting the resilient means to urge the pawl into the locking position; and camming means operably associated with the ratchet plate and engageable with the pawl upon movement of the controlled member a predetermined distance in said opposite direction to move the pawl into retracted position if the pawl is in locking position.

3. In a support, a member mounted on the support for reciprocal movement in opposite directions along a predetermined path, a unidirectional control mechanism for limiting movement of the member in one direction until the member is moved a predetermined distance in the opposite direction comprising an elongated ratchet plate; means mounting the ratchet plate on the support in longitudinally extended, adjacent relation to the path of movement of the member, the plate having a row of notches longitudinally spaced and aligned along the plate; a housing supported on the member for movement therewith; a pawl slidably mounted in the housing in a plane coincident with said notches for movement transversely of said path between a locking position slidably engaging the plate and adapted for extension into one of the notches upon registration therewith, and a retracted position disengaged from the plate; resilient means in the housing yieldably urging the pawl into said locking position; a latching pin mounted in the housing for movement between a latched position engaging the pawl and holding it in its retracted position and an unlatched position disengaged from the pawl and permitting the resilient means to urge it into locking position; and camming means operably associated with the ratchet plate and engageable with the pawl upon movement of the member a predetermined distance in said opposite direction to move the pawl into retracted position.

4. In a support, a substantially rectangular frame circumscribing an opening and a sash mounted in the frame for slidable movement in opposite directions along a predetermined path between open positions and a closed position in said opening; a mechanism optionally operable in an open position of the sash for limiting opening movement thereof until the sash is first moved into closed position comprising an elongated ratchet plate; means mounting the ratchet plate on the frame in longitudinally extended, adjacent relation to the path of movement of the sash, the plate having a row of notches therein facing the sash and longitudinally spaced and aligned along the plate; a housing supported on the sash for movement therewith; a pawl slidably mounted in the housing in a plane coincident with said notches for movement transversely of said path between a locking position slidably engaging the plate and adapted for extension into one of the notches upon registration therewith, and a retracted position disengaged from the plate; resilient means in the housing yieldably urging the pawl into said locking position; a latching pin mounted in the housing for movement between a latched position engaging the pawl and holding it in its retracted position and an unlatched position disengaged from the pawl and permitting the resilient means to urge it into locking position; and camming means operably associated with ratchet plate and engageable with the pawl adjacent to the closed position of the sash to move the pawl into retracted position if the pawl is in locking position.

5. The mechanism of claim 3 wherein the pawl has an elongated flange movable longitudinally thereof between said locking and retracted positions and a camming shoulder transversely extended from the flange in laterally spaced relation to the plate; wherein the ratchet plate has opposite end portions; wherein the camming means includes a detent aperture in the ratchet plate offset from the row of notches and located in the end portion of the plate toward which the sash moves in closing, a camming wheel rotatably mounted in the housing in a plane substantially coincident with the aperture, the wheel being rotatable about an axis disposed transversely of said path in spaced relation to the plate and having a camming edge eccentric to said axis and in engagement with said camming shoulder, the wheel being rotatable in opposite directions between angularly spaced, pawl retracting and releasing positions, said camming edge sliding against said shoulder during rotation to effect movement of said camming shoulder between a position closer to said axis in said releasing position than in said retracting position thereby to move the flange between locking and retracted positions, respectively, the wheel also including a radially extended detent engageable with the plate and in substantial alignment with the aperture; and resilient means engageable with the wheel in its releasing position and yieldably urging the detent against the plate so that when the sash is moved toward closed position, the detent is urged into the aperture thereby to rotate the wheel from releasing position to locked position and to allow the pawl to move into ratchet plate engagement.

6. The mechanism of claim 3 wherein the ratchet plate has opposite end portions; and wherein said camming means includes an elongated stud mounted in the ratchet plate at the end portion thereof toward which the sash moves in closing for alternate and opposite movement into the path of the sash and into the path of the pawl when the latter is in locking position, and means engaging the stud yieldably urging the stud into the path of the sash, the sash being engageable with the stud in the closed position thereof to move the stud into the path of the pawl, said pawl being alignable with the stud in the closed position of the sash whereby the pawl is urged into retracted position by the stud.

