United States Patent [19]

Ramsey

[11] **3,792,886**

[45] **Feb. 19, 1974**

[54] **TWO WAY DOOR LATCH**

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[73] Assignee: **Acme General Corporation**, Monrovia, Calif.

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June 2, 1972 Mexico 135,924

[52] **U.S. Cl.** ...**292/169.21**, 292/169.18, 292/DIG. 38

[51] **Int. Cl.** **E05c 1/12**

[58] **Field of Search**..... 292/169.17, 169.21, 169.22, 292/169.23, DIG. 38

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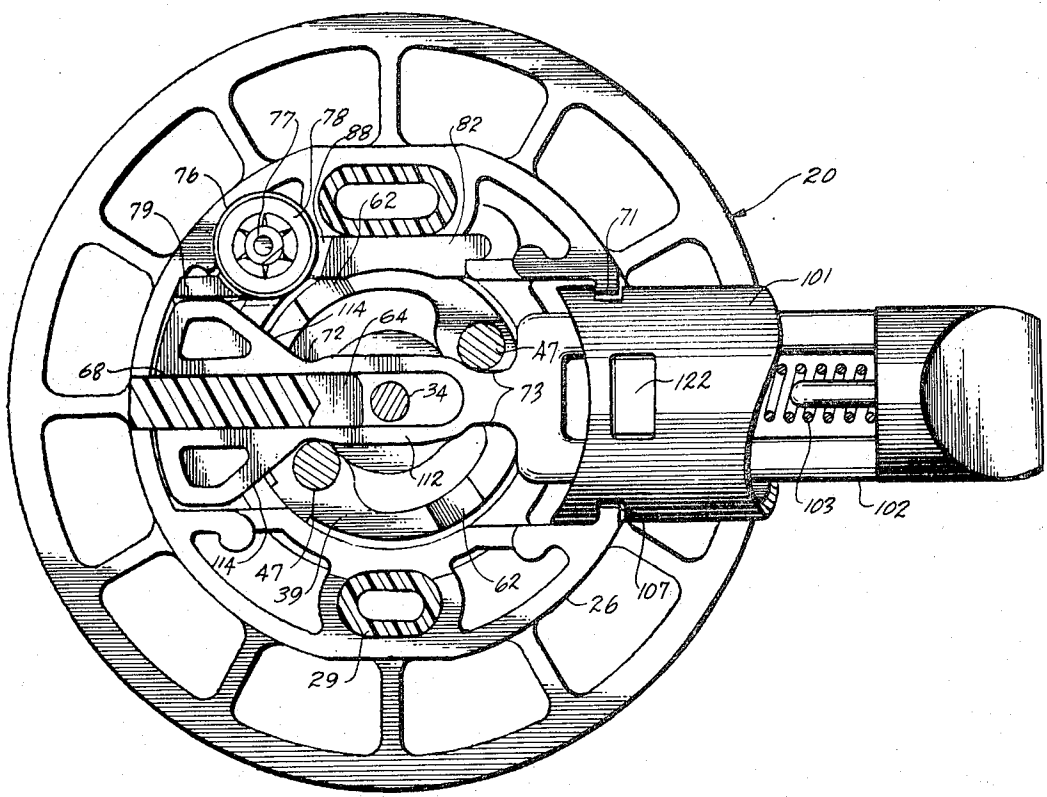
Primary Examiner—Marvin A. Champion
Assistant Examiner—Richard P. Tremblay
Attorney, Agent, or Firm—Christie, Parker & Hale

[57] **ABSTRACT**

A door latch, the knobs of which may be turned either clockwise or counterclockwise for operating the latch bolt is described. One of the knobs engages the corresponding escutcheon when the knob is pushed towards the door to prevent rotation and provide a privacy lock. A pair of pins extend between the knobs and engage ramps on the inside end of latch bolt for retracting it. The latch bolt is split so that the ramp portions may collapse towards each other for insertion through a hole in the edge of the door. Interlocking support posts on the two escutcheons prevent the latch bolt from collapsing during use. A "kickoff" mechanism operated by the latch bolt prevents inadvertent locking and also provides resilient release to prevent damage in case the door is locked while the locking knob is held in. The door latch is made of injection molded plastic and the two escutcheons are held together by a single axial screw.

