

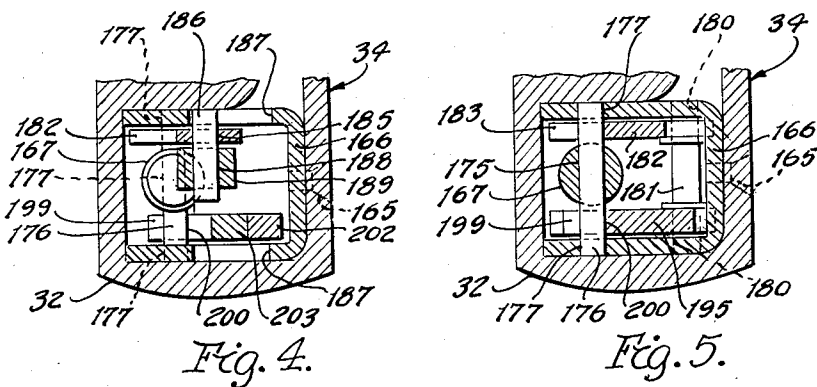
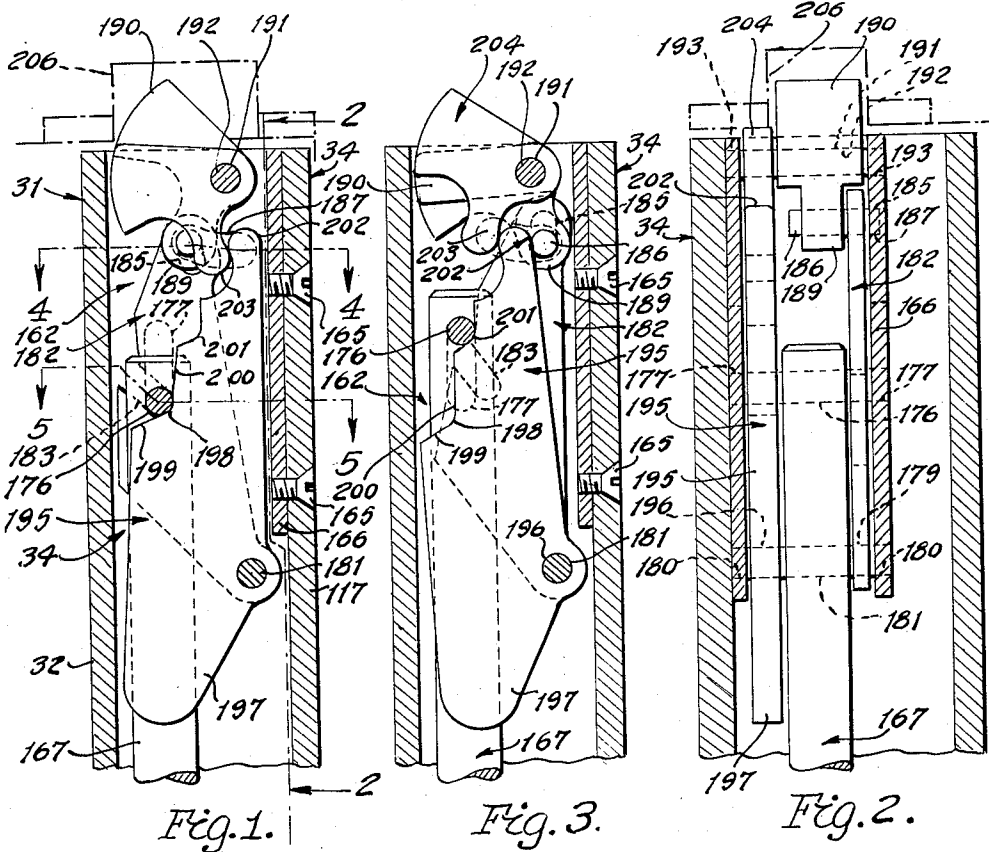
Nov. 3, 1959

