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3,438,227

POP HANDLE LOCK

Filed July 13, 1966

FIG. 1

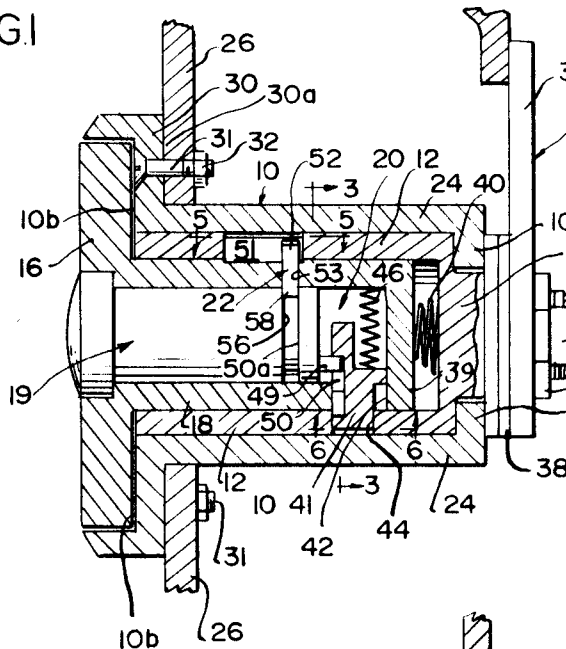


FIG. 2

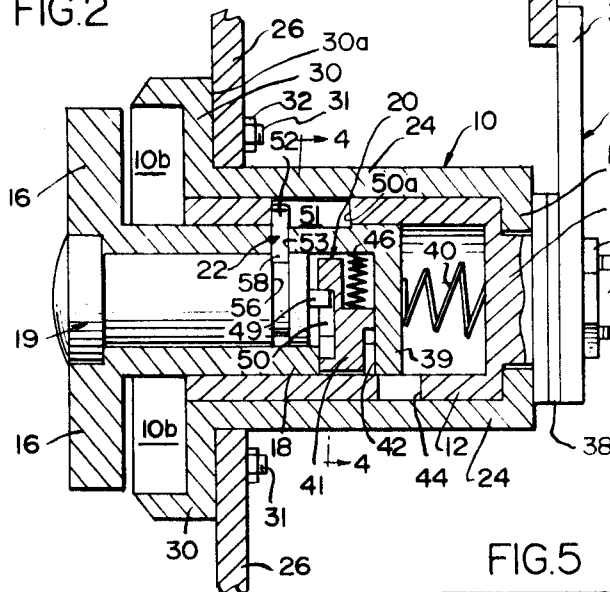


FIG. 3

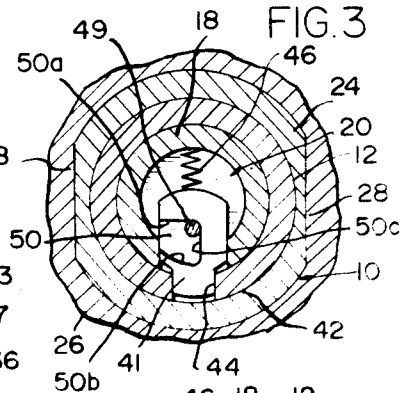


FIG. 4

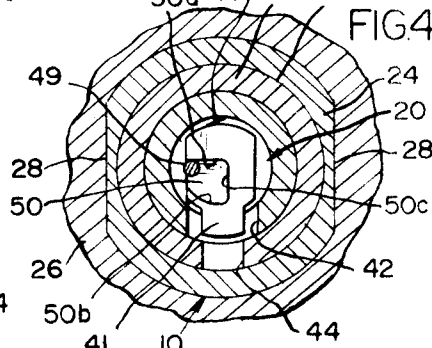


FIG. 4A

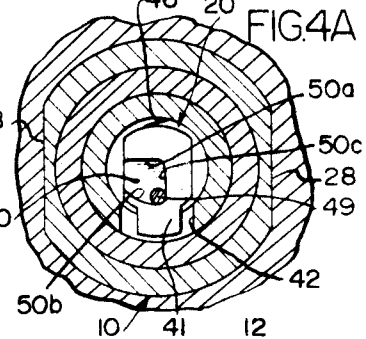


FIG. 6

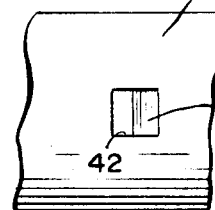


FIG. 5

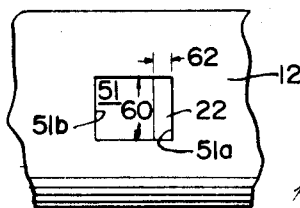
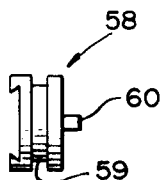


FIG. 7



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POP HANDLE LOCK

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Int. Cl. E05b 5/00

U.S. Cl. 70—208

3 Claims

ABSTRACT OF THE DISCLOSURE

A pop handle lock in which a handle, located on the outside of a door, is movable between a retracted position wherein the handle is in a position of register with and is wholly contained within a recess in a lock housing to an extended operative position wherein the handle is positioned forwardly of the front face of the housing. The lock has improved retaining means and driving means between a cylinder portion of the lock, a sleeve portion of the handle and a lock plug assembly located in the sleeve portion of the handle. A lost motion means is provided to permit the lock plug assembly to be rotated back to its locking position while the handle is extended to provide a self-locking mechanism on return of the handle to its retracted position.

This invention relates to an improved lock construction and particularly to a device commonly known as a "pop handle" lock.

A pop handle lock generally includes an operating leverage-applying handle which is located on the outside of the door and which has a portion extending through the door to which a locking mechanism is secured. When the door is in its locked condition, the handle may be placed in an inoperative retracted position in registry with and wholly contained within a pocket or recess where it is inaccessible for manipulation. To unlock the device, a key is inserted into a plug assembly and rotated to release a catch means and the handle will pop out of the recess to an extended operative position forwardly of the front face of the door where it can be rotated to operate the locking mechanism on the opposite side of the door. In such lock constructions, the key merely releases the handle rather than operating the locking mechanism. The handle is the leverage-applying means for operating the locking mechanism secured thereto.

It is an object of this invention to provide a new and improved lock construction of the pop handle type which is stronger and simpler than those heretofore provided.

