

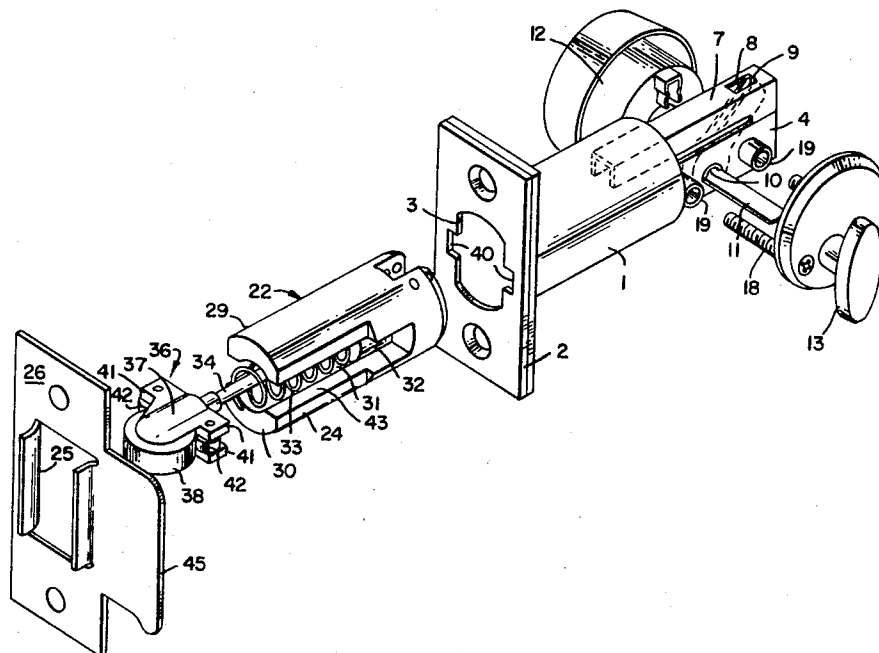
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[21] Appl. No 637,988
[22] Filed May 12, 1967
[45] Patented Feb. 9, 1971
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[54] **DOOR PULL LOCK**
6 Claims, 3 Drawing Figs.
[52] U.S. Cl. 292/15,
292/40, 292/75, 292/143
[51] Int. Cl. E05c 1/02,
E05c 1/16
[50] Field of Search 292/73, 75,
9, 23; 70/107, 192, 193; 292/15, 40, 143

ABSTRACT: The combination of a spring-urged roller or bullet catch and a deadbolt mounted for projecting from the edge of a door along a horizontal axis centered between the vertical edges of the opening in a strike on the jamb.



