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FLUSH MOUNTED LOCK ASSEMBLY

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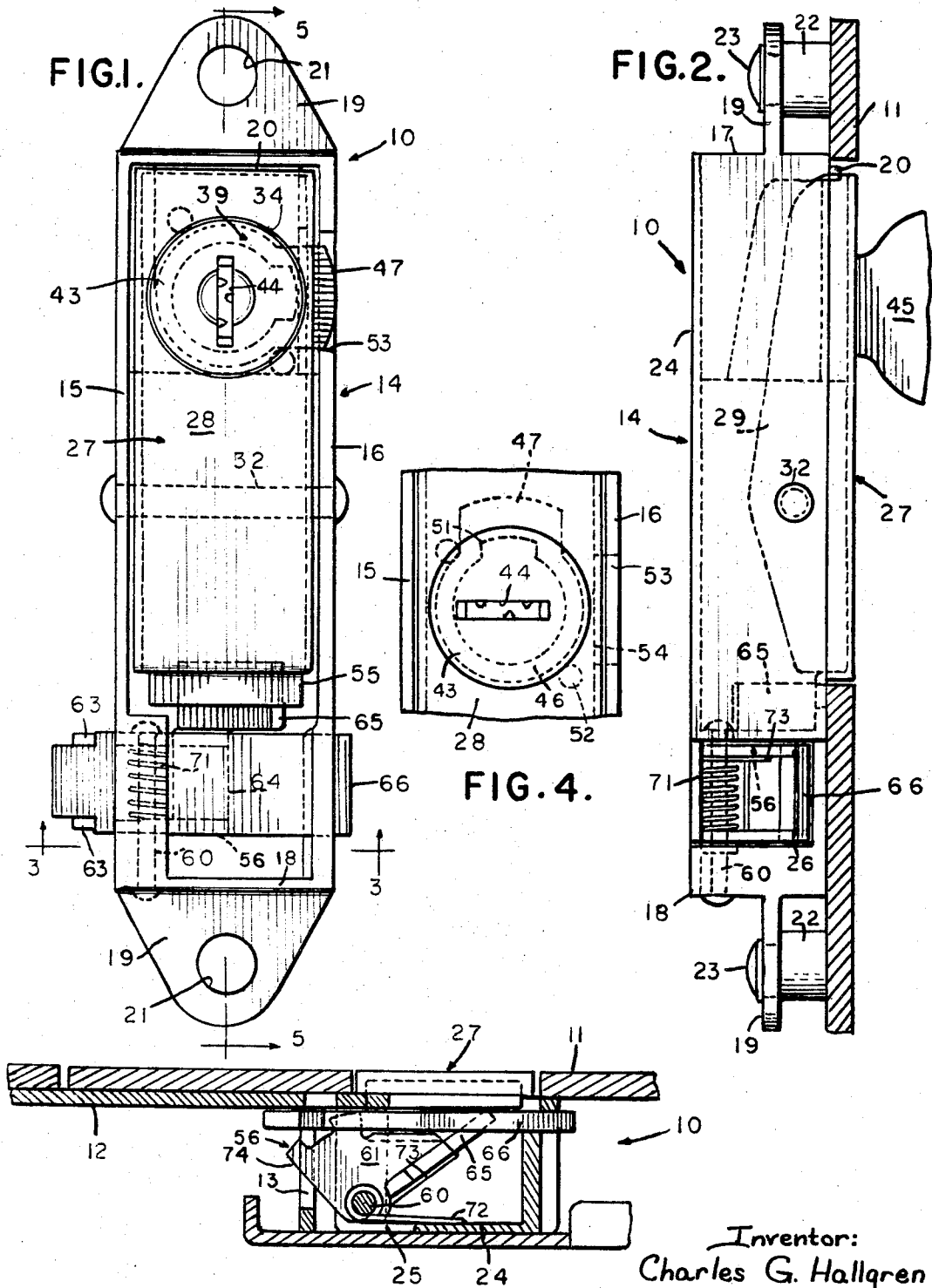


FIG. 3.

