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F. J. RUSSELL ETAL

3,397,002

TWO-WAY AUXILIARY BOLT

Original Filed April 23, 1965

Fig. 1

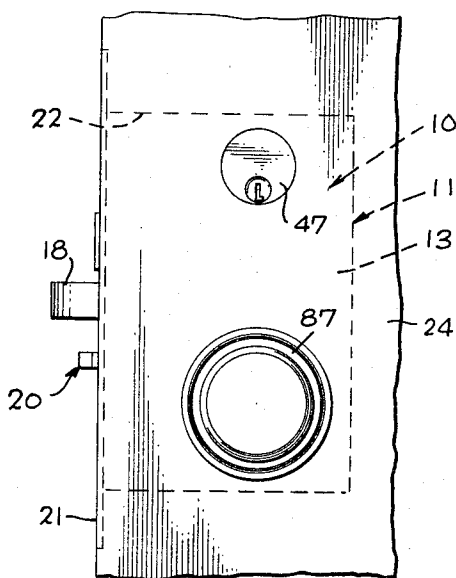


Fig. 2

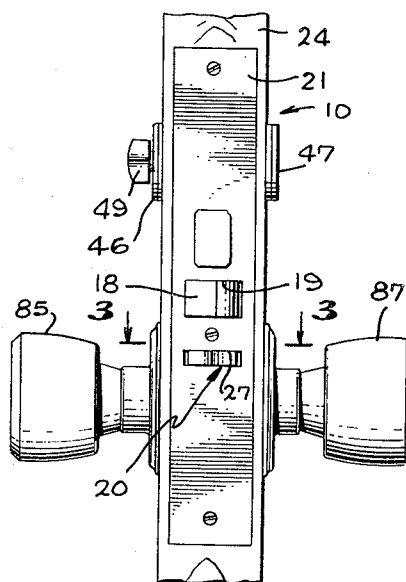


Fig. 3

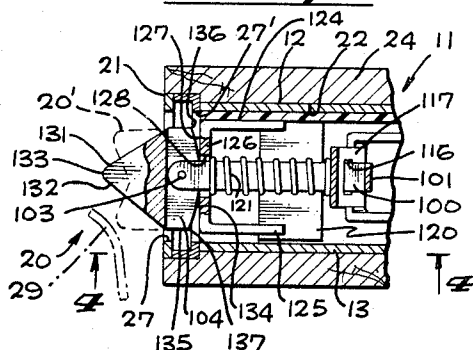


Fig. 4

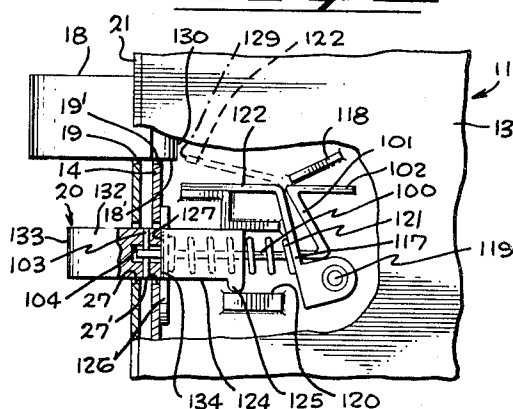
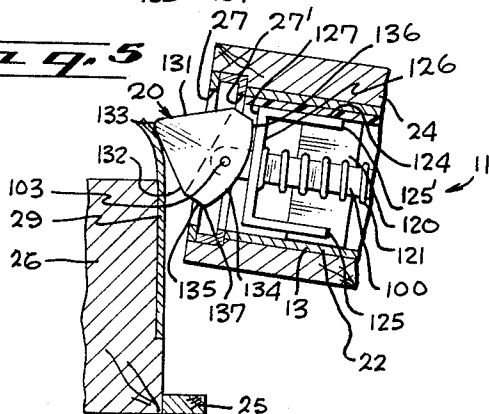


Fig. 5



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TWO-WAY AUXILIARY BOLT

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Continuation of application Ser. No. 450,460, Apr. 23,
1965. This application May 12, 1967, Ser. No. 638,158
3 Claims. (Cl. 292—192)

ABSTRACT OF THE DISCLOSURE

The invention resides in a door lock which is provided with a latch bolt and an auxiliary bolt. The latch bolt is for the conventional purpose of holding a door closed, and the auxiliary bolt is for the purpose of blocking the latch bolt against release from closed position when the door is closed. The blocking is accomplished by tilting the auxiliary bolt so that its shank is shifted endwise whereby to throw a pivotally mounted blocker into blocking position behind the latch bolt. A particular form of structure present in the disclosed device resides in the provision of an auxiliary bolt having opposite faces which are the same and which is pivoted so that it can be depressed when the door is swung in either direction. The connection between the auxiliary bolt and its shank is such that the shank will be depressed whereby to manipulate the pivotally mounted blocker no matter which way the auxiliary bolt shifts when it strikes an appropriate strike plate.