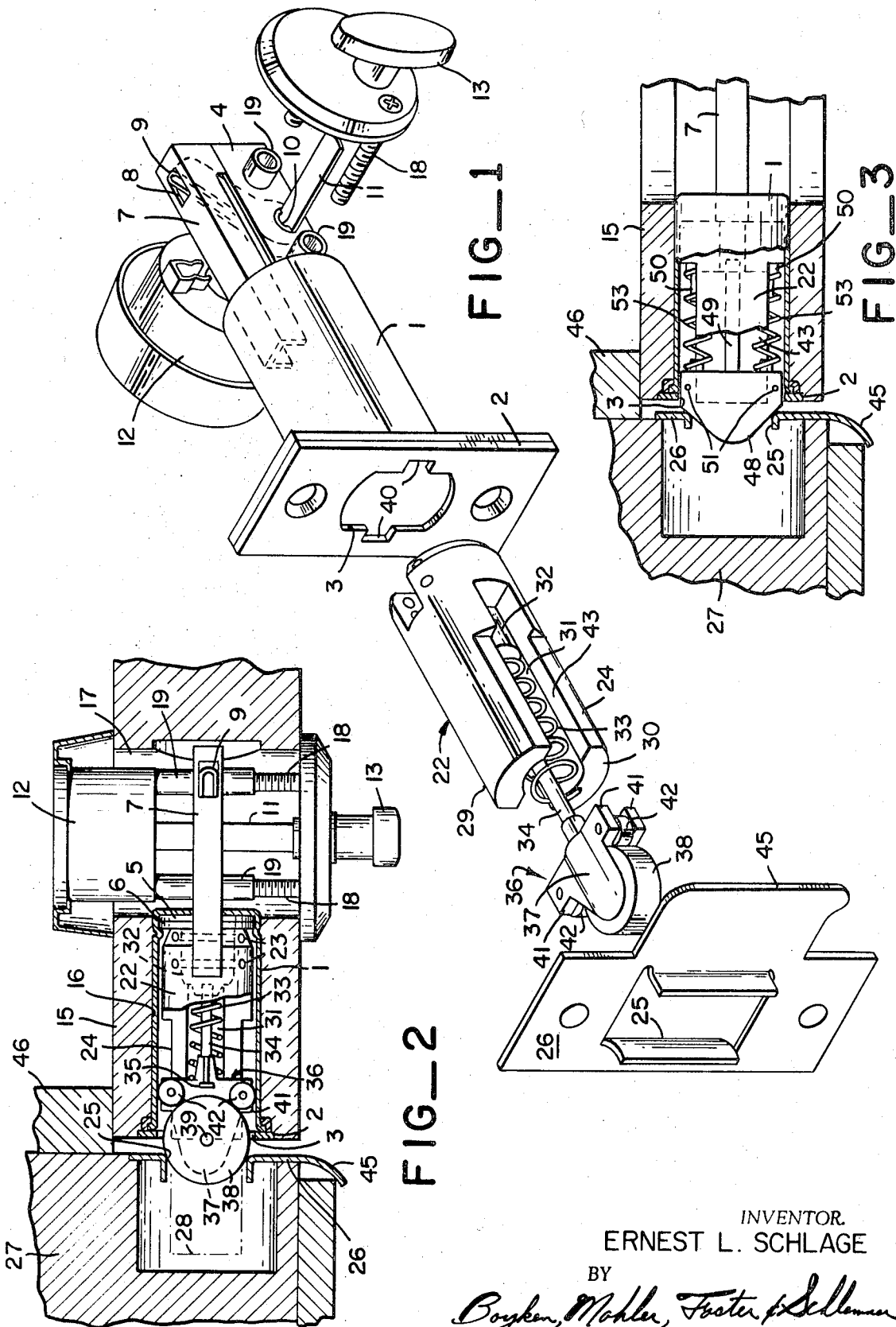


FIG-2

FIG-1

FIG-3

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DOOR PULL LOCK

BACKGROUND OF INVENTION

This invention relates to a door pull lock, i.e., the combination of a catch that frictionally engages a strike on the door jamb and may be unlatched by merely pulling or pushing the door and a maximum security lock that may be released only by manually retracting a bolt projecting through the strike opening.

Friction catches, such as roller or bullet catches for performing the first function, and deadbolts for performing the latter, are each old, per se. Heretofore the two types of structure have been mounted in the same housing and on occasion, as in U.S. Pat. No. 1,553,531, combined into a single assembly. Insofar as is known, however, there is no coaction between the roller catches and deadbolts of such prior art devices but each functions separately and independently of the other and performs only the function attributable to its particular structure.

Furthermore, prior efforts to combine friction catch and deadbolt functions in a single lock unit have resulted in sacrificing some of better features of each for the sake of convenience and facility of manufacture or have failed to make full use of the possible capabilities of either.

SUMMARY OF INVENTION

A door pull lock constructed in accordance with this invention includes a friction catch which is self-centering and functions to prevent the door from rattling with respect to its associated jamb and stop. Not only does the friction catch yieldably engage the edges of the strike plate opening on the jamb to hold the door against accidental opening, but it positions the door with respect to the strike plate so that a deadbolt, mounted in the same housing for throwing along the same longitudinal axis, may be projected accurately through the strike plate opening for maximum security.

It is therefore an object of this invention to provide an improved friction catch which accurately and effectively holds a door in closed position but may be opened readily by merely pulling on the door.

Another object of this invention is the provision of a door pull lock in which a friction catch and deadbolt cooperate to provide ease of operation with different degrees of security, as desired.

Other objects and advantages will appear from the following description of preferred embodiments of the invention.

