Aug. 11, 1953 H. QUIGLEY ET AL 2,648,560

LOCKING LATCH

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FIG. 1.

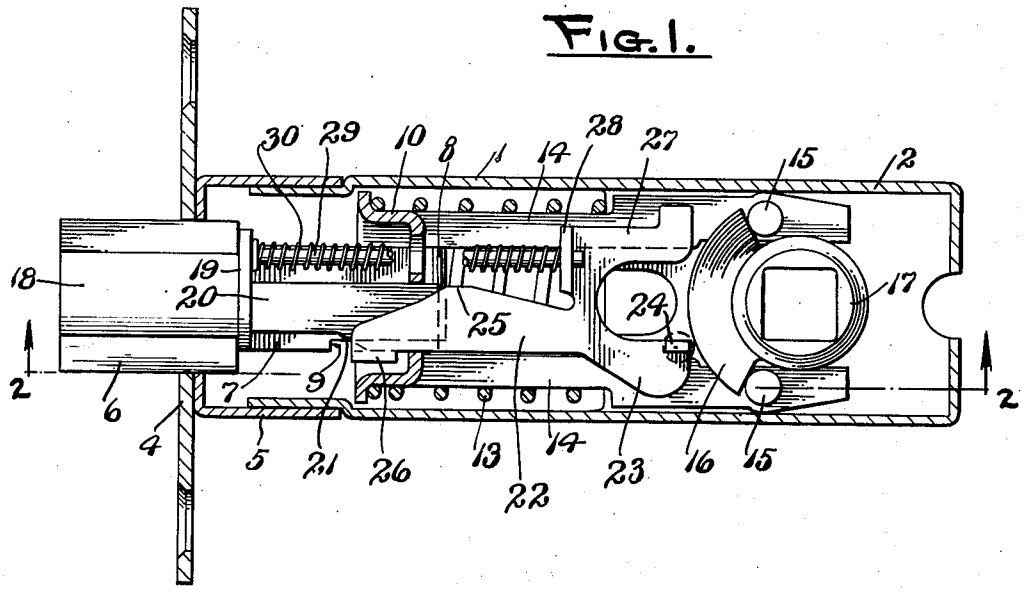
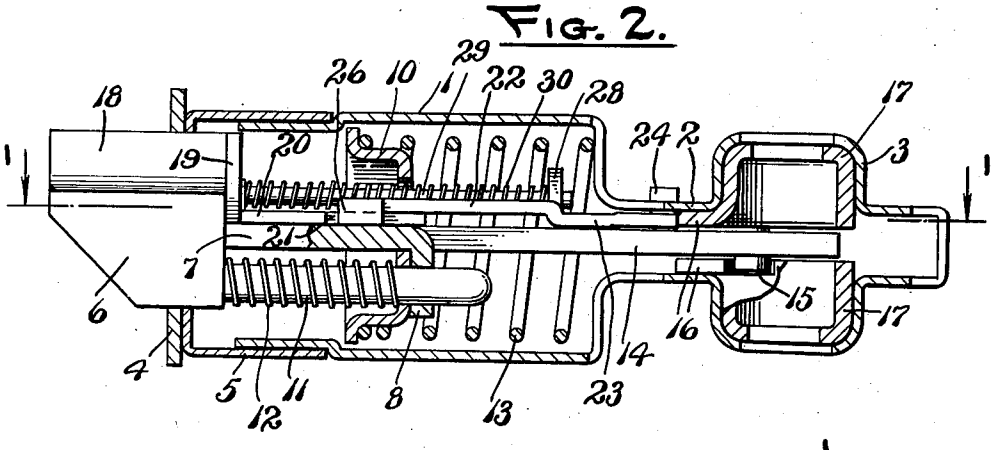


FIG. 2.



