May 29, 1962 R. W. SCHMID 3,036,850

TUBULAR LOCK

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Fig. 1.

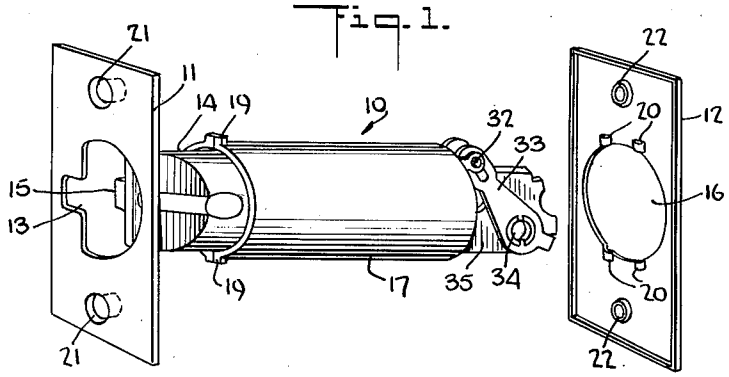


Fig. 3.

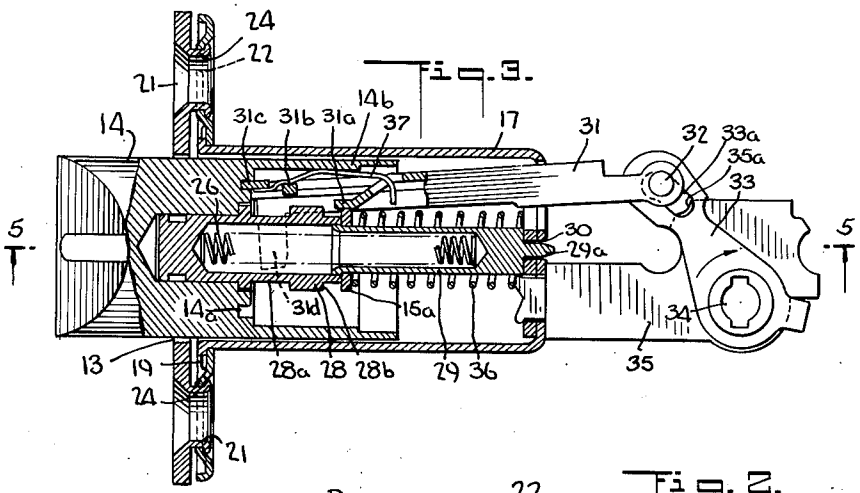


Fig. 4.

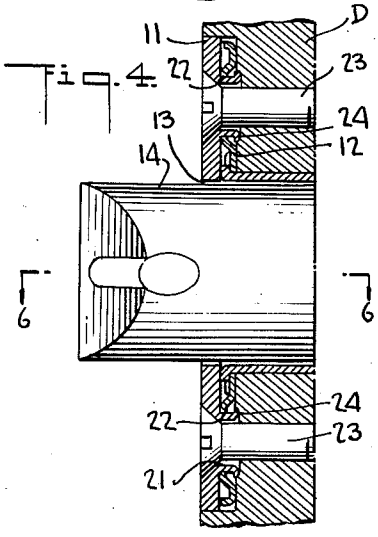
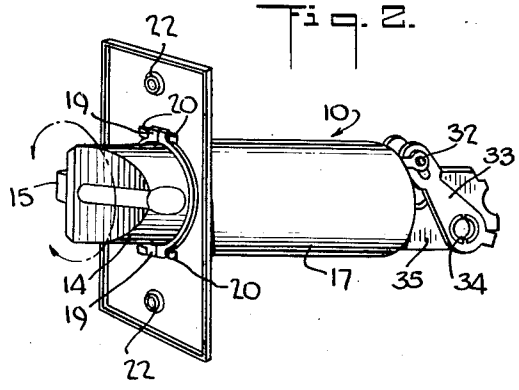


Fig. 2.



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Fig. 5.

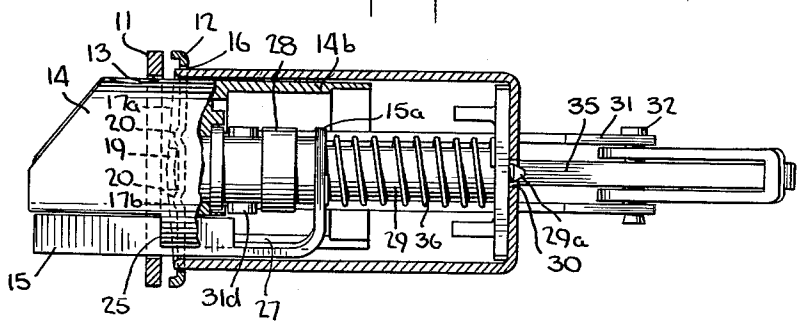


Fig. 6.