4 Claims, 16 Drawing Figures



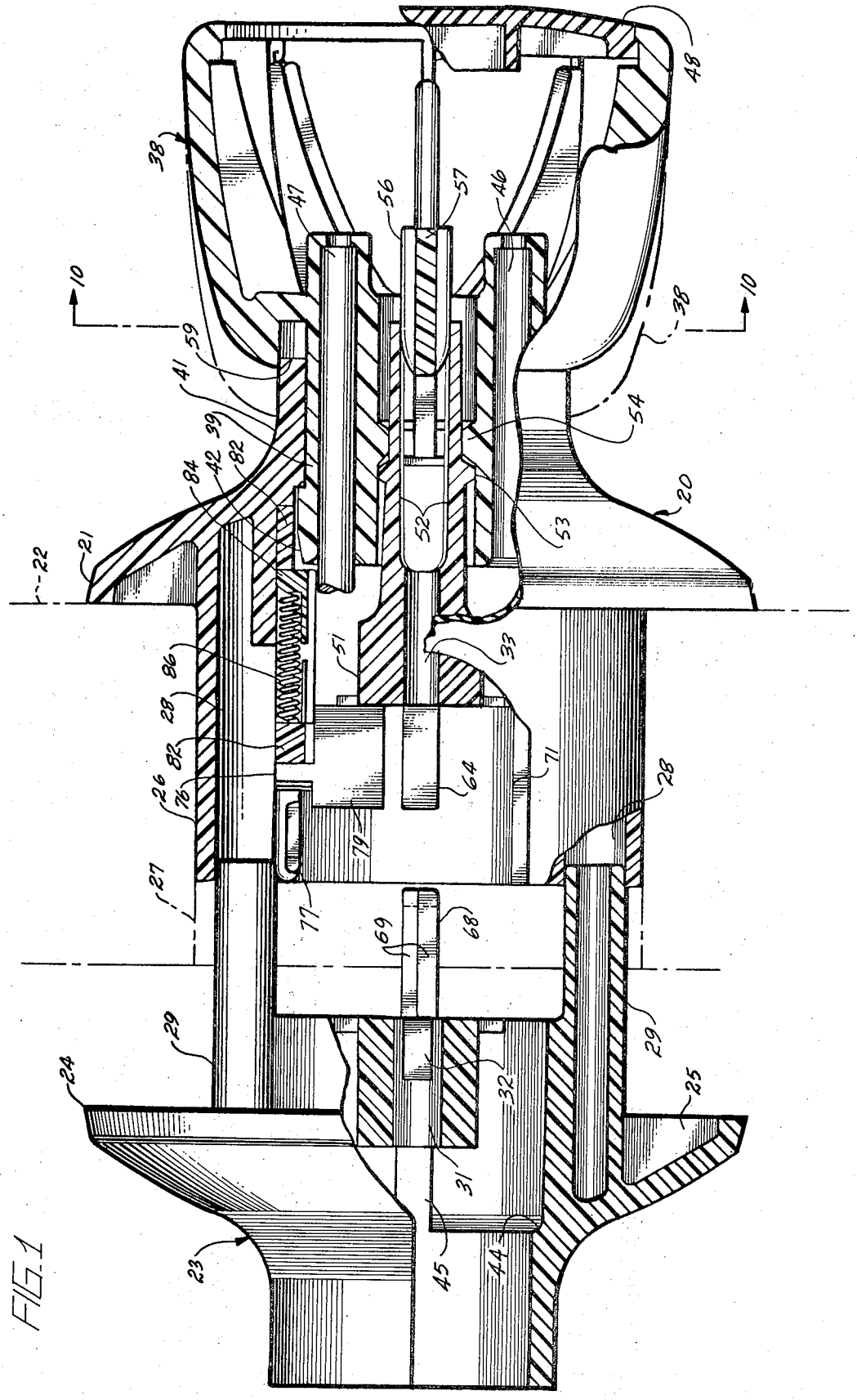

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FIG. 1

FIG. 2

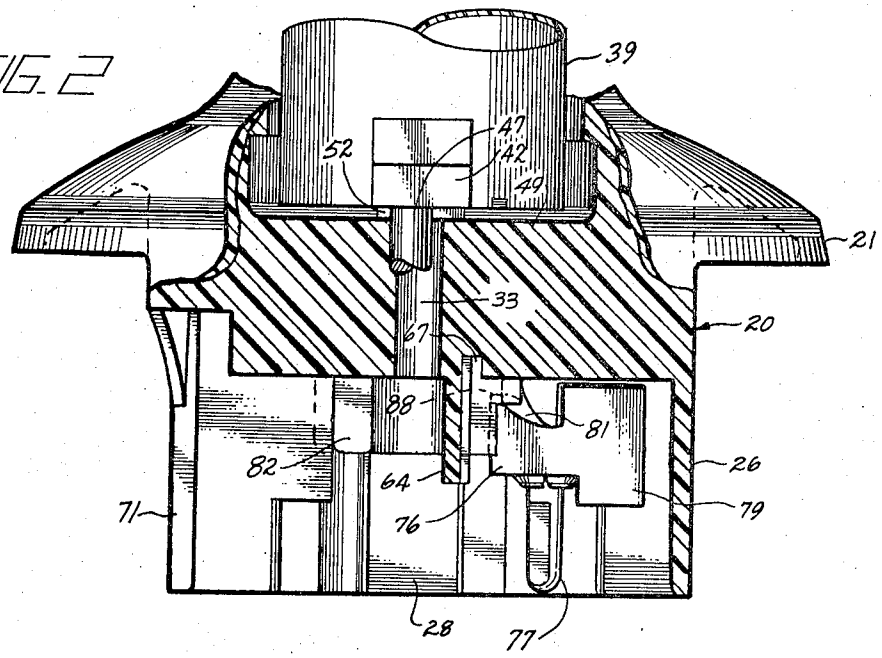
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FIG. 3

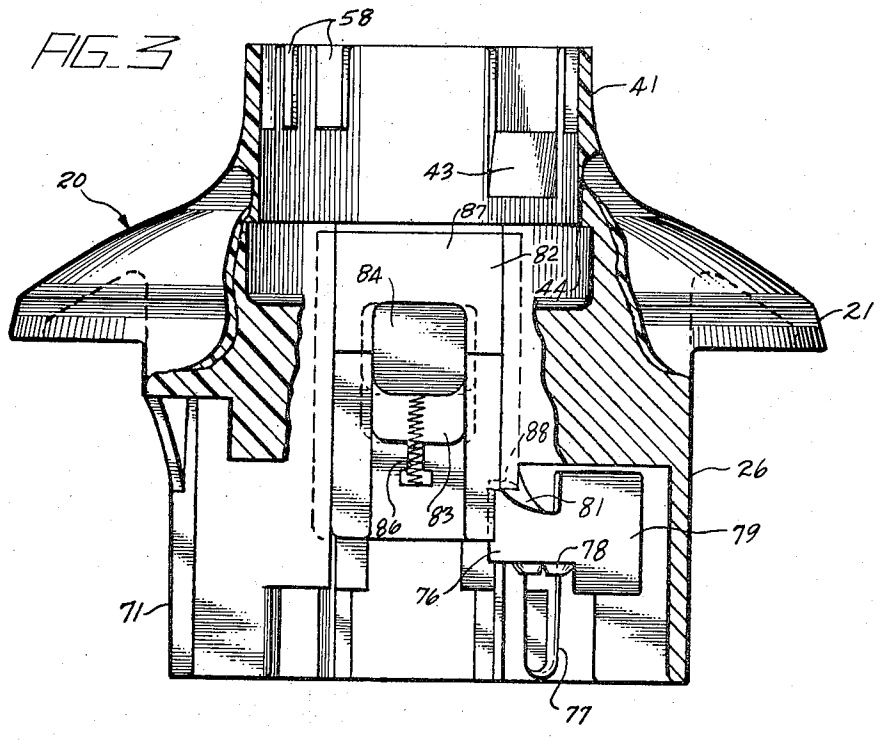
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FIG. 4

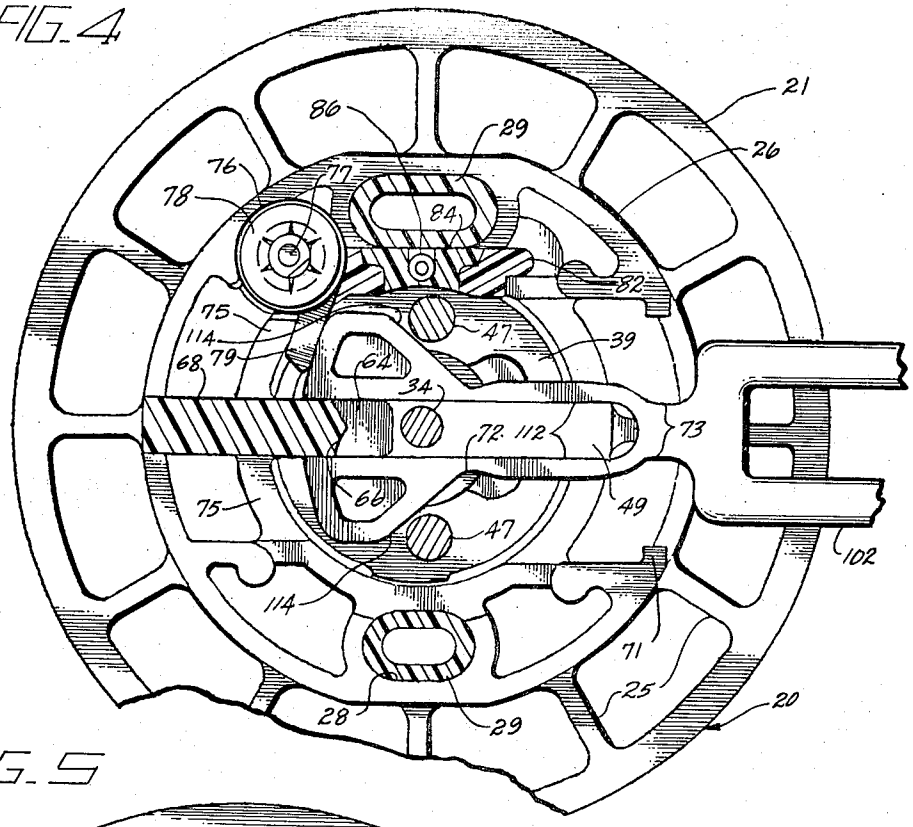
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FIG. 5