D. N. JEWETT ET AL
AUTOMATICALLY-LATCHING UPPER LOCK BOLT
UNIT FOR PANIC EXIT LOCKS

2,911,249

Original Filed March 5, 1953

2 Sheets-Sheet 1



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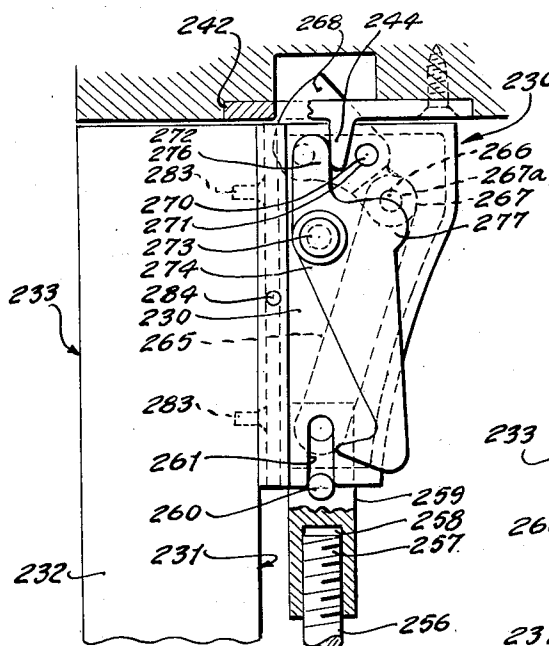


Fig. 7.

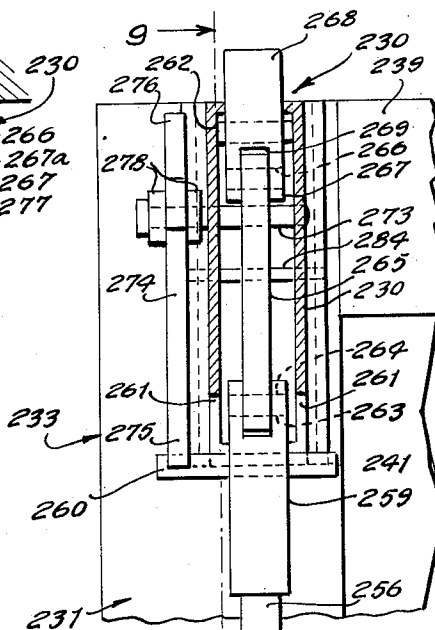


Fig. 6.

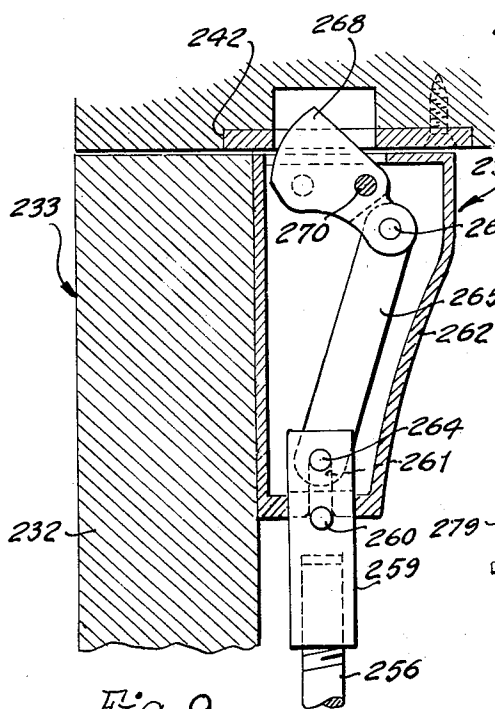


Fig. 9.

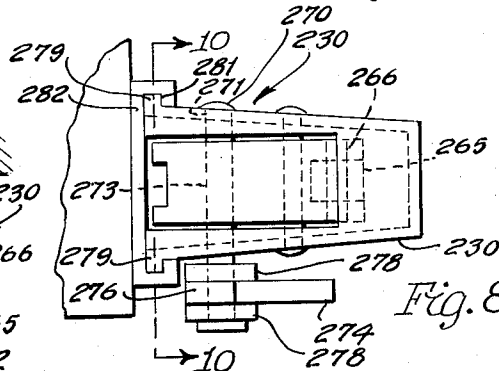


Fig. 8.

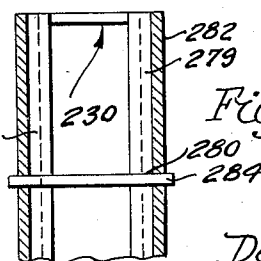


Fig. 10.

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AUTOMATICALLY-LATCHING UPPER LOCK BOLT UNIT FOR PANIC EXIT LOCKS

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Original application March 5, 1953, Serial No. 340,432, now Patent No. 2,824,440, dated February 25, 1958. Divided and this application February 21, 1958, Serial No. 719,987

4 Claims. (Cl. 292—336)

This invention relates to closure devices and, in particular, to panic exit devices or locks for doors of public buildings.