DESCRIPTION OF FIGURES

FIG. 1 is an exploded perspective view of one preferred embodiment of the door pull lock of this invention;

FIG. 2 is a horizontal sectional view, partly broken away to show detail, of the embodiment of FIG. 1 mounted in a door with its associated jamb; and

FIG. 3 is a partial horizontal sectional view, similar to FIG. 2, of another embodiment of the door pull lock of this invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The embodiment of the lock of this invention disclosed in FIGS. 1 and 2 comprises a tubular housing 1 having a two-piece face plate 2 with a central opening 3 therein secured to the front end of said housing in a conventional manner. Projecting rearwardly from the rear end of housing 1 is an elongated anchor 4. Anchor 4 carries a flange 5 (FIG. 2) at its inner end which, together with a washer 6, are stapled against the inner side of the closed rear end of housing 1 to secure anchor 4 in place.

Slidably mounted on the upper edge of anchor 4, and extending through an opening in the rear end of housing 1 is an elongated retractor bar 7. The rear end of bar 7 is provided with an opening 8 for engagement with the outer end of a retractor crank 9 having a boss 10 journaled in anchor 4 thereby supporting said crank for swinging toward and away

from housing 1. A cross slot in boss 10 receives the edges of a flat spindle bar 11 which is operatively connected to the cylinder of a conventional pin tumbler lock 12. A thumb turn 13, mounted on the side of anchor 4 opposite lock 12 is also operatively connected to spindle bar 11. By either turning the cylinder of lock 12 with a key or turning thumb turn 13, spindle bar 11 rotates crank 9 thereby projecting retractor bar 7 toward face plate 2 or retracting the same to the position shown in FIGS. 1 and 2.

The lock of this invention is adapted to be mounted in a door 15 (FIG. 2) with housing 1 received in a cylindrical bore 16 and face plate 2 mortise into and attached by screws to the outer edge of said door. Lock 12 and thumb turn 13 are mounted on opposite faces of door 15 and extend into a cross bore 17. The unit is secured in place by a pair of screws 18 extending through the escutcheon of thumb turn 13 into threaded engagement with a pair of posts 19 extending from lock cylinder 12 through openings in anchor 4.

Slidably supported in housing 1 is a generally cylindrical locking bolt 22, the rear end of which is slotted and connected, as by pins 23 (FIG. 2), to the forward end of retractor bar 7. The forward end of bolt 22 is formed with flats 24 on its opposite sides so that it is narrower in width than the rear end of said bolt. As a crank 9 is rotated forwardly by either thumb turn 13 or lock 12 it throws retractor bar 7 forwardly and bolt 22 outwardly through the opening 3 in face plate 2, projecting the forward portion of said bolt through an opening 25 in a strike plate 26. Strike plate 26 is mounted in the customary manner on the jamb 27 associated with door 15 and the forward end portion of bolt 22 extends therethrough to the projected locking position indicated by dot-dash line 28 in FIG. 2. Preferably, the width of opening 25 (the spacing between its edges) is just slightly larger than the width of the forward end portion of bolt 22 so as to freely receive the same without substantial lateral play.

Bolt 22 is further provided with a central, longitudinally extending through bore 31 which receives a generally cylindrical spring seat 32 and a helical compression spring 33 in abutment therewith extending toward the forward end of bolt 22. An elongated spring guide rod 34 is slidably received in a bore in seat 32 and extends forwardly through the coils of spring 33 to a head 35 (FIG. 2) connecting it to a roller carriage 36.

Said carriage comprises a pair of upper and lower plates 37 which receive head 35 of rod 34 in correspondingly shaped recesses at the rear portions of said plates. The forwardly-projecting portions of plates 37 receive therebetween a disc-shaped roller 38 which is journaled for rotation about a vertically-extending pin 39, the ends of which are received in bearings in said plates. The forward end portion of bolt 22 is preferably formed with a longitudinally-extending cross slot 43 (FIG. 1), opening into bore 31, providing spaced upper and lower elements 29 and 30 of said bolt. Carriage 36 is received between elements 29, 30 and plates 37 are provided with oppositely outwardly projecting ears 41 at the rear thereof which are received in slot 43. The forward end of spring 33 abuts the rear end of carriage 36.

In this manner, carriage 36 is supported for movement along the same longitudinal axis as bolt 22, roller 38 is supported for rotation about a vertical axis, and both are resiliently urged toward a projected position extending outwardly of face plate 2. Opening 3 is provided with opposing notches 40 permitting passage of roller 38 inwardly through said opening, but ears 41 project to a greater extent than notches 40 thereby preventing projection of roller 38 and its carriage 36 outwardly of opening 3 past a position in which the rear portions thereof are retained within housing 1. In a preferred form of the invention ears 41 of plate 37 carry therebetween rotatable auxiliary thrust rollers 42 in rolling engagement with the inner sides of housing 1.