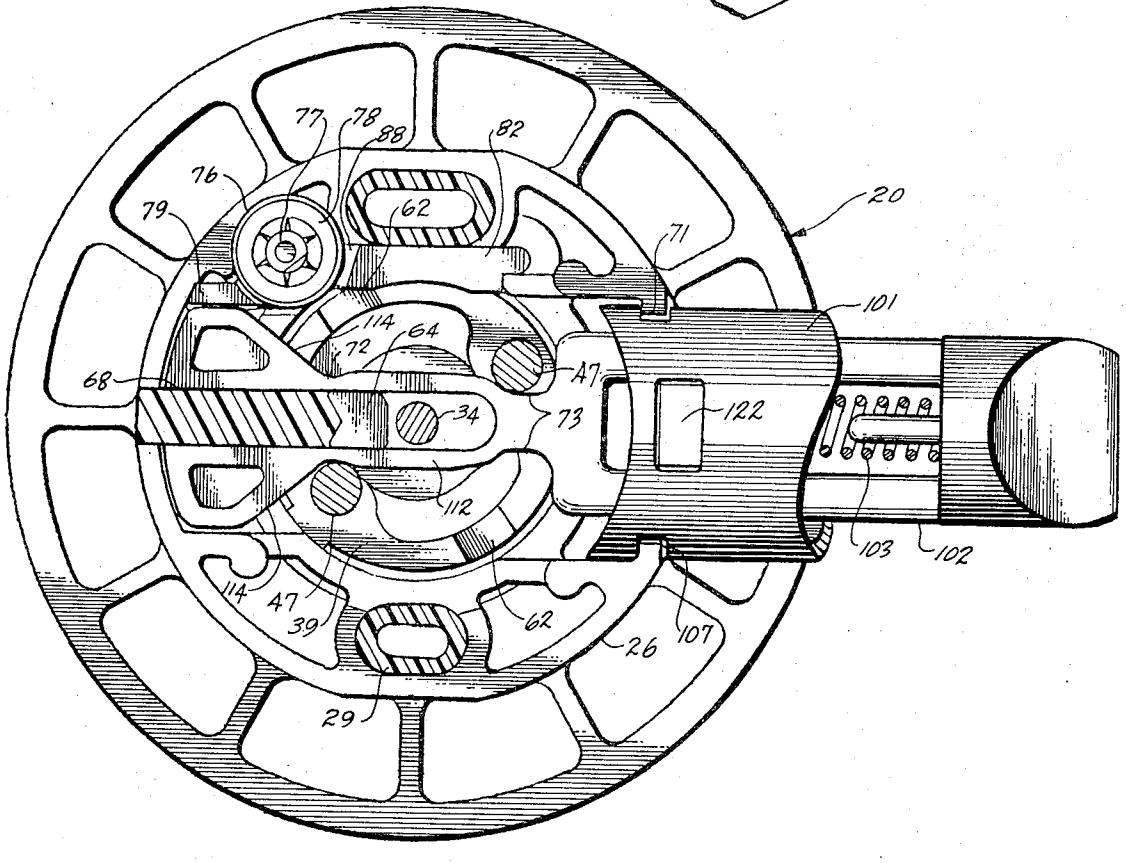
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FIG. 6