One object of this invention is to provide an upper lock bolt unit for a panic exit device or lock operated from the outside of the enclosure solely by a single lock key in a single operation, and which is automatically self-locking when closed either manually or by a conventional door check.

Another object is to provide an upper lock bolt unit for a panic exit device or lock wherein the locking bolts and their associated rods re-engage by gravity after retraction, thereby eliminating the need for the operating springs required in prior panic exit locks, other than the optional use of a weight-counterbalancing spring for cross arm stabilizing.

Another object is to provide an upper lock bolt unit for a panic exit device or lock which is capable of being mounted either internally within or externally upon the door.

Another object is to provide an upper lock bolt unit for a panic exit device or lock which is free from the externally-projecting latch-releasing pins of prior devices or locks of this character, such pins being easily bent, broken or lost.

Another object is to provide an upper lock bolt unit for a panic exit device or lock which is operated from outside the enclosure by a single operation of a single lock key, instead of requiring two or more separate operations as in prior panic exit locks which must first be unlocked by a key and then actuated by means of a knob or lever, wherein means is also provided to prevent scarring of the frame after the door is unlocked and is being swung open.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawings, wherein:

Figure 1 is an elevation, partly in vertical section with the front edge wall of the hollow door removed, through an internally-mounted upper panic exit door lock bolt unit according to one form of the invention, with its operating mechanism shown in its locked position;

Figure 2 is a vertical section at right angles to Figure 1, taken along the line 2—2 therein;

Figure 3 is a vertical section similar to Figure 1, but showing the parts in their unlocked positions;

Figure 4 is a horizontal section taken along the line 4—4 in Figure 1;

Figure 5 is a horizontal section taken along the line 5—5 of Figure 1;

Figure 6 is a front elevation of a slight modification of the panic exit upper lock bolt unit of Figures 1 to 5 inclusive, as mounted externally on the door, with its operating mechanism shown in its locked position;

Figure 7 is a side elevation of the upper lock bolt unit shown in Figure 6;

Figure 8 is a top plan view of the upper lock bolt unit shown in Figures 6 and 7;

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Figure 9 is a vertical section taken along the line 9—9 of Figure 8; and

Figure 10 is a fragmentary vertical section taken along the line 10—10 of Figure 8.

This application is a division of our prior co-pending application Serial No. 340,432, filed March 5, 1953 for Panic Exit Lock, now United States Patent No. 2,824,440, issued February 25, 1958.

General description of the invention

Hitherto, the locking and unlocking of doors of public buildings, such as banks, theaters, schools, office buildings, governmental buildings and the like, has presented the difficult problem of maintaining free access into and out of the building during the daytime or business hours, yet properly securing and safeguarding the building to prevent entrance of intruders outside such hours. This problem has been further complicated by the difficulty of the locking and unlocking of such doors when equipped with so-called "panic hardware" which automatically unlocks the door from the inside when anyone pushes against it.

The present invention provides an upper panic exit door lock bolt unit having mechanism which automatically latches the mechanically-interconnected upper and lower locking bolts when they are retracted, so as to prevent the lower locking bolt from scoring or otherwise damaging the door frame or sill while the door is being swung open, yet at the same time automatically unlatches the mechanically-interconnected upper and lower locking bolts so that they move into locking positions as the door closes the door opening. The present invention also operates by gravity without the need for operating springs.

Internally-mounted panic exit lock upper bolt unit

Referring to the drawings in detail, Figures 1 to 5 inclusive show a panic exit lock upper bolt unit, generally designated 34, shown as installed in the interior of a door, generally designated 31, of any suitable and conventional type. The door shown is of hollow metal construction but the invention is also obviously applicable to doors of wood or other material where space is provided within the outer stile or vertical bar at the outer edge of the door, for receiving the mechanism. As will be seen from the description of Figures 6 to 10 inclusive, the panic exit lock upper bolt unit of the present invention is equally applicable to mounting on the exterior of the door.

The door 31 is of conventional construction having a hollow outer stile 32 serving to receive the locking mechanism, including the upper bolt unit, generally designated 34, the lower bolt unit (not shown), and the center unit or bolt-operating assembly (also not shown), this in turn being connected to the panic bar unit (likewise not shown) to an edge unit mounted on an inner stile upon which the hinges (not shown) are customarily mounted. The above-mentioned omitted parts are shown in the above-identified parent Jewett et al. Patent 2,824,440, issued February 25, 1958 of which the present application is a division.