With bolt 22 in the retracted position (shown in full line in FIG. 2) the rounded nose or forward portion of roller 38 projects outwardly of the edge of door 15. When moving the door from an open toward a closed position in its associated jamb

27, the projecting portion of roller 38 first engages and rolls onto the curved lip 45 of strike plate 26. The purpose of rollers 42 is to absorb the lateral thrust on the roller carriage effected by engaging the strike plate on opening or closing the door. Since the roller 38 projects a greater distance than the gap between the edge of door 15 and the face of strike 26, roller 38 and carriage 36 are progressively cammed inwardly against the resilience of spring 33 as said roller rolls across strike plate 26 toward opening 25. When the door has been swung to the closed position against the stop 46 (FIG. 2) roller 38 is projected by spring 33 into opening 25 thereby engaging at two contact points the opposing vertical side edges of said opening and being wedged therebetween. The form of roller 38 provides it with diverging cam surfaces which extend to a greater lateral extent outwardly of said contact points than the width of opening 25, so that roller 38 bridges the opening and serves the function of centering the lock with respect to strike plate 26 on the jamb.

Preferably the conventional stop 46 (FIG. 2) on jamb 27 of a one-way door is positioned so as to firmly engage the door face when roller 38 is in the self-centered position on the strike plate. The catch of this invention therefore functions to yieldably hold the door against such stop. Furthermore, in installations where the stop 46 is mounted farther away from strike plate opening 25, in a double-swinging door which has no stop on the jamb or on double doors, this catch effectively prevents rattling of the doors caused by drafts and the like by virtue of the yieldable engagement of roller 38 with the opposing edges of the strike plate opening 25.

Since the two contact points on roller 38 and bolt 22 are mounted symmetrically with respect to the same longitudinal axis of housing 1, roller 38 also functions to properly position the bolt centrally of opening 25. When the bolt is thrown to its projected position 28 (FIG. 2) it readily enters said opening without requiring manipulation of the door. It will also be noted that roller 38 continues to perform its rattle-preventing function when bolt 22 is in the locked position.

In the modified form of FIG. 3, like parts have been numbered the same as in FIGS. 1 and 2. A deadbolt 22 is similarly mounted for projecting and retracting by a retractor bar 7 along the longitudinal axis of its housing 1, similarly supported in door 15. A flat blade 48 is supported for similar projecting and retracting movement along the same axis. An elongated tail 49 extends rearwardly from blade 48 through the central opening in bolt 22 and the outer rear portions of said blade are received in the slot 43 thereof.

On opposite sides of tail 49 a pair of elongated spring guides 50 extend rearwardly through openings in bolt 22 into engagement with the closed rear end of housing 1 and carry helical coil springs 53 extending forwardly into yieldable engagement with the rear end of blade 48. Blade 48 is thereby mounted for movement along the longitudinal axis of housing 1 and is resiliently urged to a projected position by springs 53. In such position the nose portion of said blade projects outwardly of the face plate 2 and is prevented from moving outwardly of such position by a pair of stops 51 on blade 48 which engage the back side of said face plate.

The forwardly projecting nose portion of blade 48 is provided with a wedge-shaped cam surface which is rounded at its outer point and diverges rearwardly toward the outer edges of said blade to a greater lateral extent than the width of strike plate opening 25 between its opposing side edges. Upon closing the door 15 of FIG. 3 said nose portion of blade 48 similarly engages lip 45 of strike plate 26 and is cammed inwardly, depressing it against springs 53. When the face of door 15 is in engagement with a properly positioned stop 46, the nose portion of blade 48 is yieldably projected into opening 25 in strike plate 26 with the diverging cam surfaces of said blade in engagement with the opposing vertical edges of said opening at a pair of opposed contact points.

As in the previously described form of the invention, the cam surfaces on blade 48 extend laterally outwardly of said contact points and the latter are spaced apart a slightly greater

distance than the width of the forward end portion of bolt 22. In a similar manner, blade 48 centers the lock embodiment of FIG. 3 with respect to the opening 25 thereby properly positioning said lock for accurate entry of bolt 22 into opening 25 as it is thrown by retractor bar 7. Because of its diverging cam surfaces blade 48 also yieldably holds door 15 against rattling with respect to its associated jamb 27 and stop 46.