This application is a continuation of Ser. No. 450,460, filed Apr. 23, 1965, now abandoned.

The invention relates to door locks generally and, in particular, to an auxiliary bolt in operative association with the door lock which is adapted, when it strikes a strike plate on the door frame, to reciprocate in and out of the lock but not to project into any opening in a strike. The purpose of the auxiliary bolt, when depressed, is to deadlock the latch bolt of the lock against end pressure when the auxiliary bolt is in depressed condition. The invention relates to an auxiliary bolt which operates in either swing direction of a door.

When doors are mounted upon a door frame, they are hinged at one edge in such fashion that they can either swing in to open or swing out to open. When an inwardly swinging door is closed, the latch bolt, and any auxiliary bolt which is provided in the door, will engage a strike plate which has its edge facing inwardly. On the other hand, when an outwardly swinging door is closed, the latch bolt, and any auxiliary bolt, must strike an outwardly facing edge of a strike plate. Consequently, a conventionally beveled latch bolt or auxiliary bolt, namely one which has a beveled face on only one side, must be reversed in some manner if it is to be capable of use with both an inwardly swinging door and an outwardly swinging door. Some types of locks are so constructed that they can be taken apart, and the beveled latch bolt and auxiliary bolt can be mounted in an opposite direction. Where this is not possible, it may be necessary to order from stock a lock with the beveled latch bolt and auxiliary bolt so mounted that they swing in the desired direction. Where, however, the lock is sufficiently versatile to permit the beveled latch bolt and auxiliary bolt to be reversed in position upon disassembly and reassembly, the adjustment is bothersome and time-consuming. If the lock chances to be already installed in the door, the lock casing will need to be entirely removed from the door before it can be taken apart, the latch bolt and auxiliary bolt direction reversed, the lock casing then put back together again, and the lock casing ultimately reinstalled in the door.

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It may also be that, in order for a beveled latch bolt and auxiliary bolt to be reversed in position, the lock must be constructed specially in some fashion, so that, upon reversal, all operating portions of the mechanism continue to function as they are intended.

It is therefore among the objects of the invention to provide a new and improved auxiliary bolt which, without readjustment of any kind, can accommodate either an inwardly swinging or an outwardly swinging door.

Still another object of the invention is to provide a new and improved auxiliary bolt which operates properly, whether mounted in a lock on an inwardly swinging door or an outwardly swinging door, without change and which also is very simply constructed and dependable in its operation.

Still another object of the invention is to provide an auxiliary bolt which can be used advantageously in a lock which needs to be mounted only once and which thereafter cooperates properly with a latch bolt associated in said lock to block retraction of the latch bolt, the relationship being such that the latch bolt may be reversed in position to accommodate a swing in either an inward or an outward direction without any need to readjust the auxiliary bolt.

With these and other objects in view, the invention consists in the construction, arrangement, and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a side elevational view of a fragment of door showing a typical lock mounted in place therein.

FIGURE 2 is an end elevational view of the installation of FIGURE 1.

FIGURE 3 is a fragmentary transverse sectional view taken on the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary longitudinal sectional view taken on the line 4—4 of FIGURE 3.

FIGURE 5 is a view somewhat similar to FIGURE 3 but showing the door in the act of being closed.

In an embodiment of the invention, a mortise type lock indicated generally by the reference character 10 has been chosen, the lock being housed within a case indicated generally by the reference character 11. The case 11 consists, in part, of an inside wall 12, an outside wall 13, and an end wall 14. By way of example, the lock chosen is one provided with a latch bolt 18 reciprocating in a hole 19 in the front plate 21 and an aligned hole 19' in the end wall 14. An auxiliary bolt indicated generally by the reference character 20 is mounted in a hole 27 in the front plate 21 and an aligned hole 27' in the end wall 14.

The case 11 is mounted in a recess 22 in a door 24. The door 24 swings with relation to a door frame 26 provided with a strike plate 29, against which the auxiliary bolt 20 is adapted to engage before the door swings into engagement with a door stop 25.

As is customary with a lock of the kind here under consideration, the lock is provided with a turn mechanism 46 on the inside, a key-actuated mechanism 47 on the outside, and a handle 49 which is part of the turn mechanism 46. An inside knob 85 is adapted to manipulate the latch bolt 18 on the inside of the door 24, and an outside knob 87 performs a comparable function on the outside of the door 24. A lock construction especially well adapted to the invention here under consideration is shown and described in co-pending Ser. No. 450,446, now Patent No. 3,337,248, filed Apr. 23, 1965; Ser. No. 450,447, now Patent No. 3,337,252, filed Apr. 23, 1965; Ser. No. 450,450, now Patent No. 3,298,729, filed Apr. 23, 1965; Ser. No. 450,461, now Patent No. 3,316,003, filed Apr. 23, 1965; Ser. No. 450,462, now Patent No. 3,316,006,

filed Apr. 23, 1965; Ser. No. 450,472, now Patent No. 3,337,251, filed Apr. 23, 1965.