Secured as at 165 to the inner wall 117 of the outer stile 32 within the upper end of the chamber 162 thereof is the upper bolt housing 166 (Figures 1 and 4). The latter is of channel shape. Projecting into the space between the side walls of the housing 166 is the upper end of the upper bolt-operating rod 167.

The upper end of the rod 167 is transversely bored (Figure 5) as at 175 to receive a cross pin 176, the opposite ends of which project outwardly beyond the rod 167. The opposite ends of the pin 176 are guided in aligned vertically-elongated slots 177 in the side walls of the channel-shaped housing 166. The opposite side walls of the channel-shaped housing 166 near their lower ends are provided with aligned bores 180 in which a pivot pin

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181 is seated at its opposite ends. Pivotally mounted as at 179 near one end of the pivot pin 181 is an upper bolt-operating lever 182 of roughly triangular shape (Figures 1 and 3). Intermediate its upper and lower ends, the bolt-operating lever 182 is provided with an upwardly-inclined notch 183 slidably receiving one end of the cross pin 176. As a consequence, when the upper bolt-operating rod 167 is reciprocated vertically by certain key-operated mechanism (not shown) beneath it, it swings the upper bolt-operating lever 182 in one direction or the other around the pivot pin 181 by reason of its engagement with the notch 183.

The upper end of the bolt-operating lever 182 is provided with a vertically-elongated slot 185 which is engaged by a pin 186 guided in an arcuate slot 187 in one of the side walls of the channel-shaped housing 166 (Figure 3). The pin 186 is mounted in a transversely bored boss 189 (Figure 2) which projects downwardly from the lower side of the upper bolt 190 which is bored as at 191 to receive a pivot pin 192, the opposite ends of which are mounted in aligned bores 193 (Figure 2) in the opposite side walls of the channel-shaped housing 166. In this manner, as the upper bolt-operating rod 167 moves upward or downward it acts through the linkage between the pin 176 in notch 183 and the bolt-operating lever 182 to swing the latter inward or outward around the pivot pin 181 and thus swing the upper bolt 190 upward into its locking position (Figure 1) or downward into its unlocked position (Figure 3).

In order to latch the upper bolt 190 and lower bolt (not shown) in their retracted positions so as to prevent scarring of the floors, door frame or other parts as the door is swung open after being unlocked, the upper bolt unit 34 is provided with a latch lever 195 (Figures 1 and 3) which, like the upper bolt-operating lever 182, is roughly in the shape of a triangular plate, and likewise bored as at 196 to pivotally receive the pivot pin 181. The lowermost portion 197 of the latch lever 195 extends downwardly below the bore 196, whereas the upper edge 198 thereof is provided with an inclined cam portion 199 above which is a vertical edge portion 200 leading to a notch 201 releasably receiving one end of the pin 176 carried by the rod 167. The extreme upper end 202 of the latch lever 195 (Figures 7 and 11) is rounded to engage the similarly rounded projection 203 extending downwardly from the lower edge of a latch-releasing lever or pivoted dog 204 which is pivotally mounted on the pivot pin 192. In its upward or locked position, the upper bolt 190 engages the recessed upper keeper 206 (Figure 1) which is seated in and flush with the door frame head jamb.

Externally-mounted panic exit lock upper bolt unit

The externally-mounted panic exit lock upper bolt unit, generally designated 230, shown in Figures 6 to 10 inclusive, is of generally similar construction to the panic exit lock upper bolt unit 34 of Figures 1 to 5 inclusive, but differs in certain details for mounting upon the inner side surface 231 of the outer or lock stile 232 of a door, generally designated 233. The form of the invention shown in Figures 6 to 10 inclusive is suitable for mounting upon a solid door, such as a wooden door, lacking an internal chamber for accommodating the mechanism. The center unit, panic bar unit and edge unit are of generally similar construction to the corresponding units of the internally-mounted panic exit lock 30, shown in the above-mentioned parent patent 2,824,440 of February 25, 1958. The top jamb is recessed to receive an upper keeper 242 and 243 respectively, the former having a downwardly-projecting operating lug 244.