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FLUSH MOUNTED LOCK ASSEMBLY
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ABSTRACT OF THE DISCLOSURE

A flush mounted lock assembly utilized on switch boxes and similar structures having a lock housing secured within a closure and aligned with an opening in the closure for a push plate pivotally mounted in the housing on a pivot pin extending transversely between the side walls of the housing. The housing includes an integral lock cylinder for a tumbler lock having a lock bolt mounted for arcuate movement between an unlocked position and locked position with the end of the bolt extending through a slot in the edge wall of the push plate to prevent rocking movement thereof. The lower inwardly moving end of the push plate engages and rocks an actuating arm of a pivotally mounted retractor which is operatively connected to and reciprocates a latch bolt cooperating with a strike on the enclosure for the closure carrying the lock assembly.

The present invention relates to a novel lock for a switch box and more particularly to a novel flush mounted lock assembly which may be utilized on switch boxes and similar structures.

Among the objects of the present invention is the provision of a combination latch, pull and lock assembly which is designed for locking switch panel doors or the like where it is desired to have a combination latch and locking mechanism that is as inconspicuous as possible. The lock mechanism is completely concealed; the only parts showing are the push plate and the head of the lock plug. When the lock assembly is mounted on the door, the push plate and plug are flush with the outer surface of the panel or door.

Another object of the present invention is the provision of a combination latch, pull and lock assembly having the entire mechanism contained within a unitary housing. The assembly includes a push plate which is pivotally mounted within the housing and has two main functions; namely, pivotal movement of the plate actuates a latch bolt for the door, and the push plate in its pivoted or actuated position provides a pull for opening the panel or door.

A further object of the present invention is the provision of a combination latch, pull and lock assembly having a key-actuated locking bolt which cooperates with the pivotally mounted push plate to prevent pivotal movement thereof and thus restrict or prevent the panel or door from being opened. The locking bolt is rotatably mounted upon a key-actuated plug assembly mounted in the housing. The outer end of the locking bolt is adapted to be received within a slot in the push plate to prevent pivotal movement thereof.

The present invention also comprehends the provision of a combination latch, pull and lock having a spring-biased latch bolt extending from one side of the housing to engage a lip or strike on the cabinet enclosing the panel or door to retain the panel or door in closed position. The latch bolt is actuated by pivotal movement of the push plate through a pivotally mounted latch bolt retractor. A coil wound spring not only biases the latch bolt and retractor to the latching position, but also biases the push plate to its flush position.

The present invention further comprehends the provision of a combination latch, pull and lock which is flush

mounted in a panel or door to provide a minimum opportunity for tampering or forcing the lock assembly to unlock the panel or door.

The present invention further comprehends the provision of a combination latch, pull and lock which may have a dead bolt actuated by the locking plug which acts independently of the push plate and latch bolt to lock the panel or door in its cabinet or other enclosure.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

FIG. 1 is a front elevational view of the combination latch, pull and lock assembly utilized in a switch box panel or other door and adapted to be mounted flush therein.

FIG. 2 is a side elevational view of the assembly of FIG. 1 showing the flush mounting in a panel or door.

FIG. 3 is a horizontal cross sectional view taken on the line 3-3 of FIG. 1 and showing the mounting of the assembly in a door of a cabinet or enclosure.

FIG. 4 is a partial front elevational view of the lock plug in the assembly with the locking bolt in its unlocked position.

FIG. 5 is a vertical cross sectional view taken on the line 5-5 of FIG. 1 and viewed in the direction of the arrows.

FIG. 6 is a partial front elevational view of the locking plug in the upper end of the assembly with the push plate broken away.

FIG. 7 is a front elevational view of the housing for the assembly.

FIG. 8 is a vertical cross sectional view of the housing taken on the line 8-8 of FIG. 7.

FIG. 9 is a side elevational view of the push plate.

FIG. 10 is a front elevational view of the latch bolt retractor.

FIG. 11 is a side elevational view of the retractor.

FIG. 12 is a front elevational view of the lock bolt.

FIG. 13 is a front elevational view of the latch bolt.

