LOCKING MECHANISM FOR A DOOR LOCK ASSEMBLY

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

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The present invention relates to an improvement in a door lock construction and especially to a novel locking mechanism for locking the outer knob and its cam tube against rotation and retraction of the latch bolt by actuating a push button in the inner knob of such a lock construction.

It is an object of the present invention to provide a novel locking bar having locking engagement when a floating push plate or follower for locking the outer knob and its cam tube against turning and opening of the door from the exterior when the closed door is locked by operation of a locking means such as a push button in the inner knob, whereby the occupant of a room is assured privacy until such occupant releases the locking means by turning of the inner knob.

In this novel embodiment, the locking bar or rod and the push plate or follower are so constructed and arranged that when the push button is depressed it moves the locking bar longitudinally into interlocking engagement with the push plate and in which position the locking bar is detachably retained in locked position in which it locks the outer cam tube and its outer knob against turning until the inner knob and its cam are turned, whereupon the push plate is actuated to release the locking bar whereupon the spring-loaded locking bar is returned to unlocked position.

To engage the spring-biased locking bar and the push plate so as to retain the locking bar in its depressed position in which it locks the outer knob and its cam tube against rotation, the locking bar is notched along one edge to conformably receive in said notch and bridge the spring-loaded push plate which automatically drops into the notch when the locking bar is depressed and its notch is aligned with and receives the push plate.

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

In the drawing:

FIGURE 1 is a view in horizontal cross section taken longitudinally through the completely assembled lock construction and showing the manner in which the latch bolt unit is mounted in the open face of the housing of the assembly.

FIG. 2 is a top plan view of the housing, the outer cam tube upon which the outer knob is mounted, and the inner sleeve for mounting the inner knob and the assembled push button.

FIG. 3 is an enlarged view in vertical cross section taken on the line 3--3 of FIG. 1 and viewed in the direction of the arrows.

FIG. 4 is a view in rear elevation of the push plate or follower.

FIG. 5 is a view in side elevation of a novel slidable locking bar or rod actuated by a push button for locking the outer knob and its cam against turning and retraction of the latch bolt.

The present door lock assembly is of the type particularly adapted for use with a door of a bathroom, bedroom or other room where privacy is desired and includes an outer knob and cam tube adapted to be locked from the interior of the room by depressing a push button in the inner knob when the door is closed. When the push button is depressed upon closing the door, as when a person entering the room desires privacy, the outer knob is locked against turning although the inner knob may be freely turned to retract a latch bolt and permit opening of the door from the interior. This turning of the inner knob automatically releases the push button and the locking means so that the door may then be freely opened either from the interior or exterior by turning of either knob to retract the latch bolt.

The present lock assembly includes an outer knob mounted at the exterior of a door upon the outer end of a split cam tube, and an inner knob mounted upon a split sleeve. The cam tube is split longitudinally to provide an elongated slot adapted to receive a detent on the neck of the outer knob for aligning and permitting ready sliding assembly of the outer knob on the cam tube. This knob upon assembly may then be staked or anchored to the cam tube at 18 or removably attached thereto in the same manner as the inner knob 13.

The inner knob 13 is detachably mounted on the split sleeve also by means of a detent 19 conformably received in a longitudinal slot 21 in the sleeve 14 and the inner knob held in place by a spring-pressed knob holder 22, the projecting end of which extends through a transverse slot in the sleeve 14. The knob holder 22 is spring-biased to its extended anchoring position in a transverse slot 23 in the neck 24 of the inner knob 13, whereby the inner knob is detachably locked to and rotates the sleeve 14.

An inner concentric tube 25 is mounted within and encompassed by the sleeve 14 and extends through a substantial portion of the length of the cam tube 12 and the sleeve 14, the outer end of the sleeve 14 terminating adjacent the inner end of the cam tube, and the inner tube 25 is secured to the sleeve 14 by oppositely located spaced tongues 26 bent inwardly from the body of the sleeve 14 and depressed into longitudinally extending slots 26 in the inner tube 25.

The assembled cam tube 12, inner concentric tube 25 and sleeve 14 are assembled in a stationary housing 27 (FIGS. 1 and 2) mounted in a conforming bore or opening in the door 11. The cam tube 12 at its outer end is provided with diametrically arranged slots 28 and intermediate its length with outwardly extending projections 29 providing spaced stops for locating the cam tube 12 in the housing 27. Adjacent its inner end the cam tube 12 is slotted to provide an indentation 31 depressed into a circumferential slot 32 in the inner tube 25 whereby these tubes 12 and 25 are connected together but permitted limited rotation therebetween so that the outer knob 10 and its cam tube 12, and the inner tube 25, the sleeve 14 and the inner knob 13 may be separately rotated through an arc of travel sufficient to retract a latch bolt of a latch bolt assembly 33.
The cam tube 12 is deeply slotted or cut away and notched at 34 to provide spaced longitudinally extending camming edges 35 and to receive and permit limited rotation about a locking bar 36. The inner tube 25 is also slotted or cut away at 37 to provide spaced longitudinally extending camming edges 38 with the slots 34 and 37 aligned to align the camming edges 35 and 38 within the housing 27.