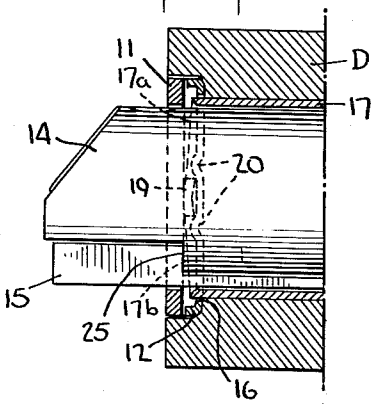


Fig. 7.

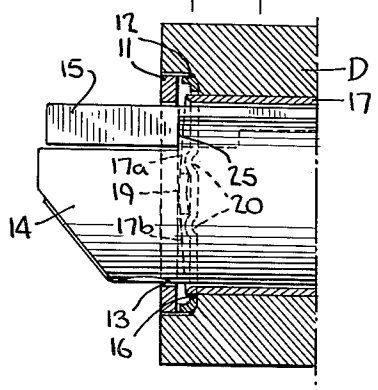


Fig. 8.

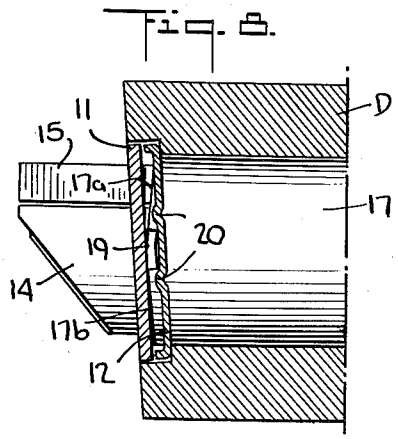
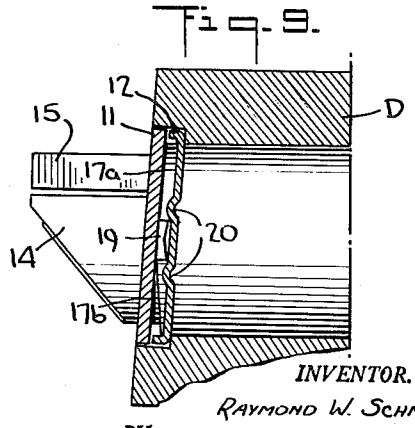


Fig. 9.



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3,036,850

TUBULAR LOCK

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Filed Apr. 13, 1959, Ser. No. 805,936
4 Claims. (Cl. 292—244)

This invention relates to a latch construction of the type in which a latch bolt is mounted for sliding motion within a tubular housing, the housing having a front plate at the outward end thereof through which the latch bolt projects. The relationship of the latch bolt to the front plate and the casing is such that the latch bolt may be rotated together with the front plate relatively to the tubular housing so as to change readily the hand of the lock. In some locks of the particular type, the latch bolt is rotatable together with an auxiliary latch bolt relatively to the tubular housing, the auxiliary latch bolt being used for controlling the deadlocking of the latch bolt. Again, the rotation of the latch bolt will be accompaned by a rotation of the front of the lock.

Structures of the particular class are quite well known in the art and are disclosed in earlier patents. However, prior art constructions do not provide effective means whereby the front of the lock may be secured to the tubular housing against relative rotation once a suitable positioning of the front and latch bolt relatively to the tubular housing has been obtained. Still further, structures of the prior art do not provide for the ready adjustment of the front relatively to the housing to allow the lock to be secured readily to beveled doors. While it is quite old in the art to utilize a front that pivots or adjusts relative to a lock housing, I know of no construction wherein the front may be locked to the housing against rotation relatively thereto, while at the same time secured in an angular position on a beveled door, with the latch bolt and front having been first rotated into one of opposed adjusted positions.

As a feature of my invention, the decorative front plate of a tubular lock is secured to a base front plate, the two plates being mounted for pivotal adjustment as well as rotation about the tubular housing of the lock, all as I have broadly outlined. More in detail, a part of the tubular housing rests between the base front plate and the decorative plate, the base and decorative front plates being adapted for some endwise movement relatively to one another through means loosely holding the two together when the lock is not assembled to a door. Because of this relationship of the front plates, they may be rotated relatively to the housing and pivotally positioned relatively thereto. Locating parts, preferably on the base plate function to secure and locate the front parts to the tubular housing as will be disclosed presently.