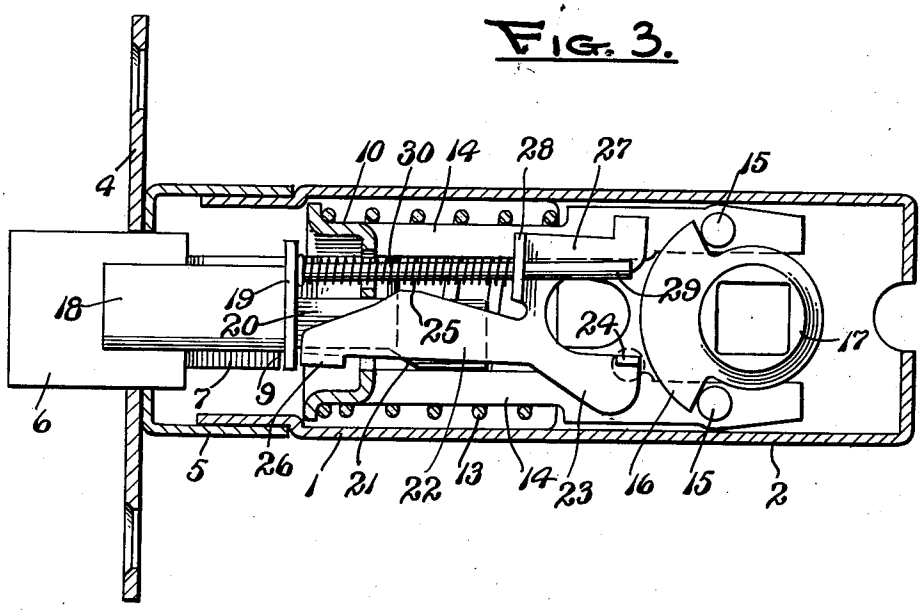
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FIG. 3.



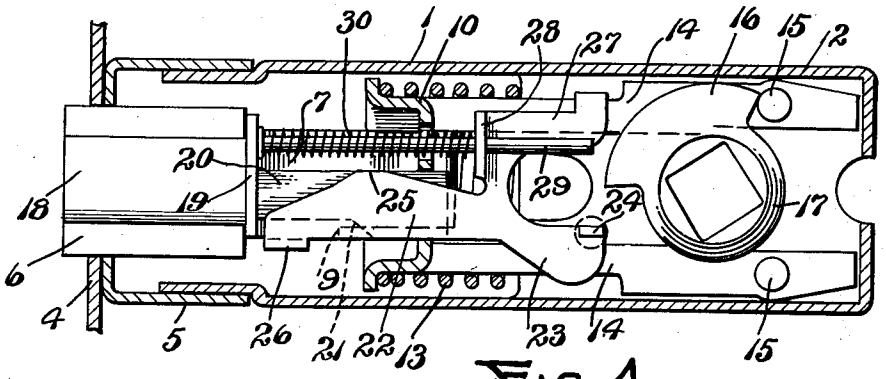


FIG. 4.

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LOCKING LATCH

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10 Claims. (Cl. 292—169)

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This invention relates to a door lock designed for installation at the free vertical edge portion of a swinging door, and which automatically locks the lock bolt when the door is closed against releasing movement except through manual operation of the door knobs which are associated with door locks or latches, thus insuring against retraction of the lock bolt by pressing against it at its outer end or otherwise applying pressure, for example, against the beveled outer end surface of the bolt to work it back to disengage it from its keeper. With the present invention it is impossible to insert a knife blade or other thin implement between the edge of the door and the door casing to engage with the beveled end of the bolt to retract such bolt, as with our invention the bolt is positively locked in its outer position when in its keeper and cannot be retracted except by the door knob operation.

With our invention, the retraction of the bolt is by means of roll-backs mounted at the inner end portion of the lock assembly and which are operated by suitable spindles to which door knobs are attached, the bolts being retracted by a rotation of the spindle in either direction. Key locking of the door against opening may be used with our invention, but is not disclosed as it is not a part of the present invention.