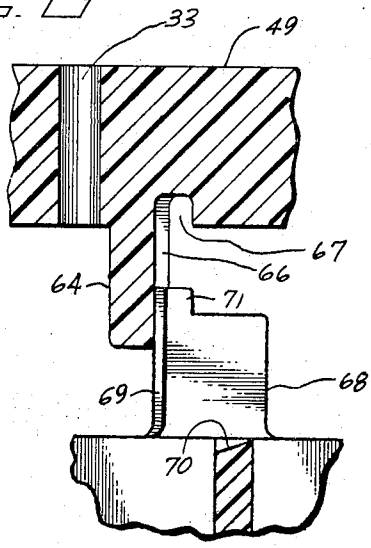


FIG. 11

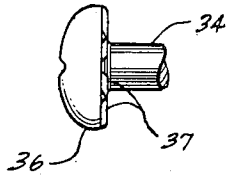


FIG. 12

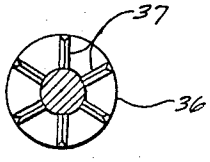


FIG. 7

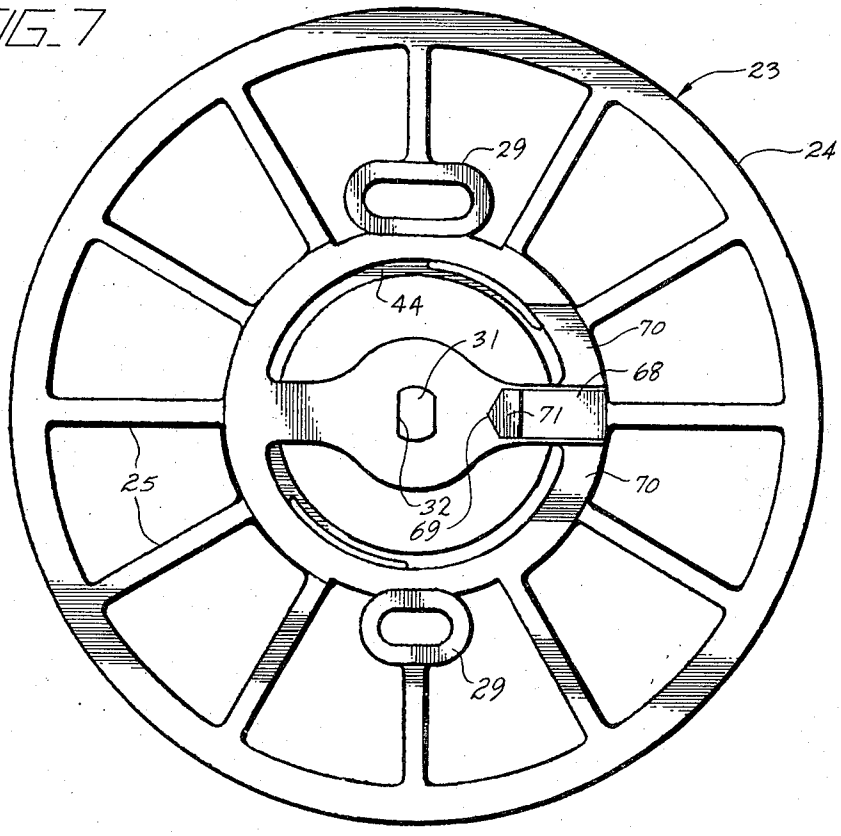


FIG. 8

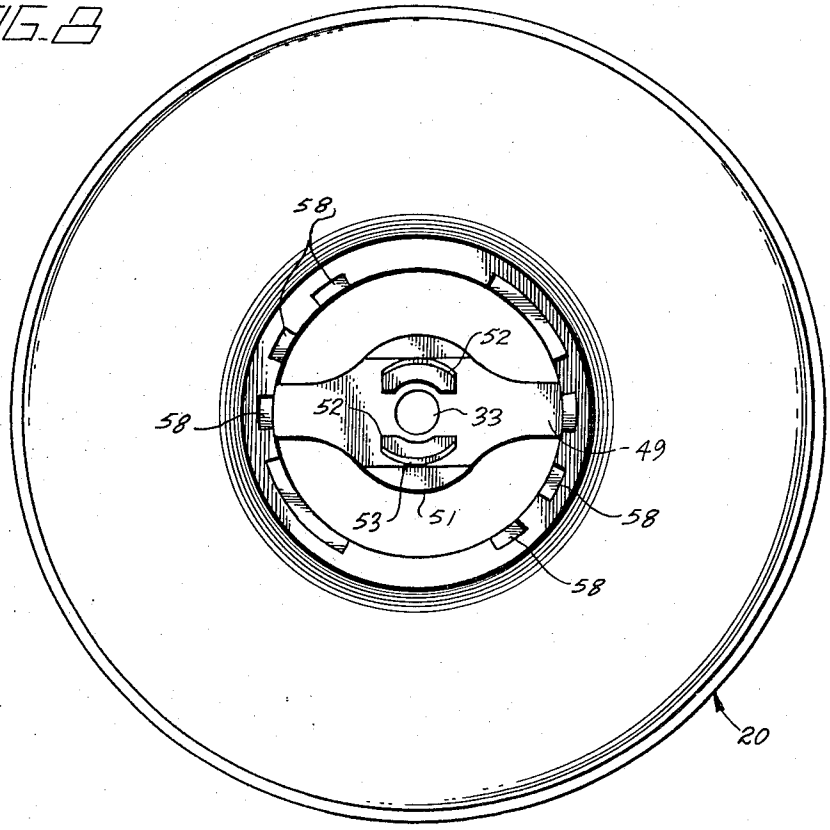


FIG 10

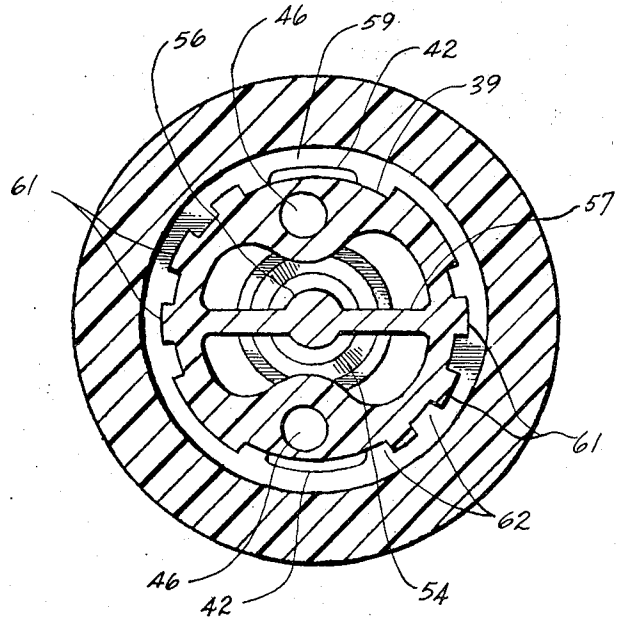


FIG. 9

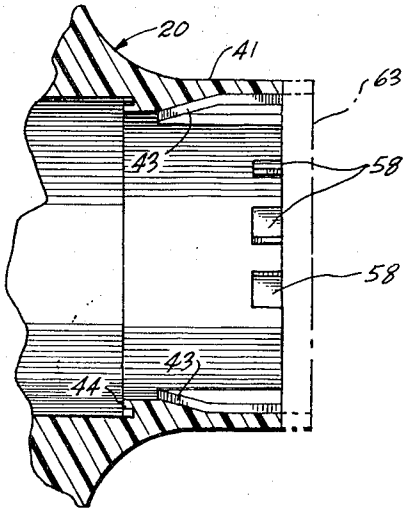


FIG. 13

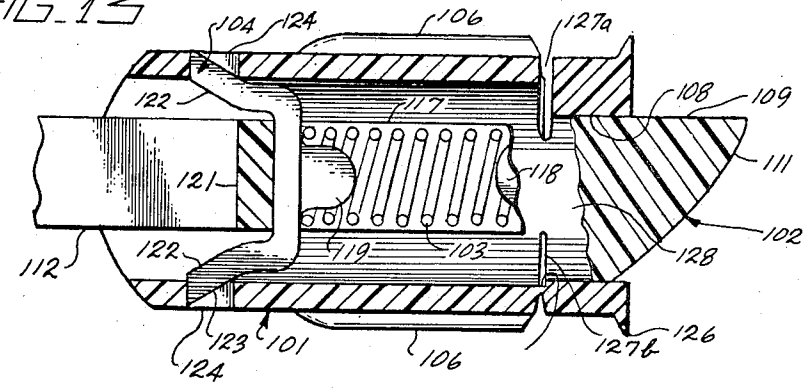


FIG. 15

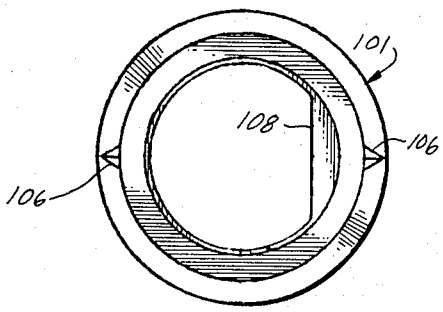


FIG. 14

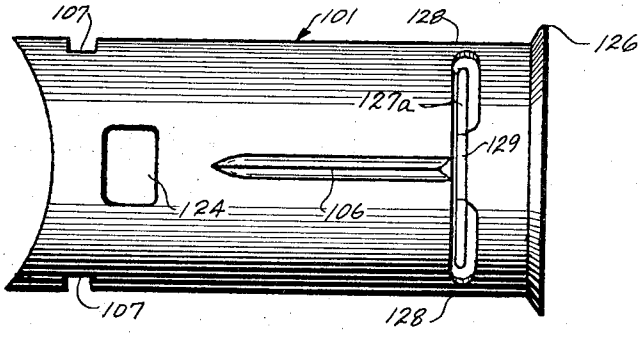
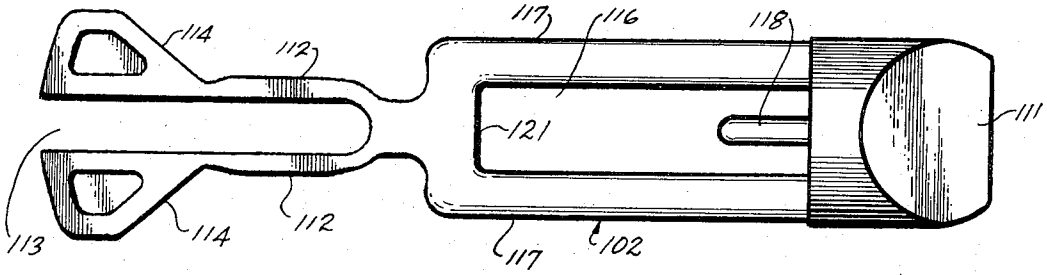


FIG. 16



TWO WAY DOOR LATCH

BACKGROUND

U. S. Pat. No. 3,580,622 describes an injection molded plastic privacy lock or door latch where two substantially identical escutcheons are interconnected by a single axial screw. One of the knobs in that door latch may be shifted axially to engage the corresponding escutcheon to provide a privacy lock. That latch operates in such a way that the knobs can be turned in only one direction, clockwise for example, for unlatching the door. The direction each knob is turned depends on which side of the door the door latch is mounted on.