Another object of this invention is to provide an improved lock construction of the character described having an improved tamper-proof device.

A further object is to provide such a lock construction including a single member which limits the outward movement of the operating handle, connects the handle and cylinder for rotation and also retains the plug assembly within the handle.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a central sectional view through a lock embodying the invention, illustrating the handle in its wholly retracted position;

FIG. 2 is a central sectional view as in FIG. 1 illustrating the handle in its extended position;

FIG. 3 is a vertical sectional view taken generally along the line 3—3 of FIG. 1, illustrating the bolt holding the handle in its retracted position with the lock's key removed;

FIG. 4 is a vertical section view taken generally along

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the line 4—4 of FIG. 2, illustrating the bolt as positioned when the handle is in its extended position with the key in;

FIG. 4A is a view similar to that of FIG. 4 with the key removed;

FIG. 5 is a fragmentary section view taken generally along the line 5—5 of FIG. 1, illustrating the stop segment positioned in the opening in the cylinder means;

FIG. 6 is a partial section view taken generally along the line 6—6 of FIG. 1, illustrating the bolt as positioned in FIG. 3; and

FIG. 7 is an elevation view of a plug extension adapted for employment with the device of this invention.

The invention is illustrated herein as embodied in a cam type pop handle lock having a handle which is movable between a retracted position (FIG. 1), wherein the handle is in a position of register with and is wholly contained within a pocket or recess, and an extended position (FIG. 2), wherein the handle is positioned forwardly of the front face of a door or the like, the lock including a key operated catch means or bolt which releasably retains the handle in its retracted position.

Referring generally to the drawings, the lock construction includes a housing 10 having an inwardly projecting bearing means 10a at the rear thereof and a pocket or recess 10b in its front face, a cylinder means 12 rotatably received in the housing and having a hub portion 12a projecting rearwardly through the housing bearing means 10a, a handle 16 having a sleeve portion 18 slidable axially in the cylinder means 12, a lock plug assembly 19, a spring-biased key operated catch means generally designated 20, and a stop segment 22 interconnecting the plug assembly 19, handle 16 and cylinder means 12. A locking means generally designated L is secured to the hub portion 12a of the cylinder means as by a rearwardly projecting stud 23 (hereinafter described).