As a still further feature of this part of the invention, the decorative front piece is actually pushed by the latch bolt to an extreme position, thereby opening up as far as possible the space between the decorative plate and the base plate so as to permit free rotation between the front plates and the housing. However, when the base plate and the decorative front plate are applied by screws to a door, the said plates will be drawn together into binding relationship to the tubular housing, locking the entire assembly in a final adjusted position against disturbance.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto.

Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

In the drawings:

FIG. 1 is a perspective exploded view showing the decorative front plate, the tubular lock and the base plate,

FIG. 2 is a perspective view showing the base plate assembled with the tubular lock,

FIG. 3 is a sectional view of the assembled decorative front plate, tubular lock and the base plate,

FIG. 4 is a partial sectional view showing the decorative front plate, base plate and tubular lock secured to a door,

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 3,

FIG. 6 is a sectional view taken on the line 6—6 of FIG. 4,

FIG. 7 is a sectional view similar to that of FIG. 6, but showing the bolts of the lock and the front and base plates rotated 180° to change the hand of the lock,

FIG. 8 is a sectional view showing the decorative front plate, lock and base plates secured to a door beveled in one direction, and

FIG. 9 is a sectional view similar to that of FIG. 8, but showing the decorative front plate, lock and base plate secured to a door beveled in the opposite direction.

Referring to the drawings and in particular to FIGS. 1 and 3, the tubular lock is generally designated by the reference numeral 10, the decorative front plate is designated by the reference numeral 11 and the base plate is designated by the reference numeral 12.

The decorative plate 11 is provided with a suitable opening 13 therethrough to permit it to be fitted over the latch bolt 14 and trigger bolt 15 of the lock 10 from the front end of the lock as shown in FIG. 3.

The plate 12 is provided with a suitable circular opening 16 to permit it to be fitted over the tubular housing 17 of the lock 10 from the rear of the lock and slipped along the housing 17 until it engages outwardly extending, diametrically opposed, integral ears or projections 19. Ears 19 are adapted to be engaged between spaced pairs of bosses 20 formed on the face of the base plate 12 to prevent rotation of the plate 12 relative to the housing 17.

The decorative plate 11 and the base plate 12 are provided with openings 21 and 22, respectively, which are adapted to be aligned and to receive suitable fastening means, such as the screws 23, shown in FIG. 4, for fastening the assembled unit to a door D. In order to hold the plates assembled with their openings 21 and 22 aligned prior to their installation on the door and to still allow the plates 11 and 12 to be moved apart a sufficient amount to disengage the bosses 20 from the ears 19 so that the plates 11 and 12 may be rotated relatively to the lock housing 17, tubular fastening elements 24 are provided which allow limited, relative, endwise movement between the plates 11 and 12 while preventing relative rotation between the plates. As best shown in FIG. 3, the tubular elements 24 are conveniently formed integral with plate 11 around openings 21. The elements 24 are extended through openings 22 and crimped over at their ends to form eyelets securing the plates together. The elements 24 are made sufficiently long to allow sufficient clearance between the plates 11 and 12 to permit plate 12 to be moved back endwise a sufficient amount to disengage the ears 19 on the housing 17 from between the bosses 20 to permit rotation of the plates 11 and 12 relative to the housing 17. As will be hereafter described, the latch bolt 14 and trig-

ger bolt **15** are so constructed and arranged that they may be rotated 180° to change the direction of the lock, as indicated by comparison of FIGS. 6 and 7, depending on which way the door is hung.

Referring to FIG. 5, the latch bolt **14** is provided with a shoulder **25** which engages the front plate **11** and limits outward movement of the latch bolt under pressure of the latch bolt spring **26**. Prior to assembly of the lock on a door, the latch spring **26**, acting through the shoulder **25**, forces the decorative plate **11** outwardly. This in turn pulls the base plate **12**, which is secured to the decorative plate **11**, against the ears **19** to hold the ears **19** properly located between the bosses **20** when the lock assembly is being fastened to a door. The spring pressure also holds the plates **11** and **12** separated to facilitate unseating of the ears **19** between the bosses **20** and rotation of the plates **11** and **12** relative to the housing **17** when such is desired.