FIG. 14 is a partial end elevational view of the assembly similar to FIG. 3 except for the inclusion of a dead bolt actuated by the lock plug.

Referring more particularly to the drawings wherein is disclosed an illustrative embodiment of the present invention, FIGS. 1, 2 and 3 disclose a combination latch, pull and lock assembly 10 adapted to be mounted on the interior or rear surface of a door or panel 11 for a cabinet, box or other enclosure 12. The enclosure includes a strike plate 13 cooperating with a latch bolt in the assembly 10.

The combination latch, pull and lock assembly 10 includes a generally rectangular die cast housing 14 having side walls 15 and 16 and end walls 17 and 18, each end wall being provided with an outwardly extending mounting ear or tab 19 having an opening 21 therein. A flange 20 is formed on the upper end wall 17 for a purpose to be later described. As clearly seen in FIG. 2, the door 11 has internally threaded nuts 22 welded onto the interior surface of the door and suitable securing means such as the screws or bolts 23 extend through the openings 21 of the ears 19 and threadingly engage the nuts 22 to mount the housing 14 against the internal surface of the door 11. The housing 14 is also provided with a rear wall 24 having a generally rectangular opening 25 (FIGS. 3 and 7) adjacent the end wall 18; the opening 25 extending up into the side wall 15 as at 26 (see FIG. 2).

A push plate 27 (FIGS. 1, 2, 5 and 9) has a front wall 28 and rearwardly extending spaced side walls or flanges 29, each having an opening 31 intermediate its ends for a pivot pin 32. The flange 20 on the housing co-

operates with the upper end of the push plate 27 to provide for self-alignment thereof. The pivot pin 32 extends across the housing 14 through openings 33 in the side walls 15 and 16 and is secured therein. The front wall 28 of the push plate has an opening 34 aligned and concentric with passage 37 extending through the rear wall 24 of the housing 14.

A lock cylinder 35 (FIGS. 5, 7 and 8) is formed integral in the upper end of the housing 14 and includes an irregular block 36 (FIG. 7) extending upward from the wall 24; the block having a central passage 37 therethrough aligned with the opening 34 in the push plate. The block 36 includes four equally spaced axially extending grooves 38 in the passage 37 which cooperate with the plate tumblers in a lock plug 39 which is received in the passage 37 of the cylinder 35. The lock plug 39 is provided with a groove receiving a lock or retainer ring 41 which cooperates with the lower ends of the ribs formed between the grooves 38. Also, the rib 42 is shortened as seen in FIG. 8 to allow for movement of a projection 51 (FIG. 4).

The lock plug 39 has an enlarged head 43 at the front of the cylinder 35 and a plurality of slots for the tumblers and a longitudinally extending keyway 44 for a suitable key 45 (FIG. 2). The head or flange 43 of the plug abuts a lock bolt 46 (FIG. 12) which has a generally circular body with a locking ear 47 and a central opening 48 adapted to receive the plug 39. An arcuate recess 49 is formed in the opening 48 and aligned with the locking ear 47 to receive a complementary projection 51 (FIG. 4) formed on the plug 39 adjacent the head 43 so the plug 39 and bolt 46 will rotate simultaneously. The cylinder 35 has a pair of pins or projections 52 formed on the outer face thereof on substantially diametrically opposite sides of the block 36 to cooperate with the locking ear 47 to limit the arc of rotation of the plug and lock bolt to approximately 90°. Also the side wall 16 of the housing 14 has a cut-out 53 to accommodate the locking ear 47 as seen in FIG. 1, and the side 29 of the push plate 27 adjacent the side wall 16 as a slot 54 (FIG. 9) to receive the locking ear 47 and thereby prevent pivotal movement of the push plate about the pivot pin 32.

The inner end of the push plate 27 is formed with an actuating lip 55 which is offset below the plate 28 and engages a pivotally mounted latch bolt retractor 56 (FIGS. 1, 3, 10 and 11). A wall or flange is formed in the side wall 15 of the housing 14 extending into the housing to aid in defining the opening 25 in the rear wall 24; which opening extends up into the side wall 15 at 26 and terminates in an inwardly extending portion 58 of wall 15. The wall 57 and end wall 18 have openings 59 to receive a pin 60 which extends through the wall 57 and down through the end wall 18, and is secured therein to pivotally mount the retractor 56.