Referring to the drawings in greater detail, the housing 10 includes a generally cylindrical portion 24 inserted into an appropriate opening 25 in a door 26. The housing is provided with an enlarged front portion 30 having a rear face 30a abutting the front face of the door 26. The front portion 30 includes the shallow elongated recess 10b for receiving handle 16. Flat headed bolts 31 extend through the front portion 30 and door 26 and secure the cylindrical portion 24 to the door and prevent relative rotation thereof. Nuts 32 are threaded onto the bolts from the inside of the door. The housing also includes, at the rear thereof the radially inwardly projecting bearing means 10a.

The cylinder means 12 is rotatably received in the housing cylindrical portion 24 and the hub portion 12a projects rearwardly through the rear bearing means 10a of the housing whereby a suitable locking mechanism can be secured thereto. The locking mechanism illustrated includes an externally threaded stud 23 extending axially rearwardly from the hub 12a. A cam 34 is secured thereto by threading a nut 36 onto stud 23 to retain the cam thereon. The cam 34 has flat external faces corresponding to flat faces 37 on stud 23 to prevent relative rotation between the cam and stud. Appropriate washers 38 may be employed between the hub 12a and/or the bearing means 10a to maintain the proper spacing and engagement with the cam 34. The cam cooperates with an appropriate bearing plate to hold the door closed.

The sleeve portion 18 of handle 16 is slidably received axially in cylinder 12 whereby handle 16 is movable with sleeve 18 axially between a retracted position, wherein the handle is in a position of register with and is wholly contained within recess 10b (FIG. 1), and an extended position wherein the handle is positioned forwardly of the front face of the housing (FIG. 2). The sleeve 18 is

provided with a rear end wall 39 formed integrally therewith. A first spring means 40 is biased between the end wall 39 and the hub portion 12a of cylinder 12 to urge the handle axially relative to the cylinder toward its extended position. As hereinafter described, stop segment 22 defines the extended position of the handle.

A catch means is disposed within the sleeve portion 18 of the handle immediately forward of the end wall 39 thereof and includes a bolt 41 extending radially through an opening 42 in the sleeve portion and into an opening 44 in cylinder 12. A second spring 46 is disposed between the bolt and the interior cylindrical wall of sleeve 18 to urge the bolt into opening 44 in cylinder 12. Thus retraction of bolt 41 out of opening 44 in the cylinder 12 in a radial direction against spring 46 will permit spring 40 to pop handle 16 and sleeve 18 axially out of cylinder 12 toward its extended position.

In order to interconnect the bolt with the plug assembly 19 whereby rotation of the plug releases the handle, the plug assembly includes a stud 49 extending axially rearwardly away from the rear face thereof. The bolt 41 has a bolt pocket 50 facing forwardly away from the bolt 41 for receiving the stud 49 and includes a peripheral camming surface (hereinafter described and best illustrated in FIGS. 3 and 4). The stud 49 is spaced from the axis of rotation of the plug assembly 19 whereby on rotation of the plug assembly (as by a key, described above), the stud follows an arc from its position shown in FIGS. 1 and 3 to the position shown in FIGS. 2 and 4, thereby applying force to camming surface 50a and forcing the bolt 41 against spring 46 and out of cylinder opening 44, FIG. 4, releasing the handle. The handle 16 will now pop out of recess 10b to its extended position, FIG. 2, whereby it may be rotated to operate the locking mechanism L. The bolt pocket 50 is sufficiently large to permit the stud 49 to be rotated without contacting the bolt. The arc shaped portion 50b of the bolt pocket eliminates possible catching of the bolt pocket on other parts of the lock. This arc shaped portion closes up the side opening of the pocket 50 to provide maximum side guiding of the bolt, but the arc portion clears the rotational movement of stud 49. The pocket surface 50c acts as a stop surface for stud 49 and thereby positions the lock plug vertically for key removal.