In both embodiments of the lock, the fact that the spring-urged friction catch or detent (roller 38 in FIGS. 1 and 2 and blade 48 in FIG. 3) has diverging cam surfaces extending across or bridging the strike opening and engaging opposed contact points on its edges results in the catch yieldably centering and holding the door in the jamb, so that the deadbolt is accurately positioned for entering the strike opening.

In the other embodiments of this invention the nose portion of the friction catch may take the form of a spherical ball, supported in a socket, or may be shaped like the nose of a bullet. It is also obvious that the roller catch and deadbolt may be mounted on the jamb or on one door of a pair of double doors and the strike plate on a door, or the lock may be employed to secure a window or other closure, without departing from the invention.

I claim:

1. In a door lock of the type having:

- a. a lock housing;
 - b. a strike adapted to be mounted in opposed, operative relationship to said housing, the improvement comprising;
 - c. said strike having an opening therein defined by a pair of laterally spaced, opposed side edges;
 - d. a friction catch supported in said housing for movement along a longitudinal axis between a forward projected position and a rearward retracted position relative to said strike, said catch including:
 1. means for resiliently urging said catch toward said projected position, and
 2. a forwardly projecting nose portion having cam surfaces thereon diverging rearwardly and extending laterally of said axis a greater distance than the spacing between said side edges for extending across said opening and resiliently engaging both said side edges;
 - e. an elongated deadbolt having a forward end portion of narrower width than the spacing between said side edges and mounted in said housing for movement along said axis between a retracted position wholly within said housing and a locked projected position in which said forward end portion extends forwardly through said opening; and
 - f. means for so mounting said deadbolt in said housing and with said deadbolt positionable in said projected position when said catch is in any position along said longitudinal axis between said forward projected position and said rearward retracted position.
2. The improvement of claim 1, in which:
- said friction catch includes a roller of circular section supported for rotation about an axis normal to said longitudinal axis and said cam surfaces being on the periphery of said roller.
3. The improvement of claim 1, in which:
- said friction catch includes a wedge-shaped blade having a rounded forward end and said cam surfaces are on the forward edges of said blade.
4. The improvement of claim 1, in which:
- said friction catch and said deadbolt are laterally symmetrical about said axis.
5. In a door lock of the type having:
- a. a lock housing;
 - b. a strike adapted to be mounted in opposed, operative relationship to said housing, the improvement comprising;
 - c. said strike having an opening therein defined by a pair of laterally spaced, opposed side edges;
 - d. a friction catch supported in said housing for movement along a longitudinal axis between a forward projected

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position and a rearward retracted position relative to said strike, said catch including:

1. means for resiliently urging said catch toward said projected position, and
 2. a forwardly projecting nose portion having cam surfaces thereon diverging rearwardly and extending laterally of said axis a greater distance than the spacing between said side edges for extending across said opening and resiliently engaging both said side edges;
 - e. an elongated deadbolt having a forward end portion of narrower width than the spacing between said side edges and mounted in said housing for movement along said axis between a retracted position wholly within said housing and a locked projected position in which said forward end portion extends forwardly through said opening;
 - f. said forward end portion of said deadbolt is provided with spaced upper and lower elements; and
 - g. said friction catch is supported between said upper and lower elements.
6. In a door lock including a strike, the improvement comprising:
- a. said strike having an opening therein defined by a pair of laterally spaced, opposed side edges;

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- b. a detent supported for movement along a longitudinal axis between a forward projected position and a rearward retracted position relative to said strike, said detent including: 1. means for resiliently urging said detent toward said projected position against said strike, and 2. a forwardly projecting nose portion having cam surfaces thereon diverging rearwardly and extending laterally of said axis a greater distance than the spacing between said side edges for extending across said opening and resiliently engaging both said side edges;
- c. an elongated deadbolt having a forward end portion of narrower width than the spacing between said side edges and supported adjacent said detent for movement along said axis between a retracted position and a locked projected position in which said forward end portion extends forwardly through said opening; and
- d. means for so-supporting said deadbolt and with said deadbolt positionable in said projected position when said detent is in any position along said longitudinal axis between said forward projected position and said rearward retracted position.

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