The retractor 56 includes a pair of generally sector-shaped sides 61, each side having an opening 62 to receive the pin 60 and a pair of spaced lugs or teeth 63 on the arcuate surface. The sides 61 are joined by a connecting portion 64, and an actuating arm 65 is integral with the upper side 61 at one edge thereof. A latch bolt 66 is actuated by the retractor 56 through the teeth 63 engaging notches 67 on opposite edges 68 of the bolt. The bolt 66 is positioned underneath the portion 58 in side 15 and extends through a slot 69 in the side wall 16; the bolt resting on the retractor 56.

A coil spring 71 is mounted on the pin 60 between the sides 61 of the retractor 56 with one end 72 biased against and engaging the wall 24 of housing 14 and the other end 73 biased against and engaging the underside of the connecting portion 64 to urge the retractor to rotate in a counterclockwise direction as seen in FIG. 3 and project the latch bolt 66 to its extended latching position. Also, as clearly shown in FIG. 3, the actuating arm 65 is in an angularly arranged position engaging the actuating lip 55 of the push plate.

With the plug 39 rotated in a counterclockwise direction, the lock bolt 46 is in its inactive position as shown in FIG. 4. Pressure applied to the lower portion of the push plate 27 causes the plate to pivot in a clockwise direction as seen in FIGS. 2 and 5. The lip 55 on the push plate 27 urges the actuating arm 65 downward rotating the retractor 56 in a clockwise direction as seen in FIG. 3 against the action of the spring 71 to move the latch bolt 66 to the right to unlatched position. The upper outwardly projecting portion of the push plate 27 may now be grasped and utilized as a pull to open the door 11.

When the push plate 27 is released, the spring 71 urges the retractor 56 to rotate in a counterclockwise direction (FIG. 3) causing the latch bolt 66 to move to latched position and the actuating arm 65 urges the push plate to inactive position. When the door is being closed, the strike plate 13 engages the camming surfaces 74 of the retractor 56 to rotate the retractor and reciprocate the latch bolt 66 to its unlatched position so the door may be closed; the bolt 66 and retractor 56 returning to latching position once the door is closed under the impetus of the spring 71.

To lock the door 11 against opening, the key 45 is inserted in the keyway 44 in the lock plug 39 and the key and plug rotated clockwise as seen in FIG. 1 so that the locking ear 47 on the lock bolt 46 abuts the lower right-hand pin 52 on the lock cylinder 35. The locking ear 47 enters the slot 54 in the side 29 of push plate 27 and the cut-out 53 in the side 16 of the housing 14. The key may be removed from the plug in this position, and the locking ear 47 in the slot 54 prevents any pivotal movement of the push plate 27 to retract the latch bolt 66 (see FIGS. 1 and 6).

Although the present assembly is shown with a locking bolt which prevents actuation of the latch bolt through the push plate, the present invention also contemplates the use of a dead bolt 75 as shown in FIG. 14 secured to the inner end of the lock plug 39 at the exterior of the housing 14 which will engage the strike plate 13 and prevent movement of the assembly 10 and door 11 regardless of actuation of the latch bolt 66. Obviously, where a dead bolt is utilized, the lock bolt for the push plate is unnecessary.

Having disclosed the invention, I claim:

1. A combination latch, pull and lock assembly for a door of an enclosure having a strike plate, comprising an elongated housing mounted on the interior surface of the door, a latch bolt extending across said housing to engage the strike plate in the enclosure, a push plate in the housing, said door having an opening exposing the push plate, a pivot pin extending transversely across said housing and push plate to pivotally mount the push plate about a horizontal axis, a spring-biased retractor pivotally mounted in said housing, said retractor having an actuating arm engaging the lower end of the push plate and spaced sides with teeth engaging the latch bolt to actuate the latch bolt upon rotation of the retractor resulting from pivotal movement of the push plate, a key-actuated lock in the housing having a rotatable plug, and a lock bolt actuated by rotation of the plug between unlocked and locked positions to prevent opening of the door.