The upper bolt unit 230 is operated by an upper bolt-operating rod 256, the upper threaded end 257 of which is threaded into a correspondingly threaded socket 258 of a tubular head 259. The head 259 is bored trans-

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versely to receive a cross pin 260 which reciprocates vertically in guide slots 261 (Figures 6 and 7) in the opposite side walls of an upper bolt housing 262 of U-shaped cross-section. Also mounted in the head 259 and extending across a slot 263 in the upper end thereof is a pivot pin 264 upon which is pivotally mounted the lower end of a link 265, the upper end of which is bored to receive a pivot pin 266 similarly mounted in the hole 267a in the boss 267 of the upper bolt 268 which is slotted as at 269 to receive the link 265. The upper bolt 258 is bored to receive a pivot pin 270 which is mounted in bores 271 in the opposite side walls of the housing 262. The upper bolt 268 is provided with an additional hole 272 to make it interchangeable with the lower bolt (not shown).

The opposite side walls of the housing 262 are also bored to receive and support a headed pivot pin 273 upon which is pivotally mounted a roughly triangular latch lever 274 having a hook portion or ledge 275 at its lower end and an arm 276 projecting upwardly from its upper end. The third corner portion 277 is rounded and extends outwardly, away from the pivot pin 273, providing a counterweight effect to swing the hook 275 to the left under the influence of gravity (Figure 7). The lever 274 is mounted between bosses 278.

The housing 262 at the opposite edges of its side walls is provided with parallel vertical ribs 279 which are notched intermediate their ends as at 280 (Figure 10). The ribs 279 engage corresponding grooves 281 in a mounting plate 282 which is secured as at 283 to the inner surface 231 of the door 233. Pins 284 extend through the suitably bored side walls adjacent the grooves 281 of the mounting plate 282 and enter the notches 280 (Figure 24), securing the assembly in position so that the screws 283 are completely concealed.

Operation

The operation of the invention is generally the same whether it is embodied in the internally-mounted panic exit lock of Figures 1 to 5 inclusive or in the externally-mounted panic exit lock of Figures 6 and 10 inclusive, the two embodiments differing in operation only in minor details.

The upward motion of the upper rod 167 and its cross pin 176 in response to the actuation of the key-operated mechanism (not shown) by the operator causes the cross pin 176 to exert a camming effect upon the upwardly-inclined notch 183 in the bolt-operating lever 182, swinging the latter in a clockwise direction around its pivot pin 181 from the position shown in Figure 1 to that shown in Figure 3. As a consequence, the engagement of the elongated slot 185 in the upper end of the bolt-operating lever 182 with the end of the pin 186 mounted in the depending boss 189 of the upper bolt 190 swings the upper bolt 190 downwardly around its pivot pin 192 in a counterclockwise direction from the position shown in Figure 1 to that shown in Figure 3, withdrawing the upper bolt 190 from its recessed upper keeper 206 (Figures 1 and 2) and unlocking the upper end of the door.

Meanwhile, as the cross pin 176 in the upper end of the upper bolt-operating rod 167 moves upward, as described above in unlocking the door, it moves upward past the vertical portion 200 of the latch lever 195 to the top thereof, permitting the latch lever 195 to swing downwardly by gravity in a counterclockwise direction around its pivot pin 181 as the cross pin 176 comes opposite the notch 201 in the lever 195 (Figure 11). As a result of this motion, the upper end 202 of the latch lever 195 pushes to the left the projection 203 depending from the latch-releasing lever or dog 204, swinging the latter upward in a clockwise direction around its pivot pin 192 as the door 31 is swung open. Thus, even when the operator removes his key from the cylinder lock of the door 31 after performing the foregoing unlocking operation, the upper rod 167 will remain in its raised position

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with the cross pin 176 resting in the notch 201 of the latch lever 195. In this manner, the upper bolt 190 and the lower bolt of the lower bolt unit (not shown) connected thereto are latched in their unlocked or retracted positions, as the door is swung open by the operator, thereby preventing scarring of the frame or other damage.