It is usually preferable if one can unlatch the door by turning either knob in either direction for unlatching. It is, therefore, desirable to have an inexpensive two-way latch mechanism rather than one that turns only one way.

Furthermore, because of the close spacing of various elements of the door latch, the throw or stroke of latch bolts in inexpensive locks is typically about three-eighths inch. Although this is quite suitable for many applications, it is desirable to have a throw as long as about one-half inch as in better grade locks.

BRIEF SUMMARY OF THE INVENTION

Thus, in practice of this invention according to a presently preferred embodiment, there is provided a two-way door latch having first and second escutcheons insertable into an opening through a door and defining a knob axis. A knob is mounted on each escutcheon for rotation about the knob axis in either a clockwise or counterclockwise direction. A pair of pins extending between the knobs straddle an inner end of a latch bolt and engage it for retracting it and unlatching a door. The inner end of the latch bolt is split for passage through a hole in the door edge during installation, and interlocking posts on the escutcheons prevent collapse of the latch bolt during use. One of the knobs may be translatable along the knob axis for engaging its respective escutcheon for forming a privacy lock. A pair of opposed fingers on one of the escutcheons engage the locking knob to form a detent.

DRAWINGS

These and other features and advantages of the present invention will be appreciated as the same becomes better understood by reference to the following detailed description of a presently preferred embodiment when considered in connection with the accompanying drawings wherein:

FIG. 1 illustrates in partial longitudinal cross section a pair of interlocking escutcheons and a locking knob in a door latch construction according to principles of this invention;

FIG. 2 is a longitudinal cross section through the locking escutcheon and transverse to the cross section of FIG. 1;

FIG. 3 is a cross section similar to FIG. 2 and further cut away to show a kickoff mechanism;

FIG. 4 is a transverse cross section through an assembled door latch with the latch bolt extended;

FIG. 5 is similar to FIG. 4 with the latch bolt retracted;

FIG. 6 is a fragmentary view illustrating interlocking posts on the escutcheons for supporting the inner end of the latch bolt;

FIG. 7 illustrates the inside face of the free escutcheon;

FIG. 8 is an end view of the locking escutcheon;

FIG. 9 is a fragmentary transverse cross section of the locking escutcheon;

FIG. 10 is a transverse cross section of the locking knob;

FIG. 11 is a side view of the head of a screw for securing the escutcheons together;

FIG. 12 is a cross section of the screw of FIG. 11;

FIG. 13 illustrates in longitudinal cross section a latch bolt assembly;

FIG. 14 is a side view of the housing for the latch bolt assembly;

FIG. 15 is an inside end view of the housing; and

FIG. 16 is a face view of the latch bolt of the assembly of FIG. 13.

DESCRIPTION

FIG. 1 illustrates in longitudinal cross section a door latch constructed according to principles of this invention. Three principle elements of the door latch are illustrated in this cutaway view. A locking escutcheon **20** has a peripheral flange **21** abutting one face of a door **22** shown only in phantom. The locking escutcheon **20** has a cylindrical skirt **26** that fits into an opening **27** through the door. A free escutcheon **23** is partially exploded from the other face of the door in this view and when fully installed, its flange **24** abuts the opposite face of the door from the locking escutcheon. The escutcheon used in a privacy lock on the locking side of the door (e.g., inside a bathroom) is referred to as the locking escutcheon. The opposite one is referred to as the free escutcheon. Both flanges **21** and **24** may have radiating reinforcing ribs **25** on their inner sides for maximum strength.

The locking escutcheon has a pair of sockets **28** into which posts **29** slide for aligning the two escutcheons. Preferably, as seen for example in FIG. **4**, the two posts and sockets are made in sets of dissimilar sizes to assure proper assembly of the two escutcheons. The sockets and posts are relatively long so that the two escutcheons may stay in engagement over quite a distance. Thus, the door latch assembly may be used on doors having a variety of thicknesses, such as, for example, from about 1–¼ to 1–13/16 inch. The locking escutcheon engages the door by its flange **21** and the skirt **26.** The free escutcheon engages the door by its flange **24** and is positioned by the locking escutcheon. The two escutcheons when engaged in this manner define a knob axis extending normal to the faces of the door.

The two escutcheons are fastened together by a screw (not shown in FIG. 1) which passes through a hole **31** on the knob axis of the free escutcheon **23.** Small flats in the hole **32** lightly hold the screw in the hole prior to installation of the door latch. When assembled, the threaded portion of the screw goes into a hole **33** on the axis of the locking escutcheon **20.** This hole **33** has a smaller diameter than the screw threads so that the threads cut into the plastic and secure the escutcheons together. It has been found convenient to employ a screw **34** having a head **36** as illustrated in FIGS. **11** and **12.** A series of radiating ribs **37** beneath the flat screw head engage the plastic inside the free es-

cutcheon. As the screw is seated, these ridges tend to engage the plastic somewhat more gradually than a screw with a flat underside on the head and the person installing can sense seating of the screw since the driving torque increases rapidly as the ridges engage the plastic. This is particularly desirable when power tools are used for assembling the door latch to keep from stripping the threads formed by the screw in the hole **33.** A Phillips head screw is desirable for preventing overloading and damage to the plastic when the screw is seated.

Knobs are mounted on the escutcheons for limited rotation about the knob axis. A locking knob **38** is mounted on the locking escutcheon **20.** The free knob (not shown) mounted on the free escutcheon **23** is generally similar to the locking knob **38** except for absence of means for engaging the free escutcheon for the locking function. The free knob is retained on the free escutcheon in the same manner as the locking knob is retained on the locking escutcheon. Each knob has a shaft **39** that fits into the hub **41** of the escutcheon. The shaft has a short ramp **42** that rides over a corresponding ramp **43** inside the hub of the escutcheon (FIG. **9**). To assemble the knob onto the escutcheon, the two are forcibly pressed together with the ramps in alignment. This causes a slight elastic deformation of the shaft and hub and permit the knob to enter. Thereafter, the knob is retained in place as the shoulder at the end of the knob ramp engages a shoulder **44** within the escutcheon. A raised portion **45** within the escutcheon engages the sides of the ramp **42** on the shaft and thereby acts as a stop limiting the extent of rotation of the knob.