7. The mechanism of claim 1 wherein the first ratchet member is an elongated plate extended longitudinally of the path of the sash and providing a plurality of longitudinally spaced locking notches; wherein the second ratchet member is a pawl mounted on the sash for movement transversely of said path between said locking position engaging the plate and said retracted position, the pawl being in longitudinal alignment with the notches in said locking position for registration therewith incident to

movement of the sash along said path; and resilient means borne by the sash engaging the pawl and yieldably urging it into locking position and into said notches upon registration of the pawl therewith.

8. The mechanism of claim 7 wherein said pawl includes a camming surface in spaced substantially parallel relation to the plate, wherein said control means includes a cam rotatably mounted on the sash for rotatable, slidable, wedgable engagement between the ratchet plate and the camming surface of the pawl as the sash moves into its closed position to move the pawl into retracted position when the sash is in its completely closed position.

9. The mechanism of claim 8 wherein the ratchet plate has longitudinally spaced, first and second end portions, wherein the pawl and cam are adjacent to the first end portion in the fully closed position of the sash and adjacent to the second end portion in the fully open position of the sash, wherein the notches are located between said end portions, wherein said control means includes a plurality of detent apertures in the ratchet plate in longitudinally spaced relation to each other with respect to the plate, the apertures being offset from the notches transversely of the plate and being located between the first end portion of the plate and the notches, said cam being a wheel rotatably mounted on the sash for rotation about an axis disposed transversely of said path of movement and including an eccentric camming edge engaging the camming surface of the pawl and a plurality of circumferentially spaced detents extended substantially radially outwardly from the axis on the opposite side thereof from said edge, the wheel being in a plane extended longitudinally of the ratchet plate and coincident with the apertures, said eccentric edge having circumferentially spaced maximum and minimum radii, the wheel having a releasing position when the sash is open wherein the detents are directed toward the first end portion of the plate and wherein the minimum radial portion of the edge is in engagement with the camming surface, the wheel also having a retracting position when the sash is completely closed wherein the maximum radial portion of the edge is in engagement with said camming surface, and the detents individually successively fitting into the apertures as the sash moves toward closed position and rotating the wheel to move said maximum radial portion into engagement with the camming surface.

10. The mechanism of claim 1 wherein said second ratchet member is movable with the sash along said path between first and second positions spaced longitudinally of the path, said second ratchet member being in said first position when the sash is in closed position, and wherein said control means is a stud slidably mounted in the support adjacent to the first position of the second ratchet member for slidable movement transversely of the path of the sash between a retracted position in the path of the sash and a camming position in the path of the second ratchet member, resilient means borne by the support engaging the stud and urging the same into retracted position, wherein the second ratchet member is in alignment with the stud in said first position, and wherein the sash engages the stud in said closed position and moves the stud into its camming position in engagement with the second ratchet member to retract the same.

11. The mechanism of claim 1 wherein said second ratchet member is movable with the sash along said path between first and second positions spaced longitudinally of the path, said second ratchet member being in said first position when the sash is in closed position, and wherein said control means is a tongue extended outwardly from the first ratchet member adjacent to said first position of the second ratchet member and in the path of travel thereof for engagement with the second ratchet member to move the same into its retracted position.

12. The mechanism of claim 3 wherein said camming means is a tongue rigidly projected outwardly from the plate on the same side thereof as the housing and in the path of travel of the pawl for engaging the pawl and forcing it into retracted position.

13. In a rectangular frame having opposite longitudinally spaced side portions; first and second sashes having inner side portions and extended portions, the sashes being mounted in the frame in spaced parallel planes for movement along individual paths between closed positions with their inner side portions in adjacent relation to each other, and open positions with said inner portions spaced apart; an elongated ratchet plate mounted on the first sash and extended longitudinally of the path of movement of said sash, the plate providing a plurality of longitudinally spaced locking notches directed toward the second sash; a pawl mounted on the second sash for movement transversely of the path of the second sash between a locking position engaging the ratchet plate and in alignment with the notches, and a retracted position disengaged from the plate; means mounted on the second sash engaging the pawl and urging the same into locking position; a tongue extended outwardly from the plate adjacent to the inner side portion of the first sash, in longitudinal alignment with the notches, and engageable with the pawl in the closed position of the sashes for moving the pawl into its retracted position; and a latch borne by the second sash and movable between a position releasably engaging the pawl in its retracted position for holding the pawl in such a position, and a position disengaged from the pawl.