2. A combination latch, pull and lock assembly as set forth in claim 1, in which said lock bolt is mounted within the housing and said push plate has a slot to receive the lock bolt and prevent pivotal movement of the push plate.

3. A combination latch, pull and lock assembly as set forth in claim 1, in which said key-actuated lock includes a lock cylinder integral with the housing and having a central passage, and a lock plug mounted within said passage, said push plate having an opening aligned with and accommodating the lock plug.

4. A combination latch, pull and lock assembly as set forth in claim 3, in which said lock cylinder includes a pair of spaced pins engaged by said lock bolt to limit

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rotation of the lock bolt and plug between unlocked and locked positions.

5. A combination latch, pull and lock assembly as set forth in claim 1, including a second pivot pin mounted in said housing, a coil spring mounted on said second pivot pin and having one end engaging the housing, said retractor being pivotally mounted on said second pivot pin, and the other end of said coil spring engaging the retractor to bias the retractor and the latch bolt to latched position.

6. A combination latch, pull and lock assembly as set forth in claim 1, in which the push plate has an offset edge engaging said actuating arm of the retractor, said push plate when pivoted having a projecting portion which is utilized as a pull to open the door.

7. A combination latch, pull and lock assembly as set forth in claim 1, including an aligning flange on the upper end of the housing cooperating with the upper end of the push plate.

8. A combination latch, pull and lock assembly for a door of an enclosure having a strike plate, comprising an elongated housing secured to the interior surface of the door, a pivot pin extending transversely across the housing, a push plate having downwardly extending parallel sides, said door having an opening exposing the push plate, said pivot pin extending through said parallel sides to form a transverse axis for pivotal movement of the push plate, a lock cylinder integral with and positioned at one end of the housing and having a central passage, said push plate having an opening aligned with said passage, a lock plug received in said passage and rotatable therein and having an enlarged head received in the opening in the push plate, a lock bolt mounted on and rotatable with said plug and located between said enlarged head and said cylinder, one side of said push plate having a slot adapted to receive said lock bolt upon rotation of said plug, a second pivot pin mounted in said housing, a coil spring mounted on said second pivot pin and having one end engaging the housing, a retractor pivotally mounted on said second pivot pin and having an actuating arm, said push plate having an offset edge engaging said actuating arm, and a latch bolt reciprocable between latched and unlatched positions operatively connected to said retractor so that pivotal movement of said push plate will pivot the retractor and reciprocate the latch bolt, the other end of said coil spring engaging the

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retractor to bias the retractor and the latch bolt to latched position.

9. A combination latch, pull and lock assembly for a door of an enclosure having a strike plate, comprising an elongated housing having mounting tabs for securing the housing to the interior surface of the door, a pivot pin extending transversely across the housing, a push plate having downwardly extending parallel sides, said door having an opening exposing the push plate, said pivot pin extending through said parallel sides to form a transverse axis for pivotal movement of the push plate, a lock cylinder integral with and positioned at one end of the housing and having a central passage therethrough, said push plate having an opening aligned with said passage, a lock plug received in said passage and rotatable therein and having an enlarged head, a lock bolt mounted on and rotatable with said plug and located between said enlarged head and said cylinder, one side of said push plate having a slot adapted to receive said lock bolt upon rotation of said plug, a spring-biased retractor including an actuating arm engaging said push plate, a pair of spaced generally sector-shaped sides and a connecting portion, a second pivot pin mounted in said housing, a coil spring mounted on said second pivot pin and having one end engaging the housing and the other end engaging the retractor, each sector-shaped side being pivotally mounted on said second pivot pin at the apex of the side and having spaced teeth on the arcuate edge opposite the apex, and a latch bolt reciprocable between latched and unlatched positions and having spaced notches on each edge thereof engaging the teeth of the sides of the retractor so that pivotal movement of the push plate will pivot the retractor and reciprocate the latch bolt, said coil spring biasing the retractor and the latch bolt to latched position.

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