FIGURE 3 shows the relationship of the bolt 41 and the plug 49 when the lock is locked and the key is removed. FIGURE 4 illustrates the unlocked relationship with the key in. Here the bolt is retracted by rotation of the plug and the handle can pop out to permit operation of the locking mechanism. FIGURE 4A illustrates the relationship when the handle is extended and the key is removed. Actually a spring-bolt self-locking feature is provided whereby the handle may be pushed in to lock the lock without using a key. The bolt will snap from its position in FIG. 4A to its position in FIG. 3 when the handle is pushed into its recess.

In order to limit the outward movement of handle 16 and provide means interconnecting the handle and cylinder 12, the cylinder 12 is provided with a longitudinal slot 51 (FIG. 5) having an inner stop surface 51a and an outer stop surface 51b. The slot receives the outer portion 52 (FIG. 1) of stop segment 22. The sleeve portion 18 of handle 16 is provided with an opening 53, FIGS. 1 and 2, in angular alignment with slot 51 and loosely embracing stop segment 22. The plug assembly 18 is provided with an annular groove 56 which receives the inner portion 58 of the stop segment. Groove 51 in cylinder 12, opening 53 in sleeve 18, annular groove 56 in plug assembly 18, and the stop segment 22 cooperate to maintain the handle and cylinder conjointly rotatable relative to the plug assembly and housing, and provide a lost motion connection to maintain the handle and

plug assembly conjointly movable axially in relation to the cylinder. The stop surface 51b of slot 51 defines the extended position of handle 16. The stop segment also retains the plug assembly within the handle.

The stop segment 22 (FIG. 5) has an annular width 60 which is substantially greater than the axial thickness 62 thereof, and the angular width of slot 51 conforms to the width of segment 22. The inner edge of segment 22 is convexly formed to provide a better fit in the annular groove 56 in the plug assembly 18, and its outer edge is concavely formed to conform to the shape of slot 50 in cylinder 12. Referring to FIG. 7, it can be seen that the device of this invention is readily adaptable for use with a plug assembly including a plug extension 58, as disclosed and described in my copending application, Ser. No. 457,619, filed May 21, 1965, and now Patent No. 3,336,774. The plug extension includes an annular groove 59 and a stud 60 identical to groove 56 and stud 49 described above, and may be used in combination with a standard plug assembly as disclosed in said application.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations are to be understood therefrom as some modifications will be obvious to those skilled in the art.

I claim:

1. A pop handle lock comprising: a housing having a cylindrical portion and a recessed outer face; a cylinder rotatable within the cylindrical portion of said housing and carrying a fastening means, said cylinder having an axial longitudinal slot; a handle having a manually engageable portion and a sleeve portion slidable axially in said cylinder between a retracted position with said manually engageable portion nested in said recess and an extended position with said manually engageable portion exposed for engagement; a lock plug assembly rotatable in said sleeve portion and having a bolt extending radially outwardly through aligned radial openings in said sleeve and in the cylinder and retractable on rotation of the lock plug assembly to release said handle for movement outwardly from said cylinder, said lock plug assembly having an annular groove on the exterior thereof; and a stop segment having an outer portion extending radially away from the lock plug assembly through the sleeve portion of said handle into said slot to permit axial movement of the handle within the cylinder between the retracted and extended positions of the handle, said slot and said stop segment maintaining said handle and said cylinder conjointly rotatable relative to said housing, said stop segment having an inner portion loosely received in said annular groove to maintain said handle and said plug assembly conjointly movable axially within said cylinder between the retracted and extended positions of the handle.

2. The lock of claim 1 wherein the annular width of said stop segment is substantially greater than the axial thickness thereof, and the width of said slot corresponds to the width of said segment.

3. The lock of claim 2 wherein said stop segment has an outer convex edge conforming with the radial cross sectional shape of the slot in said cylinder and wherein said stop segment includes an inner concave edge conforming with the radial cross sectional shape of the annular groove in said lock plug assembly.

References Cited

UNITED STATES PATENTS

3,213,654	10/1965	Davenbaugh et al.	70—208
3,234,765	2/1966	Kerr	70—208

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