There has been filed heretofore, an application for a similar type of door lock, Ser. No. 47,437, on September 2, 1948. In such door lock the bolt locking means against retraction for a pressure against the outer end of the bolt is controlled through the movement of the roll-backs, the bolt locking means camming thereagainst. It is an object and purpose of the present invention to provide a better and improved structure in which the operation of the bolt lock is more certain and easy, through a camming action in which all tendency or danger of snubbing is eliminated. Novel structure for such improved operation is provided, an understanding of which will be had from the following description taken in connection with the accompanying drawings, in which,

Fig. 1 is a longitudinal vertical section through the bolt housing, the plane of the section through the housing being substantially that shown in line 1—1 of Fig. 2, the bolt mechanism and assembly being shown mainly in side elevation with some parts broken away and in vertical section for better disclosure.

Fig. 2 is a longitudinal horizontal section generally on the plane of line 2—2 of Fig. 1, looking in the direction indicated by the arrows and showing the main bolt and the auxiliary bolt in

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association therewith both in outwardly projected position, and

Figs. 3 and 4 are views similar to Fig. 1, in which the lock bolt and the auxiliary bolt are both in outwardly projected position, Fig. 3 showing the parts in the position occupied when engaged with a keeper and with the auxiliary bolt retracted, and in Fig. 4 both the lock bolt and the auxiliary bolt retracted when a door carrying the lock is opened by roll-back operation.

Like reference characters refer to like parts in the different figures of the drawings.

The housing or casing for the lock assembly mechanism is of sheet metal and of a generally cylindrical form at its outer portion. It is usually stamped in two parts, the cylindrical form being for easy installation on a door as only a hole has to be bored at the free vertical edge of the door for reception of the lock. The outer portion of the casing is of cylindrical form, as indicated at 1, the inner portion being shaped and formed to be of a generally rectangular form in cross section as at 2, having generally parallel flat sides from which outwardly extending roll-back housings 3 are stamped or pressed. An attaching plate for the edge of the door at 4 has secured to it a cup member 5 of sheet metal which embraces the outer end portions of the two parts of the housing or casing in accordance with old practice, the detail of which it is not necessary to set forth herein.

The bolt 6 passes through an opening in the plate 4. It is rectangular in cross section except for a beveled outer end portion for the camming retraction of the bolt when a door is closed as such beveled portion engages the strike on the door jam, the bolt being retracted until the keeper receiving recess or opening is reached into which the bolt moves. From the inner end of the bolt a relatively heavy and vertically disposed plate 7 extends into the housing for a distance and is laterally turned at right angles terminating in a tongue 8. At the under edge of the bar 7 a portion of it at its rear end is cut away forming a stop shoulder 9 at the forward edge of the recess cut, as shown in Fig. 1. Such shoulder is located approximately midway between the ends of the bar 7.

A flanged cup 10 of flat metal is located within the cylindrical portion of the lock housing or casing and has an opening in its bottom through which the bar 7 slidably passes. A rod 11 secured at the inner end of the bolt 6 extends therefrom and passes slidably through the bottom of the cup 10 and also through the terminating tongue 8 of

the bar 7. A relatively light coiled compression spring 12 is located around the rod 11 between the bolt 6 and the bottom of the cup, so that the bolt is readily retracted by overcoming the spring 12 when the door is closed without the necessity of overcoming a much heavier coiled spring 13 the outer end of which is seated against the flange of the cup 10 and the inner end against the shoulders provided between the cylindrical and rectangular portions 1 and 2 of the housing or casing.

From the cup 10 upper and lower spaced generally parallel retractor bars 14 extend lengthwise of and within the lock housing toward, but terminating short of, the inner end thereof. Each bar 14 at each side is equipped with a short outwardly extending projection 15 which may be the end portions of short pins or rods passing through the upper and lower bars 14. Such projections 15 are located in the path of movement of the shoulders at the ends of arc shaped flanges 16 on roll-backs 17 mounted for rotation in the housings 13 therefor. Such roll-backs have squared openings for the passage of a spindle therethrough to the ends of which door knobs may be attached for rocking the roll-backs. Of course, each roll-back may be independently operated as is done in some cases, by various known structures which are used in the art for such purpose.

On rotating either or both roll-backs in either direction the bars 14 are retracted and may be moved from the position shown in Fig. 1 to that shown in Fig. 4 the heavy coiled spring 13 being compressed, and the bolt 6 retracted and drawn into the housing.