After the operator has passed through the doorway and the door 31 is again swung into its closed position, either by the operator or by a conventional door check, as the door 31 reaches its closed position, the latch-releasing lever 204 engages the upper keeper 206 and is pushed downwardly thereby in a counterclockwise direction from the position of Figure 3 to the position of Figure 1. This action causes the projection 203 to swing the upper end 202 of the latching lever 195 to the right, rotating the latter in a clockwise direction around its pivot 181 and withdrawing the notch 201 from beneath the cross pin 176 on the upper rod 167. When thus released, the upper rod 167 drops downward and at the same time its cross pin 176 engages and cams the upwardly inclined notch 183 on the bolt-operating lever 182 to swing the latter in a counterclockwise direction around its pivot 181. The consequent engagement of the upper end slot 185 of the bolt-operating lever 182 with the pin 186 on the bolt projection 189 swings the upper bolt 190 upwardly in a clockwise direction around its pivot pin 192 and engages it with the recessed upper keeper 206, relocking the upper end of the door 31 in its closed position.

The operation of the externally-mounted panic exit lock upper bolt unit 230 occurs in a similar manner to that described above for the internally-mounted panic exit lock 30 bolt unit 34. As the rod 255 is moved upward in response to the operation of the key-operated mechanism by the operator, the consequent upward motion of the upper bolt-operating rod 256 (Figure 7) swings the upper bolt 268 downwardly around its pivot pin 270 in a counterclockwise direction as a result of the motion-transmitting effect of the link 265 interconnecting the pivot pins 264 and 266. As the cross pin 260 on the upper end of the upper head 259 moves upward, it exerts a camming action on the inclined lower edge of the hook portion 275 of the latch lever 274, pushing the hook portion 275 aside to the right (Figure 7) and swinging the latch lever 275 counterclockwise around its pivot pin 273. As soon as the cross pin 260 passes by the end of the hook portion 275, however, the latter moves underneath the cross pin 260 in response to the action of gravity upon the latch lever 274, latching the upper rod 256 in its raised position.

The same upward motion of the operating fork 248 lifts the lower rod 296 through the engagement of the fingers 289 with the laterally-projecting shoulders 291 on the lower head 290 (Figures 7 and 9), swinging the lower bolt 306 upward into its retracted position through the intermediate action of the link 302. Thus, both the upper and lower bolts 268 and 306 are latched by the hook portion 275 of the latch lever 274 in their retracted or unlocked positions.

The bolt 268 is released and the door 231 relocked

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when the door nears its closed position by the engagement of the lug 244 projecting from the upper keeper with the upper arm 275 of the latch lever 274, swinging the hook portion 275 out from beneath the cross pin 260 and consequently releasing the upper rod 256 and operating fork 248, permitting them to drop downward. As a consequence, the upper bolt 268 is swung upward into its keeper through the intermediate action of the link 265, relocking the door in its closed position.

10 Meanwhile, if a fire or other emergency occurs inside the building while the door 31 or 231 is locked, a person seeking to unlock the door from the inside merely needs to lean against the usual panic bar (not shown) of the door 31, thereby actuating the above-described mechanism to raise the upper operating rod 167 or 256 to retract the upper bolt 190 or 268 respectively in the manner described above.

What we claim is:

1. An automatically-latching panic exit door lock bolt unit comprising a lock bolt support adapted to be mounted adjacent the upper edge of the door and having an aperture in the top thereof, a lock bolt pivotally mounted on said support and swingable relatively thereto through said top aperture into and out of a keeper disposed beyond its respective door edge; a vertically-reciprocable bolt-shifting rod operably connected to said bolt and having a latch-engaging projection thereon, a latch pivotally mounted on said support and releasably engageable with said projection, a latch-releasing lever also swingable through said top aperture into a raised position projecting above the upper edge of the door and means operatively connecting said latch-releasing lever to said latch to swing said latch away from said projection for release of said projection and bolt-shifting rod in response to the engagement of said latch-releasing lever with a stationary abutment mounted above the door opening adjacent the keeper.

2. An automatically-latching panic exit door lock bolt unit according to claim 1, wherein a pivot element is mounted in said support near the upper end thereof and wherein said lock bolt and latch-releasing lever are both pivotally mounted on said pivot element.

3. An automatically-latching panic exit door lock bolt unit, according to claim 1, wherein said latch has a step thereon supportingly engaging said bolt-shifting rod projection and wherein swinging of said latch withdraws said step from supporting engagement with said projection.

4. An automatically-latching panic exit door lock bolt unit, according to claim 1, wherein said connecting means includes an actuating portion on said latch-releasing lever and an actuated portion on said latch operatively engageable with said actuating portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,585,167	Palmer	May 18, 1926
2,762,642	Jewett	Sept. 11, 1956
2,824,440	Jewett et al.	Feb. 25, 1958