The locking knob has a pair of sockets **46** in which pins **47** are seated (one of the pins is deleted in FIG. **1**). The free knob (not shown) has sleeves corresponding to the sockets **46** through which the pins **47** extend. The pins are free to slide longitudinally through the sleeves in the free knob for accommodating different door thicknesses. The pins extending between the two knobs assure that they rotate together about the knob axis. The sleeves are long enough to engage a long part of the pins and assure that there is minimal twisting of the knobs relative to each other. The gripping body of the knob is open on its outer end and may be closed with a snap-in decorative cap **48.** When used as privacy lock, the cap on the free knob may have a central aperture for actuating an external release mechanism in the same general manner as described in U.S. Pat. No. 3,580,622.

The locking escutcheon is seen in various aspects in FIGS. **1,2,4,8** and **9.** A transverse web **49** extends across the interior of the escutcheon and has an enlarged central portion **51** through which the axial hole **33** for the screw extends. A pair of opposed arcuate fingers **52** extend outwardly from the central portion **51** towards the locking knob. The space between the fingers provides clearance for the end of the screw (not shown) extending through the axial hole. About midway along the length of each of the fingers there is an outer ridge **53** which can engage an inwardly extending annular ridge **54** within the shaft **39** of the knob. The opposed ridges **53** and **54** on the fingers and knob, respectively, cooperate to act as a detent for yieldably retaining the knob in either of two axial positions. As illustrated in FIG. **1,** the locking knob **38** is axially displaced away from the door **23** in its unlocked position. To lock the door latch, the knob is pressed inwardly to a position as shown in phantom in FIG. **1.** This causes the ridge **54** in the knob shaft to over-ride the ridges **53** on the fingers thereby elastically bending the fingers inwardly and yieldably retaining the knob in either its locked or unlocked position.

A bullet-shaped plug **56** (see also FIG. **10**) fits between the free ends of the fingers **52,** remote from the enlarged central portion **51** for providing inward lateral support of the free ends of the fingers and preventing them from collapsing too readily as the detent overrides. Thus, instead of merely being cantilevered outwardly from the enlarged portion, the fingers are also supported by the plug at the free end. The plug **56** is mounted in the locking knob by a transverse web **57.** It will be noted that such a plug and web are absent in the free knob to permit access by a screw driver to the screw for holding the escutcheons together.

The locking knob and locking escutcheon can be engaged by complementary crenellations for preventing rotation. The locking escutcheon has a series of internal notches or crenels **58** inside the end of the hub (FIGS. **8** and **9**). The locking knob has an annular groove **59** between the shaft **39** and the gripping portion of the knob (FIGS. **1** and **10**). A plurality of teeth or merlons **61** extend into the groove and are complementary to the notches **58** in the hub of the escutcheon. When the knob is pressed towards the door in its locking position, the teeth **61** engage the notches **58** and prevent the knob from being rotated.

In addition, the locking knob has a pair of notches **62** (FIG. **5**) complementary to the web **49** (FIG. **8**) within the locking escutcheon. This also serves to prevent the knob from rotating. Since the notches **62** at the inner end of the shaft and the teeth **61** near the outer end of the shaft are axially spaced on the knob, any tendency for skewing of the knob which could cam it out of its locking position is prevented. It will be apparent that either the teeth **61** or notches **62** may be employed on the locking knob for engaging it with the escutcheon and precenting knob rotation.

The locking engagement of the locking knob and escutcheon is employed when a privacy lock is desired, such as, for example, on a bathroom door. In many applications, as passage lock is desired and identical parts may be used with the sole exception that an additional ring or extension **63** (FIG, **9**) is made integral with the outer end of the hub on the locking escutcheon. This added ring of material extends to the root of the groove **59** in the knob and prevents the locking knob from being translated, thereby preventing locking.

The locking escutcheon also has a post **64** on the transverse web **49** and extending towards the free escutcheon. The post has a V-shaped notch **66** facing outwardly relative to the knob axis. The post **64** is seen in the fragmentary cross section of FIG. **6.** There is a recess **67** in the web at the base of the post. Another post **68** is on the free escutcheon (FIGS. **1, 6** and **7**). This post **68** has a V-shaped inner face **69** that fits into the V-shaped notch **66** on the post **64** on the locking escutcheon when the door latch is assembled. A raised nib **71** on the end of the post **68** fits into the recess **67** in the locking escutcheon when the latch is assembled on a door of minimum thickness. This extra nib assures that the posts **64** and **68** are aligned even when the latch is assembled on a door of maximum tolerable thickness. The complementary V-shaped portions of the posts assure that a side load on the posts is shared

by both and neither is simply cantilevered from its respective escutcheon without some support at its free end. The free escutcheon has a sloping surface **70** (FIG. **6**) and the locking escutcheon has a similar sloping surface **75** (FIG. **4**) which slope laterally outwardly and axially towards the door so that the latch bolt (described hereinafter) does not catch on a sharp corner when it is retracted.

The escutcheons and knob illustrated in FIG. **1** can be considered to be a latch bolt operating mechanism which upon rotation of the knobs in either direction from a central rest position serves to retract a latch bolt from its extended position and permit opening of the door. The operating mechanism is installed through an opening between the faces of the door. The latch bolt assembly described hereinafter is inserted through a hole in the edge of the door transverse to the opening between the faces. A suitable latch bolt assembly and components thereof are illustrated in FIGS. **13** to **16.**

The latch bolt assembly is made up of four parts, namely, a latch bolt housing **101,** a latch bolt **102** that fits through the housing, a coiled compression spring **103,** and a spring retainer **104.** These parts are shown in their assembled relation in the longitudinal cross section of FIG. **13.** The latch bolt housing **101** is in the general form of a hollow cylinder so that it can be easily driven or pressed into a cylindrical hole (not shown) bored into the edge of a door. A pair of opposed ribs **106** on the exterior of the housing prevent it from rotating in the hole once it is driven in place.

At its inner end, the housing has a pair of flat bottomed grooves **107** which engage the edges of a notch in the skirt **26** of the locking escutcheon (see FIG. **5**). This engagement of the grooves **107** with the skirt serves to retain the latch bolt assembly in its hole. The inner end of the housing **101** (FIG. **14**) is curved to clear the free escutcheon and there is no engagement therebetween.

The interior of the latch both housing is cylindrical except for a flat **108** near its outer end, namely, that end adjacent the edge of the door. The flat **108** is opposite a corresponding flat longitudinal side **109** on the latch bolt **102** so that when the latch bolt is installed in the housing, is is prevented from rotating.

The latch bolt has a beveled face **111** opposite the flat face **109.** These faces on the latch bolt cooperate with the striker plate (not shown) on the door jamb in a conventional manner for latching a door.

At the opposite end (inner end) of the latch bolt from the striker plate engaging faces are a pair of approximately parallel legs **112** spaced apart by a central longitudinal slot **113.** The slender legs **112** permit the end of the latch bolt to collapse as it is inserted through the hole in a door and spring back for engaging the latch operating mechanism. A ramp **114** on each of the legs **112** cooperates with the pins **47** in the latch operating assembly for retracting the latch bolt in a manner described in greater detail hereinafter. The ramps slope in a direction away from the center line of the latch bolt and away from the door edge.