Alongside of the bolt 6, an auxiliary member or bolt 18 is located which, preferably, is of a generally semi-cylindrical form having a length equal to the length of the bolt 6, and with its flat side thereagainst. It likewise extends through an opening in the plate 4 joining the opening passing the bolt 6. At its inner end it is equipped with a flange 19 which extends over the inner end of the bolt 6. From the flange 19 a flat bar 20 extends inwardly alongside the heavier bar 7 and through the bottom of the cup 10. The bar 20 is widened for approximately one half of its length at its inner end portion in a downward direction, there being an inclined cam edge 21 extending downwardly and inwardly between the lower edges of the narrower and wider parts of the bar 20. When the bolt 6 and the auxiliary member 18 are at outer position (Fig. 1) said downwardly and inwardly inclined edge 21 is a short distance back of the shoulder 9, the lower edges of the wider outer front portion of the bar 7, and of the wider rear portion of the bar 20 being located in substantially the same horizontal plane.

The locking member 22 for the bolt is formed from a bar or plate of flat metal, at its outer portion lying alongside of the bar 20 and at its inner lower portion having a downwardly and inwardly extending arm 23, from which a lug 24 is turned laterally to pass through an opening in a side of the housing or casing for pivotally mounting said locking member to permit its outer end to have a limited up and down movement. The locking member 22 also passes through the bottom of the cup 10 and at its upper edge, between its ends, has a short horizontal ledge 25. The thickness of the locking member 22 vertically between the ledge 25 and the lower edge of the member is equal to the width of the bar 20 at its

inner widened end portion so that when such ledge 25 is located at the upper edge of the opening through the bottom of the cup 10, no pivotal up or down movement of the locking member may take place. At the outer end of the locking member 22 and at its lower edge a tongue 26 is turned laterally underneath bars or plates 20 and 7.

At the upper rear portion of the locking member an arm 27 is formed, which has a lug 28 extending at right angles therefrom as shown. A rod 29 secured to the flange 19 of the auxiliary bolt 18 passes through an opening in the bottom of the cup 10 and through a second opening in the lug 28. A light coiled compression spring 30 is located around the rod 29 between the flange 19 and lug 28.

When a door upon which the lock is installed is open, spring 13 moves the retractor, consisting of the cup 10 and the bars 14, outwardly until the projections at 15 come against the end shoulders of the flanges 16 of the roll-backs 17. The spring 12 moves the bolt 6 to its outer projected position until the laterally turned end 8 of bar or plate 7 comes against the cup 10. The spring 30 moves the auxiliary bolt 18 outward until flange 19 comes against the inner end of the bolt 6. In such position, as shown in Fig. 1, the tongue 26 of the locking member 22 is held, in a lower position by riding against the wider inner end portion of bar 20.

When the door is closed and the beveled end of the bolt 6 rides upon the strike of the keeper, the bolt is forced inwardly. Such inward movement of the bolt also carries with it the auxiliary bolt 18 because of the flange 19 against the inner end of the bolt 6. The parts will occupy the position shown in Fig. 4 except that the retractor is not moved but remains as in Fig. 1. The lug 26 is then located underneath the outer wider portion of the bar 7.

When the bolt 6 reaches the keeper receiving opening therefor, it is projected outward by spring 12, but the keeper having no opening for the passage of the auxiliary bolt 18, such auxiliary bolt remains retracted and in the position shown in Fig. 3. The outward movement of the bolt 6 carries the wider outer portion of the plate 7 beyond the lug 26, while the inward movement of the auxiliary bolt 18 and its retaining in such position when the bolt is engaged with the keeper on the door casing, locates the plate 20 at an inner position with the inclined cam 21 back of lug 26. The shoulder 9 is in front of the lug 26, whereupon the locking member 22 is turned or rocked counter-clockwise about its pivot 24 by spring 30, lug 26 being lifted into a position between the shoulder 9 and the cam 21. Because of such interposed position of the lug 26 the bolt 6 cannot be moved inwardly by pressure against its outer end as the shoulder 9 will come against such lug 26, which makes a positive stop against inward movement of the bolt. Thus when the door is closed and the parts are in the position shown in Fig. 3, retraction of the bolt sufficient to disconnect it from the keeper, by entrance of a knife blade or similar thin implement between the edge of the door and the door casing, is insured against.