As best shown in FIGS. 8 and 9, the decorative plate **11** and the base plate **12** may be readily pivoted on the ears **19** relative to the housing to thereby adjust the plates to beveled doors whether the doors are beveled in the direction of FIG. 8 or the direction of FIG. 9. The opening **16** of the base plate **12** is made sufficiently larger than the diameter of the housing to provide enough clearance to permit the pivoting or tilting of the base plate relative to the housing **17**. By relieving the end of the housing **17** on each side of the ears **19**, as by providing a double bevel as indicated at **17***a* and **17***b* in FIGS. 6 and 7, the plates **11** and **12** may be drawn together to the same degree when mounted on a beveled door, as shown in FIGS. 8 and 9, as they can when mounted on a flat door.

As previously stated, the lock **10** is so arranged and constructed that the latch bolt **14** may be rotated 180° relative to the housing **17**. This arrangement is best shown in FIGS. 3 and 5.

Referring to FIGS. 3 and 5, the latch bolt **14** has a generally cylindrical surface and is slidably received in the cylindrical housing **17**. The trigger bolt **15** is slidable relative to the latch bolt **14** in a groove **27** formed in the surface of the latch bolt. The latch bolt **14** has a generally tubular extension **28** which is secured by a press fit, or by suitable fastening means, to the inner end of the latch bolt **14**. The tubular extension **28** receives one end of the latch spring **26** which normally holds the latch bolt **14** in an extended position. The other end of the latch spring **26** is received in a tubular spring guide **29** which is adapted to telescope within the tubular extension **28** as the latch bolt is withdrawn. The inner end of the spring guide **29** is held in proper alignment by a projection **29***a* which extends through an opening **30** in the inner end of the housing **17**.

The latch bolt **14** is adapted to be withdrawn against the force of the latch spring **26** by a channel-shaped retracting bar **31**. Retractor bar **31** is connected at one end to the tubular extension **28** by means of a bifurcated end **31***a* which extends around the extension **28** and into an annular groove **28***a* formed in the surface of the extension **28**. It will be appreciated that the annular groove **28***a* permits the bolt **14** and the extension **28** to be rotated relative to the retractor bar **31**.

The other end of the retractor bar **31** is pivotally attached by means of a pin **32** to a latch cam or crank arm **33** which is adapted to be turned by a suitable spindle (not shown) which is inserted through an opening **34** in the crank bar. Crank arm **33** is pivotally attached to an extension **35** which is riveted or otherwise secured to the end of the housing **17**. It will be apparent that rotation of the crank arm **33** in the direction of the arrow in FIG. 3 will retract the latch bolt **14** through the medium of the retractor bar **31**.

The trigger bolt **15** has an end **15***a* which surrounds and is slidable on the spring housing **29**. A spring **36** surrounding the housing **29** normally holds the trigger

bolt in extended position as shown in FIGS. 3 and 5. When the lock assembly **10** is mounted on a door and the door is closed, the outer end of the trigger bolt **15** is engaged by the strike plate on the jamb of the door and is moved inwardly against the pressure of the spring **36**. This moves the end **15***a* toward the rear of the housing **17** permitting a finger **31***a* on the retractor bar **31** to drop down behind a shoulder **28***b* on the extension **28**. A spring **37** carried by the retractor bar **31** insures that the finger **31***a* drops down when the end **15***a* of the trigger bolt **15** is moved to the rear. At the same time, pivot pin **32** which pivotally secures the retractor bar **31** to the crank arm **33**, drops down into a recess **35***a* formed in the extension **35** thereby deadlocking the latch bolt **14** against backward movement. The upper surface of a cam slot **33***a* in which the pin **32** operates aids in seating the pin **32** in the notch **35***a* by camming the pin towards the notch.

On rotation of the cam or crank arm **33** in the direction of the arrow in FIG. 3, the pin **32** is cammed out of the notch or recess **35***a* by the lower surface of the cam slot **33***a* to thereby allow a retractor bar **31** to retract the latch bolt **14**. Release of the trigger bolt **15** from the strike plate of the door jamb allows the end **15***a* thereof to move forward under the influence of spring **36** thereby camming the finger **31***d* up into the position as shown in FIG. 3 away from the shoulder **28***b*. As best shown in FIG. 3, the spring **37** fits between two bars **31***b* and **31***c* which extend between bifurcations of the retractor **31**. Bar **31***c* projects beyond the end of the bifurcations of the retractor **31** and extends loosely into an annular groove **14***a* formed in the latch bolt **14** to provide a pivot for the retractor **31**. The spring **37** is compressed against an annular skirt **14***b* of the latch bolt **14**. Thus, all connections between the latch bolt **14**, the trigger bolt **15** and the housing **16** and retractor bar **31** are through annular grooves or cylindrical surfaces so that the connections are maintained upon relative rotation between the latch bolt **14**, the trigger bolt **15** and the housing **17** to thereby allow the bolts to be turned 180° relatively to the housing as shown by comparison of FIGS. 6 and 7.