The latch bolt has a central longitudinal slot **116** between side walls **117.** A raised spring seat post **118** is integral with the latch bolt in the central slot near its outer end. One end of the coil spring **103** is seated on the spring seat **118.** The opposite end of the coiled spring is seated on a similar post **119** on the spring retainer **104.** The spring retainer is in the form of a flat, generally U-shaped plastic member having the bight of the U seated against a transverse stop web **121** at the inner end of the central longitudinal slot **116.** The legs **122** of the spring retainer **104** have an outwardly flaring portion near their extreme ends to provide a ramp surface **123** on the outside of the U.

To assemble the latch bolt into the latch bolt housing, the spring and spring retainer are assembled on to the latch bolt in a position with the legs **122** straddling the transverse web **121** substantially as shown in FIG. **13.** This subassembly is then pressed longitudinally through the latch bolt housing from its inner end. The ramp surfaces **123** on the legs bear against the end of the housing and elastically bend the legs inwardly to fit into the cylindrical bore of the housing. The subassembly easily slides along the length of the housing until the ends of the legs **122** reach a pair of transverse apertures **124** in the side of the housing; this permits the legs to snap outwardly and, to some extent, limit further insertion of the latch bolt subassembly into the housing. The ends of the legs of the spring retainer bear against the walls of the apertures **124** and enable the coil spring **103** to bias the latch bolt towards its extended position for engagement with a striker plate.

At its outer end, the latch bolt housing has a tapered peripheral flange **126** that limits the extent the latch bolt it assembly is pressed into the door. The outer face of the peripheral flange is flush with the edge of the door when the housing is pressed or hammered into place. Near its outer end, the housing **101** has a pair of opposed slits **127***a* and **127***b* extending through the wall on the portion nearer the trailing and leading faces of the door, respectively (the leading face being the one reaching the jamb first as a door is closed). Between the ends of these transverse slits are webs **128** which connect the inner and outer end of the housing. The slits provide a localized weakening of the wall of the housing and the webs are sufficiently bendable that the outer end of the housing can be tilted with respect to its axis. Thus, in effect, the housing is made of an inner cylinder of substantial length that fits into the hole in the door and typically is parallel to the faces of the door when it is installed, and a second shorter cylinder near the outer end and also fittable into the hole in the door. These two cylinders are interconnected by the webs **128** which are bendable so that the outer cylinder can tilt relative to the inner cylinder.

When the latch bolt assembly is installed in a door that has an edge normal to its faces, the two cylindrical portions of the housing remain aligned. When the latch bolt assembly is inserted in a door with a beveled edge, the webs bend slightly and the outer cylindrical portion tilts so that the peripheral flange **126** is flush with the beveled edge. Such a tilting may be only 1 to 3 degrees in conventional beveled edge doors.

This tilting of the outer cylinder also tends to close up the leading slit **127***b* nearer the leading face of the door and widen the trailing slit **127***a*. The extent of such opening and closing is relatively small but there was a concern that the slight steps introduced into the interior of the housing could catch on some portion of the latch bolt as it moves through the housing and thereby impede its operation. The slits **127** are therefore made quite narrow near the root adjacent the inside walls of the housing. They are made relatively wide near the outside of the housing to assure complete clearance for the required tilting and also to provide

adequate strength in the molds preferably used for injection molding of the plastic housing.

The concern for catching of the latch on any minor steps introduced by tilting of the outer end of the housing is also evidenced by a very thin web **129** at the root of the slit **127*b*** which becomes more closed when the assembly is inserted in a beveled door. This web is typically less than about 0.010 inch thick and has little, it any, effect on the ability of the outer cylindrical end of the housing to tilt. This web does, however, provide a smooth transition between the tilted and untilted portions of the housing and further guarantees that the latch bolt will not catch on any slight step in the interior of the housing. This is clearly an optional feature and may be deleted, if desired, leaving a completely open slit at each side of the housing. It might also be noted that a very thin web can be left at the root of each of the slits, if desired, to guarantee a smooth transition between tilted and untilted portions of the housing. This can be done effectively without substantially impairing the tiltability of the outer end of the housing but is a difficult matter for injection molding. It has not been found to be necessary and the risk of undesirable "flash" due to imperfect webs could be more serious than the very slight steps actually encountered in the illustrated arrangement.

Referring now to FIGS. **4** and **5**, the cooperation between the inner end of the latch bolt **102** and the locking escutcheon **21** can be seen. In FIG. **5**, the inner end of the latch bolt housing **101** is seen with its edge grooves **107** in the notch **71** in the skirt of the locking escutcheon. In FIG. **4**, the housing is deleted and only the latching bolt **102** from the latch bolt assembly is illustrated. In FIG. **4**, the latch bolt is shown in its extended or latching position when the pins **47** are in their rest position on a line substantially parallel with the edge of the door. In FIG. **5**, the knobs have been twisted so that the pins are rotated towards one of their extreme positions (clockwise from their position in FIG. **4**) for retracting the latch bolt.

The legs **112** on the latch bolt have their ends straddling the post **64** on the locking escutcheon and the mating post **68** on the free escutcheon. When the knobs are in their rest position, the pins **47** are out of, or in only very light, engagement with the ramps **114** on the ends of the legs. The latch bolt is biased towards its extended position by the spring **103.**

When the knobs are twisted, for example clockwise as in FIG. **5**, one of the pins **47** rides along the corresponding ramp **114** and thereby cams the latch bolt towards its retracted position. It will be seen by comparing the positions of the pins and latch bolt in FIGS. **4** and **5** that the stroke or the throw of the latch bolt is substantially greater than the distance traveled by the pins in a direction parallel to the axis of the latch bolt. This motion amplification is obtained because of the sloping ramps **114** on which the pins **47** ride. By this means, a latch bolt stroke of about one-half inch can be obtained with a pin travel of only about five-sixteenths inch in a direction along the direction of latch bolt travel.

In order to obtain the maximum throw of the latch bolt, a recess **72** is provided in the side of each leg **112** at the base of the ramp **114.** Similarly, recesses **73** are provided in the sides of the latch bolt beyond the end of the slit **113** between the legs. These recesses **72** and **73** accommodate the pins **47** as seen in FIG. **5** when the knobs are twisted to their extreme position. This permits the pins to travel slightly further, thereby increasing the available stroke of the latch bolt.