On turning a roll-back 17, with the parts shown in the position in Fig. 3, by operating the usual door knob, either one or both the roll-backs being operated, the retractor is withdrawn moving the cup 10 and bars 14 inwardly. The bolt 6 has a limited inward movement or until the shoulder

9 comes to the lug 26 from which it is spaced a short distance, as shown in Fig. 3. The inward movement of the cup 10, by forcing the laterally turned end 8 of the bar or plate 7, to accompany such movement, withdraws the bolt such short or limited distance, by which time the cup will have reached the inclined upper edge of the locking member 22 immediately outward from the horizontal upper edge 25 with a consequent forcing the locking member downwardly at its front end, to move the lug 26 out of the path of movement of the shoulder 9, whereupon the inward movement of the retractor and the bolt continues until the bolt is fully retracted. The door may then be opened both the bolt 6 and the auxiliary member or bolt 18 being withdrawn and retracted as in Fig. 5.

When the door is opened and the roll-back, or both of them, released by letting loose of a door knob which has turned them, the several springs 12, 13 and 30 described project the retractor, lock bolt and auxiliary bolt outward to the position shown in Fig. 1. With such outward movement, the accompanying movement of the bar 20 insures that when the outward movement of the cup 10 has progressed sufficiently to pass from the horizontal upper edge at 25 of the locking member, the inclined cam edge 21 of the bar 20 will ride upon the lug 26 and hold it in lower position.

In the construction described, the straight or linear movements of the parts which control the locking and unlocking positions of the locking member 22, insures against any snubbing or restriction against complete freedom of movement of the locking member which may occur when the locking member is controlled by the rotary movements of the roll-backs. The structure by means of which this improved result is obtained is of a novel character. It is readily fabricated and assembled and there is retained all of the advantages of installation by the mere boring of a hole to receive the latching housing at the edge of a door, with merely the boring of a second transverse hole through the door for the knob carrying spindles which are used. The structure is compact, is economical to produce and is very practical and useful.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A latch comprising an elongated housing, a movable latch bolt mounted at one end of the housing and projecting beyond said end, a retractor including two parallel spaced bars located within and lengthwise of the housing and a transverse retractor member connecting the outer ends of said bars located transversely of the housing, a member connected to the latch bolt extending inwardly therefrom through said transverse retractor member, at its inner end having means for connection with the retractor for movement of the latch bolt inwardly on longitudinal inward movement of the retractor, a movably mounted locking means located within the housing and passing through said transverse retractor member, interengaging means of said locking means and said bolt for locking the bolt against retraction by application of force to its projecting outer end, and means on said locking means located in the path of movement of said transverse retractor member for releasing said locking means on inward movement of the retractor, whereby said bolt is released for inward movement.

2. In a structure as described, an elongated housing having an opening at its outer end, a latch bolt slidably extending through said opening, a retractor within the housing including a transverse retractor member at the outer end thereof, a bar connected to said latch bolt extending inwardly therefrom through said transverse member, means at the inner end of the bar for connecting it with said transverse retractor member to move the bolt inwardly upon inward movement of the retractor member, said bar being slidable through said transverse retractor member for independent inward movement of said bolt with the retractor at rest, spring means between the bolt and retractor normally moving the bolt to its outer position, locking means located within the housing and movably mounted on said housing passing through said transverse retractor member, said bar at its under side being recessed for a portion of its length and said locking means being adapted to enter said recess to hold the bolt and bar against inward movement, and means at the upper portion of said locking means located in the path of movement of said transverse retractor member when the retractor is moved inwardly for moving said locking means away from said bar whereby the bolt may be retracted by longitudinal inward movement of the retractor member.