The outer end of the inner tube 25 is provided with inwardly bent spaced flanges or projections 39 to partially close the end within the outer knob 10 and in the adjacent end of the inner tube are received in sequence a coil spring 41, a guide washer 42 and the inner end of the slidable locking bar 36. This locking bar is provided at its inner end where it projects into the slot 37 of the inner tube 25 and into the housing 27, with a laterally projecting leg 43 having spaced longitudinal projections 44 and 45, the projection 44 adapted to be received in an opening in the guide washer 42 for centering the inner or adjacent end of the locking bar 36.

The projection 45 and adjacent portion of the leg 43 are adapted to project into a slot 46 in the end plate or wall 47 and its externally threaded hub 48 of the housing 27. Intermediate its length the leg 43 is received within the longitudinal slot 15 of the cam tube 12 when the locking bar 36 is in its locked position against the compression spring 41. When the locking bar is released and spring-biased by the spring 41 forward toward the inner knob 13, this leg 43 moves out of the slot 15 of the cam tube 12, permitting this cam tube and the outer knob 10 to be rotated thereby to release the latch bolt 33.

To retain the spring-biased locking bar 36 in its locked position upon being depressed an edge of this locking bar 36 is notched at 49 with the opposed ends of the notch defined by the shoulder 51 adjacent but spaced from the rear of the projecting leg 43 and a spaced shoulder 52 to conformably receive thereby between the opposed ends 53 and 54 of a floating push plate or follower 55. Thus, when the spring-mounted push plate 55 enters the aligned notch 49 of the locking bar 36 upon the latter being depressed, this locking bar is retained in its depressed locked position in which it is held against rotation until the locking bar is released by turning of the inner knob 13.

To the other reduced end 56 of the locking bar 36 is secured a washer 57 and a bushing 58 mounting an encompassing push button 59 longitudinally movable in a confining opening 60 in the inner knob 13.

The housing 27 is provided with the outer end plate 47 and at the other end with an inner end plate 62 having a hub 63, the projecting hubs 48 and 63 of these end plates providing spaced internal bearings for receiving and journalling the cam tube 12 within the housing. The substantially cylindrical or annular portion 64 of the housing 27 is affixed to the end plates 47 and 62, with a portion of the housing cut away to provide a front opening defined by opposed inturned flanges 65 and 66 each having a projection 67. This annular portion 64 also has a pair of opposed inturned flanges or projections 68 bent inwardly to project into the housing and each forming a fulcrum about which the push plate or follower 55 is adapted to rock or pivot when actuated by turning of a free knob 10 or 13 through its connected tube.

This push plate or follower 55 has a flat outer surface 69 in contact with a spring-biased pusher or slide member 71 from the inner reduced end 72 of a stationary latch bolt housing 73 carrying at its outer end the spring-biased latch bolt. When the follower is rocked it depresses the slide member 71 and through retraction mechanism in the bolt housing 73 retracts the latch bolt.

As shown in FIG. 4, the push plate or follower 55 varies in width at its opposite ends 53 and 54 with the end 53 of greatest width having oppositely inturned or overlapping flanges 74, and the narrow end 54 also having oppositely inturned flanges 75, the flanges 74 and 75 being disposed at the rear thereof and contacted by the camming edges 35 and 38 on the cam tube 12 and the inner tube 25, respectively. The outer ends of the flanges 74 provide enclosures each receiving and anchoring an end 76 of a coil spring 77 mounted in the housing 27, with the ends spring-biasing the floating push plate 55 to its neutral or inoperative position shown in FIG. 3, in which the flanges 74 and 75 contact the inturned flanges 68 of the housing 27. As either of these flanges 68 forms a fulcrum point for rocking movement of the push plate 55, rotation of a free knob in either direction will rock its cam tube and the push plate to retract the latch bolt.

In the present novel assembly, the stationary latch bolt housing 73 has its inner reduced end 72 provided with opposed notches each adapted to slidably receive a projection 67 at the open front of the housing 27 to detachably mount and retain the latch bolt assembly in operative position onto the housing.

To securely mount the housing 27 within the bore 78 in the door 11, an outer clamping plate 79 is shown threaded onto the threaded hub 48 of the outer end plate 47, and bears against the outer surface of the door. An outer escutcheon 81 is then assembled over the clamping plate 79. On the cam tube 12 and the inner cam tube 12 is mounted a slot 82 which is longitudinally at right angles to the clamping plate 79, and having a part adapted to be projected into and slidable in the slot of said cam tube when said bar is moved to
its inner projected position by depressing the push button and in which projected position it engages a part on the stationary housing for retaining said slotted cam tube and its outer knob against rotation, said locking bar having a pair of spaced shoulders spaced by the length of the push plate and defining a notch therein spaced from said locking bar part and facing said push plate for receiving and bridging said push plate when the locking bar is in projected position, said shoulders cooperating with and engaging the edges of the push plate and retaining said locking bar against retraction until released by rocking of the push plate caused by turning of the inner knob said notch and said latch being on the same side of said locking bar.

References Cited

UNITED STATES PATENTS

1,991,031  2/1935  Schlage  -----------  70—146
2,361,734  10/1944  Baume  --------------  292—359
2,829,913  4/1958  North et al.  ---------  292—292
2,865,667  12/1958  Schlage  -----------  262—169
3,128,112  4/1964  Fryer  ----------  292—359

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