Close examination of FIG. **4** will also disclose that the pins in their rest position are on a line approximately parallel to the edge of the door and this line is relatively nearer the door edge than the screw **34** which is on the knob axis. Because of this placement of the pins, the total stroke of the pin **47** that engages its respective ramp **114** is greater in the direction of the throw of the latch bolt than it would be if the pins were at the same distance from the door edge as is the knob axis. This extra stroke of the pin that operates the door latch results in a greater stroke of the latch bolt. This placement of the pins relatively nearer the door edge than the knob axis also means that the pin that travels towards the door edge comes closer to the latch bolt axis than does the pin that travels away from the door edge. For this reason, the bottoms of the recesses **73** are closer together than the bottoms of the recesses **72.**

The stroke available in the latch bolt is also increased by making the ramps **114** as long as possible and spacing the pins **47** radially from the knob axis as far as possible. This enlargement means that the width of the latch bolt must also be increased and difficulty may be encountered in inserting it through the hole in the edge of a door in which the latch bolt housing **101** is seated. The slit **113** between the two legs of the latch bolt permits the slender legs **112** to elastically bend and collapse towards each other to provide clearance between the enlarged ends of the legs and the inside of a hole as the latch bolt assembly is mounted in the door. These slender legs would also deform under the pressure of the pin **47** as the knob is turned, if it were not for the posts **64** and **68** which are positioned between the legs when the door latch is assembled. The two posts interlock to some extent by way of V-shaped surfaces therebetween so that the lateral load imposed by one of the legs onto the posts is shared by both of them.

It will be apparent that if the knobs are twisted in the opposite direction from that illustrated in FIG. **5**, the other pin **47** will engage its corresponding ramp **114** and operate the latch bolt in exactly the same manner as that illustrated.

One minor problem may be encountered with a privacy lock, namely, that the latch is locked while the door is open and thereafter the door is closed. That is, the locking knob may be pressed in and in engagement with the locking escutcheon before the door is closed. Absent some type of release mechanism, the privacy lock may stay locked, thereby denying access from the outside. This is not a common occurrence and with a door latch having a simple external release, is not a severe problem. It is an annoyance, however, and it may be desirable to provide a means for releasing the locking knob from the locking escutcheon, in response to retraction of the latch bolt as it passes over the striker plate.

For this purpose, there is provided a cylindrical cam **76** on a post **77** in the locking escutcheon (FIGS. **1** through **5**). The cam fits loosely on the post so that it is free to rotate. It is held on to the post by a press nut **78.** The cam **77** has an outwardly extending wing **79,** one face of which is substantially tangential to the cylindrical body of the cam. As best seen in FIGS. **2** and **3,** a curved camming surface **81** is provided transverse to the cylindrical surface of the cam body.

A slide **82** fits into a channel in the locking escutcheon and is retained in place by the cam **76.** The slide **82** is shown in end view in FIG. **5** and in cross section in FIG. **4.** The inner face of the slide is seen in the cutaway portion of FIG. **3** and the slide is also seen in longitudinal cross section in FIG. **1.** The slide is in the form of a frame having a window **83.** A rectangular plunger **84** is mounted in the window and biased towards the knob end of the slide by a coil spring **86.**

As best seen in FIGS. **4** and **5,** the inner faces of the slide **82** and plunger **84** have a curved center portion to provide clearance for pivoting of the adjacent pin **47.** Similarly, the face **87** at one end of the slide is set back from the curved face of the plunger and is also curved to provide clearance for the shaft of the knob. Near the other end of the slide is a small cam shoulder **88** which engages the camming surface **81** on the cam **76.**

When the locking knob is in its unlocked position as illustrated in FIG. **1,** the slide is relatively loose in its channel and serves no functional purpose. When the knob is seated in its locking position, however, a small portion of the end of the shaft **39** on the locking knob engages the end of the plunger **84** adjacent the recessed face **87** of the slide. This presses the slide and the plunger assembly towards the cam **76** so that the camming surfaces **81** and **88** are in engagement. The camming action twists the cam around the post **77** so that it is in a position as illustrated in FIG. **4** with the wing **79** adjacent the end of the latch bolt.

If the latch bolt is then retracted, such as for example by closing the door, the end of the latch bolt presses against the wing **79** and rotates the cam to a position as illustrated in FIG. **5.** This rotation causes the camming surface **81** to bear against the camming shoulder **88** and press the slide towards the knob. The engagement of the end of the plunger **84** with the shaft **39** of the knob causes it to over-ride the detents (**53, 54**) on the fingers **52** and come out of engagement with the locking crenellations on the escutcheon. The spring **86** is chosen with a sufficiently high compression force that the detents are over-ridden and the latch unlocked before the spring yields a significant amount.

There is one other problem that can occur, namely, the door is closed while someone is forcibly holding the locking knob in its locking position. The resilience of the spring **86** between the plunger and slide prevents breakage of parts in this case. When the door is closed in this situation, the end of the latch bolt operates on the wing **79** and rotates the cam in the above-described manner, thereby displacing the slide towards the knob. Since the knob is being held in its locked position, the plunger in engagement with the end of the shaft cannot move and the spring **86** is compressed.

Thus, the cam, slide and plunger provide a linkage between the latch bolt and locking knob that provides a "kickoff" so that the privacy lock is unlocked in case the door is closed with the latch already locked. The resilient mounting of the plunger prevents damage to the lock in the extreme situation where the door is closed while the locking knob is held in its locking position.

Although but one embodiment of two-way turn door latch, which can be used as either a privacy lock or a passage latch, and which includes a "kickoff" feature to prevent inadvertent door locking and which has a relatively long throw of the latch bolt and a latch bolt housing that conforms to a beveled door, has been shown and described in detail herein, many modifications and variations will be apparent to one skilled in the art. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A door latch comprising:

a pair of knobs for opposite sides of a door and rotatable between a central rest position and a pair of extreme positions angularly displaced clockwsie and counterclockwise, respectively, from the rest position;

an escutcheon for each knob fittable to a door for mounting the respective knob thereto;

a pair of pins extending between the knobs offset from the axis thereof and rotatable therewith;

a latch bolt between the pins, said latch bolt including an axial slot extending through the inner end thereof beyond the line between the pins;

cam means on the outer portion of the latch bolt engaging the pins for retraction of the latch bolt in response to rotation of the pins, said pins cooperating with the cam means to bias the sides of the latch bolt towards the slot upon rotation of the pins; and

means on one of the escutcheons and positioned in the slot for resisting collapse of the latch bolt.

2. In a door latch to be mounted on a door having an opening therethrough adjacent one edge and having a hole in said edge into the opening, including two escutcheon members respectively insertable into and adapted to overlie the ends of the opening through the door and defining a knob axis, a single connecting means coaxial with the knob axis for interconnecting the escutcheon members, a pair of knobs respectively mounted on the escutcheon members for rotation about the knob axis, and means connected to the knobs for retracting the latch bolt, an improved cooperation between the latch bolt and the escutcheon members comprising:

a pair of elastically bendable legs on the innermost end of the latch bolt straddling the means for interconnecting;

a post on one of the escutcheon members extending between the legs for spacing them apart; and

a post on the other escutcheon member extending between the legs for spacing them apart and having a longitudinally extending portion complementary to the post on the one escutcheon member for distributing side loads between the posts.

3. In a door latch as defined in claim **2,** an improved cooperation wherein one of the escutcheon members includes a recess adjacent the base of one of the posts, and the other post includes an extending nib portion complementary to the recess.

4. In a door latch as defined in claim **2** wherein the means for retracting the latch bolt comprises a pair of pins extending between the knobs, an improved latch bolt comprising an enlarged pin engaging portion on the end of each of the legs, the space between the legs being sufficiently wide for permitting the enlarged portions to collapse towards each other for passage through a conventional hole through a door edge.

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