3. A structure as defined in claim 2, and an auxiliary bolt mounted alongside said latch bolt for movement and inwardly and outwardly with respect to said housing, a second bar connected to the auxiliary bolt at its inner end passing through said transverse retractor member underneath which said locking means passes at one end thereof, spring means located between said auxiliary bolt and locking means normally projecting the auxiliary bolt outwardly and moving the locking means into locking position, said second mentioned bar at its inner end portion being widened at its lower edge and narrowed at its outer portion at such lower edge, whereby when the auxiliary bolt is at outer position said locking means is moved into inoperative position with respect to the latch bolt.

4. In a structure as described, an elongated housing having an opening at one end, a latch bolt longitudinally movable through said opening, an auxiliary bolt alongside the latch bolt longitudinally movable through said opening, a bar connected at the inner end of each of the bolts extending into and located longitudinally of the housing, the bar connected to the latch bolt being wider at its outer than at its inner portion, and having a shoulder at its under side at the inner end of its wider portion, and the bar connected to the auxiliary bolt being wider at its rear portion than at its front portion and having an upwardly and outwardly inclined lower edge between the lower edges of the narrower and wider portions of the bar, the lower edges of the wider portions of both bars being located in the same horizontal plane, a retractor comprising upper and lower retractor bars and a transverse member connecting said bars at their outer ends, through which transverse member both of said bolt bars slidably pass, means at the rear end of the latch bolt bar for connecting it with the transverse retractor member for moving the bolt inwardly on inward movement of the retractor, a spring for normally forcing the

retractor outwardly, a spring between the latch bolt and retractor for forcing the latch bolt outwardly, a locking member pivotally mounted adjacent its inner end on said housing and extending forwardly and lying alongside said auxiliary bolt bar and passing through said transverse retractor member, at its outer end having a laterally turned lug extending under both bolt bars, and spring means between the auxiliary bolt and said locking member normally tending to project the auxiliary bolt outwardly and turn the locking member to move said lug to bear against the under edges of said bolt bars.

5. A locking latch comprising a housing, a latch bolt slidably mounted in and normally projecting from said housing, a retractor slidable longitudinally in said housing, means for actuating the retractor, a cross head fixed to said retractor, an extension on said latch bolt slidably extending through and guided by said cross head, an auxiliary bolt adjacent said latch bolt, means for retracting said latch bolt and said auxiliary bolt by movement of said retractor, independent means for thrusting said latch bolt and auxiliary bolt outward, a locking member movably mounted in said housing and extending through and guided by said cross head and movable into locking engagement with said latch bolt, and camming means on siad cross head engageable with said locking member.

6. The elements of claim 5 combined with an extension on said auxiliary bolt passing through and guided by said cross head.

7. The elements of claim 5 in which said housing has a contracted portion and a portion of said locking member lies within the contracted portion and is guided by a wall thereof.

8. The elements of claim 7 in which said locking member is pivoted in said housing and that portion which is guided by the said wall of the housing is a lateral extension from said pivot.

9. In a latch structure adapted to cooperate with a strike plate, said latch structure having a housing, a latch bolt, a retractor and roll-backs adapted to reciprocate said retractor axially of said housing, said latch bolt being adapted for reciprocation independently of said retractor, the improvement therein comprising: a transverse member on the end of said retractor adjacent said latch bolt; a locking member pivotally mounted to said housing; means for urging said locking member into engagement with said latching bolt; means for disengaging said locking member from said latch bolt when said latch bolt is extended and disengaged from said strike plate; a cam on said locking member; a bar on said transverse member adapted to engage said cam on said locking member and pivot said locking member out of engagement with said latch bolt when said retractor is moved toward said roll-backs.

10. In a latch structure having a housing, a latch bolt, a retractor and roll-backs adapted to reciprocate said retractor axially of said housing, said latch bolt being adapted for reciprocation independently of said retractor, the improvement therein comprising: a transverse member on the end of said retractor adjacent said latch bolt; a locking member pivotally mounted to said housing adjacent said roll-backs; an auxiliary bolt; means for urging said locking member into engagement with said latch bolt; a cam on said auxiliary bolt for disengaging said locking member from said latch bolt when said auxiliary bolt is extended; a cam on said locking member; a bar on said transverse member adapted to engage said cam on said locking member and pivot said locking member out of engagement with said latch bolt when said retractor is moved toward said roll-backs.

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