The engagement of bar **31***c* in the annular groove **14***a* not only provides a pivot for the retractor bar **31**, but also provides an auxiliary deadlocking action for the latch bolt **14** when the pivot pin **32** drops into the recess **35***a*, inasmuch as the engagement of bar **31***c* in the annular groove **14***a* of latch bolt **14** and the simultaneous engagement of the pin **32** in the recess **35***a* prevents rearward movement of the latch bolt **14** by force applied to the outer end of the bolt **14**. Thus, a second deadlocking action is provided in addition to that provided by the engagement of finger **31***a* behind shoulder **28***b*.

From the above description it can be seen that I have provided an improved lock construction in which the front decorative plate may be selectively rotated with the latch bolt and the trigger bolt relative to the lock housing and then effectively locked against relative rotation to the housing. At the same time, the decorative plate may be tilted or pivotally adjusted to fit on beveled doors.

I now claim:

1. In a lock of the class described, a tubular housing having ears at its forward end, a base front plate for said housing lying rearwardly of said ears and rotatably mounted on said housing, a decorative front plate for said housing lying forwardly of said ears, projections on one of said plates engageable laterally with said ears to prevent rotation of said plates relatively to said housing when said plates are drawn together as when the lock is mounted on a door, means securing said plates loosely to one another for holding said plates against relative rotation and preventing disassembly thereof from said housing while allowing sufficient endwise separating movement thereof to permit said projections to pass by said ears whereby said plates may be rotated relatively

to said housing when the lock is disassembled from a door.

2. In a lock of the class described, a tubular housing having ears at its forward end, a base front plate for said housing lying rearwardly of said ears and rotatably mounted on said housing, a decorative front plate for said housing lying forwardly of said ears, projections on one of said plates engageable laterally with said ears to prevent rotation of said plates relatively to said housing when said plates are drawn together as when the lock is mounted on a door, eyelets on one of said plates extending through holes in the other plate and securing said plates lossely to one another for holding said plates against relative rotation and preventing disassembly thereof from said housing, said eyelets being of a length to allow sufficient endwise separating movement thereof to permit said projections to pass by said ears whereby said plates may be rotated relatively to said housing when the lock is disassembled from a door.

3. In a lock of the class described, a tubular housing having ears at its forward end, a base front plate for said housing lying rearwardly of said ears and rotatably mounted on said housing, a decorative front plate for said housing lying forwardly of said ears, said ears being disposed on diametrically opposed sides of said tubular housing whereby said plates may rock on said ears to allow adjustment thereof to a beveled door, projections on one of said plates engageable laterally with said ears to prevent rotation of said plates relatively to said housing when said plates are drawn together as when the lock is mounted on a door, means securing said plates loosely to one another for holding said plates against relative rotation and preventing disassembly thereof from said housing while allowing sufficient endwise separating movement thereof to permit said projections to pass by said ears whereby said plates may be rotated relatively to said housing when the lock is disassembled from a door.

4. In a lock of the class described, a tubular housing having ears at its forward end, a base front plate for said housing lying rearwardly of said ears and rotatably mounted on said housing, a decorative front plate for said housing lying forwardly of said ears, projections on said base front plate engageable laterally with said ears to prevent rotation of said plates relatively to said housing when said plates are drawn together as when the lock is assembled on a door, means securing said plates loosely to one another for holding said plates against relative rotation and preventing disassembly thereof from said housing while allowing sufficient endwise separating movement thereof to permit said projections to pass by said ears whereby said plates may be rotated relatively to said housing when the lock is disassembled from a door, a latch bolt passing through an opening in said decorative front plate and thereby held against rotation relatively to both said plates, and a spring pressing a limit surface of said bolt against said front plate to yieldingly hold said decorative front plate away from said forward end of said housing whereby to pull said base front plate through said securing means against said ears so that said plates are yieldingly held against rotation relatively to said tubular housing to facilitate attachment thereof to a door.

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