In the chosen form of the invention the auxiliary bolt 20 performs the function of deadlocking the latch bolt 18 against end pressure when the latch bolt 18 is projecting into the opening (not shown) within the strike plate 29 and when the auxiliary bolt 20 is held in depressed position by the strike plate 29. There is no hole in the strike plate 29 in alignment with the travel of the auxiliary bolt 20.

For mounting the auxiliary bolt 20, an auxiliary bolt lever 100 is used. At the inner end of the auxiliary bolt lever 100 is a diagonal arm 101 terminating in a horizontal arm 102 which is adapted to perform certain functions in the lock unrelated to the present invention. The auxiliary bolt lever 100 is attached to the auxiliary bolt 20 by means of a pin 103 which holds the auxiliary bolt lever 100 in place in a slot 104. A bell crank 117 is pivotally mounted on the cast 11 by means of a pivot connection 119, so that it can pivot or rotate with respect to a stationary stop 118. The auxiliary bolt lever 100 extends slidably through an opening 116 in the bell crank 117, so that, when the auxiliary bolt lever 100 moves inward, it withdraws the forward-urging spring pressure of a spring 121 as translated through the contact point formed where diagonal arm 101 joins horizontal arm 102 to a blocker 122, thus enabling the spring 121 to press against sloped surface of the bell crank 117, without offset, to force a blocker 122, which is an extension of the bell crank 117, to the broken line position shown in FIGURE 4 and identified at its end as 129, if the latch bolt 18 is in extended position, or to force the blocker 122 to an intermediate position where the blocker 122 rests on the underside 18' of the latch bolt 18, if the latch bolt 18 is in depressed position, until said latch bolt 18 is moved to the extended position shown in FIGURE 4. At this point, the blocker 122 moves from its resting position on the underside 18' of the latch bolt 18 to the broken line position shown in FIGURE 4 and identified at its end as 129.

Although the auxiliary bolt 20 has been described as though it consists essentially of a bolt head, it is more properly described as an auxiliary bolt assembly which is a bolt head and related cooperating parts. In the chosen example, there is provided a carrier 124 having inner ends 125 and 125' which are slidably mounted in a slideway 120 which is part of the case 11. A wall 126 of the carrier 124 carries an outwardly facing cam face 127. Extending through the wall 126 is an opening 128, through which the auxiliary bolt lever 100 extends. The spring 121 acts between the rear side of the wall 126 and the bell crank 117, so that when the auxiliary bolt 20 is pressed inwardly, the bell crank 117 will be operated as described in the above paragraph. When the latch bolt 18 is in extended position, an end 129 of the blocker 122 will fall behind an inner end face 130 of the latch bolt 18 and will prevent the latch bolt 18 from subsequently being depressed inwardly into the case 11.

In order to achieve the purpose intended for it, the auxiliary bolt 20 is provided with opposite depressor faces 131 and 132 which diverge progressively outwardly from each other from a free end 133. A pivot face 134 is separated from the depressor faces 131 and 132 by a section 135.

In operation, the auxiliary bolt 20 normally occupies the full line position shown in FIGURE 3. In this position, the blocker 122 will occupy the full line position of FIGURE 4, and it can be assumed that the door 24 is open and the auxiliary bolt 20 is extended. When the door 24 is closed, one of the depressor faces (131 or 132, depending on the swing of the door) is adapted to engage the strike plate 29. In FIGURE 5, it is the depressor face 132 which will then be caused to pivot in a clockwise direction, as viewed in FIGURE 3, to a subsequent position 20', as shown by the broken line in FIG-

URE 3. After that time, upon further clockwise movement of said depressor face 132, a corner 136 presses against the cam face 127 of the carrier 124 and causes the carrier 124 to move inwardly in the slideway 120, the carrier 124 moving against tension in the spring 121. Energy in the spring 121 will press against the bell crank 117, as previously described, while, at the same time, the inward movement of the auxiliary bolt lever 100 and its related diagonal arm 101 will withdraw the support from behind the blocker 122, thus allowing the blocker 122 to move from the solid line position of FIGURE 4 to the broken line position of FIGURE 4, which is the blocking position which resists subsequent inward movement of the latch bolt 18.