14. The mechanism of claim 1 wherein the first ratchet member is an elongated plate extended longitudinally of the path of movement of the sash, said plate having a longitudinally extended row of longitudinally spaced sawtooth, locking notches therein; wherein the second ratchet member includes a pawl mounted on the sash for movement between a locking position engaging the plate and in longitudinal alignment with the row of notches and a retracted position out of engagement with the plate; including means borne by the sash engaging the pawl and yieldably urging it toward plate engagement whereby upon registration of the pawl with one of the notches, the pawl enters the notch to limit further opening movement of the sash; and wherein the control means includes a camming arm borne by the support and movable between a retracted position when the sash is out of closed position and a camming position in the path of the pawl and engageable therewith in the closed position of the sash, and means borne by the sash engageable with the arm in the closed position of the sash for urging the arm into said camming position thereby to press the pawl into its retracted position.

15. The mechanism of claim 14 wherein the plate has an elongated slot adjacent to said arm; wherein a housing is secured to the sash and provides a surface in opposed adjacent spaced relation to the plate, said housing including a bore disposed transversely of said path of movement and registrable with said slot in the closed position of the sash; wherein the pawl is slidably received in the bore; wherein the arm is pivotally mounted on the plate and is moved through the slot into the bore by said arm urging means for moving the pawl into the bore inwardly of said surface in the closed position of the sash.

16. The mechanism of claim 15 wherein said arm urging means is a finger secured to the housing and disposed transversely of the arm in spaced relation to the pivot axis therefor.

17. In a support, a substantially rectangular frame circumscribing an opening, and a sash mounted in the frame for slidable movement in opposite directions along a predetermined path between open position and a closed position in said opening; a mechanism optionally operable in an open position of the sash for limiting opening movement thereof until the sash is first moved into closed position comprising an elongated ratchet plate; means mounting the ratchet plate on the frame in longitudinally extended, adjacent relation to the path of movement of

the sash, the plate having a row of notches therein facing the sash and longitudinally spaced and aligned along the plate; a housing supported on the sash for movement therewith; a pawl slidably mounted in the housing in a plane coincident with said notches of the plate for movement transversely of said path between a locking position extended from the housing and adapted for extension into one of the notches upon registration therewith, and a retracted position retracted into the housing; resilient means in the housing yieldably urging the pawl into said locking position; and means borne by the ratchet plate engageable with the pawl for urging the pawl into a retracted position incident to movement of the sash from an open position into closed position.

18. The mechanism of claim 17 wherein the pawl has a recess therein; and including a latch borne by the housing and slidably movable between a latching position extended into the recess of the pawl when the pawl is in a retracted position, and an unlatched position withdrawn from the recess.

19. The mechanism of claim 18 wherein the latch has a predetermined path of travel in moving between said latching and unlatched positions, the pawl being in the path of travel of the latch when the pawl is in said locking position to preclude entry of the latch into the recess unless the sash is moved into closed position.

20. In a locking mechanism including a body having spaced first and second bores interconnected by a passageway; a locking member mounted in said first bore for movement between predetermined locked and unlocked positions and having a notch facing said passageway in said unlocked position; a latch having latching and blocking projections extended in angular relation to each other, the latch being slidably mounted in the passageway for movement between latching position with the latching projection extended into the notch of the locking member when the latter is in its unlocked position, and an unlatched position with said latching projection retracted into the passageway, said blocking projection having a predetermined path of travel incident to movement of the latch in the passageway; and latch control means mounted in the second bore for movement between a blocking position in the path of travel of said blocking projection to limit movement of said latch in the passageway and a retracted position out of said path.

References Cited in the file of this patent

UNITED STATES PATENTS

504,620	Riddelle	Sept. 5, 1893
570,503	Robertson	Nov. 2, 1896
1,536,357	Simonovitz	May 5, 1925
1,769,951	Hill	July 8, 1930
2,047,937	Bohn et al.	July 21, 1936
2,072,300	Goetzmann	Mar. 2, 1937
2,153,819	Van Voorhees	Apr. 11, 1939
2,192,519	King	Mar. 5, 1940
2,699,204	Davis	Jan. 11, 1955
2,807,045	Chenoweth	Sept. 24, 1957