Obviously, if the strike plate 29 were facing in an opposite direction on the door frame 26, the door 24 would be made to swing oppositely from that shown in FIGURE 5. Swung in this direction, the opposite depressor face 131 would strike against the strike plate 29 and cause a corner 137 to press against the cam face 127 of the carrier 124, causing the same result in manipulation of the blocker 122. When the door 24 is completely closed, the auxiliary bolt 20 will move still further inwardly, thereby moving the auxiliary bolt lever 100 inwardly so that the diagonal arm 101 attached to it can perform as described in the preceding paragraphs. When the door 24 is subsequently opened, action of the spring 121 will tend to return all parts to the initial full line position shown in FIGURES 3 and 4. The auxiliary bolt 20 is capable of rocking in either clockwise or counterclockwise direction. Clearly, therefore, the auxiliary bolt 20 can accommodate a swing of the door 24 in either direction, thus to be made to perform its function without any remounting being necessary. The auxiliary bolt 20 at its outer end is guided within the holes 27, 27' and is also guided by the auxiliary bolt lever 100 in its mounting, together with the cooperative support of the carrier 124.

While the invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, 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.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. In a lock installation comprising a strike plate and a casing, the combination of an auxiliary bolt means reciprocatably mounted in the casing and adapted to swing against the strike plate in either direction, and a latch bolt reciprocatably mounted in the casing, said auxiliary bolt means comprising a slideway in said casing, a bolt carrier reciprocatably mounted in said slideway and having an outwardly directed cam face with a passage therethrough, an auxiliary bolt lever extending through said passage and reciprocatably supported therein, the outer end of said auxiliary bolt lever being located in said passage, a bolt head having lateral guide areas and a pivotal connection between the bolt head and the outer end of said auxiliary bolt lever for pivotally mounting said bolt head on a horizontal axis, a pivot face on said bolt head in engagement with said cam face, opposite depressor surfaces on said bolt head diverging progressively outwardly from each other from a free end of said bolt head toward the pivot face, one of said depressor surfaces being adapted to engage said strike plate when the casing is swung in one direction and the other depressor surface being adapted to engage said strike plate when the casing is swung in the other direction, said casing having an opening therein, with edges which engage said lateral guide areas of the bolt head, a blocking arm pivotally mounted on said casing and movable to a location behind said latch bolt, said blocking arm having a passage therethrough in sliding engagement with the inner

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end of said auxiliary bolt lever, and an extension spring acting between said carrier and said blocking arm adapted to return said bolt head to initial position.

2. In a lock installation comprising a strike plate and a casing, the combination of an auxiliary bolt means reciprocatably mounted in the casing and adapted to swing against the strike plate in either direction, a latch bolt reciprocatably mounted in said casing, said auxiliary bolt means comprising a slideway in said casing, a carrier member reciprocatably mounted in said slideway and having an outwardly directed cam face element with a passage therethrough, an auxiliary bolt lever extending through said passage and reciprocatably supported therein, a bolt head element pivotally mounted on the outer end of said auxiliary bolt lever for pivoting in a horizontal plane, a pivot face on said bolt head element in engagement with said cam face element, opposite depressor surfaces on said bolt head diverging progressively outwardly from each other from a free end of said bolt head toward the pivot face, one of said depressor surfaces being adapted to engage said strike plate when swung in one direction and the other depressor surface being adapted to engage said strike plate when swung in an opposite direction, one of said elements having a rounded cam wall at an area of engagement with the other of said elements, a blocking arm in the form of a bell crank lever having a pivot mounting on said casing, a free end of said lever being movable to a blocking location behind said latch bolt and a coiled compression spring acting between said bell crank lever at a location adjacent said pivot mounting and said carrier whereby to extend said free end to said blocking location in response to pivotal movement of said bolt head in either direction.

3. In a lock installation comprising a casing having a latch bolt reciprocatably mounted therein and a strike plate having a bolt hole cooperable only with said latch bolt, the combination of an auxiliary bolt means reciprocatably mounted in the casing and including a blocking

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arm pivotally mounted on said casing and movable to a location behind said latch bolt upon depression of said auxiliary bolt, means to block said latch bolt against depressing when in door closed position and release said latch bolt for depressing when in door open position, said auxiliary bolt means comprising a slideway in said casing, a carrier member reciprocatably mounted in said slideway and having an outwardly directed pivot face with a passage therethrough, an auxiliary bolt lever extending through said passage and reciprocatably supported therein, a bolt head pivotally mounted in the outer end of said auxiliary bolt lever for pivoting on a horizontal axis, a cam face on said bolt head in engagement with said outwardly directed cam face, opposite depressor surfaces on said bolt head diverging progressively outwardly from each other from a free end of said bolt head toward said pivot face, one of said depressor surfaces being adapted to engage said strike plate for a swing of the casing in one direction and the other depressor surface being adapted to engage said strike plate for a swing of the casing in an opposite direction, and an extension spring acting between said carrier and said blocking arm adapted to extend said blocking arm to blocking position upon depression of said bolt head and return said bolt head to extended position when said bolt head is out of engagement with said strike plate.

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