Oct. 28, 1952 C. D. LLOYD 2,615,742

SLIDING DOOR LOCK

Filed Jan. 6, 1947 2 SHEETS—SHEET 1

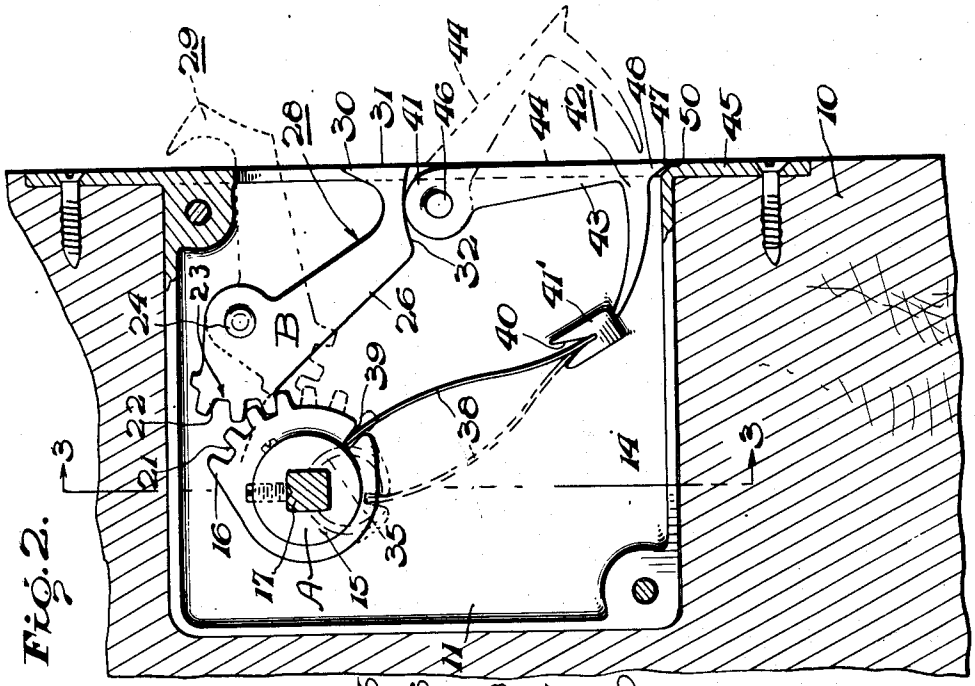


Fig. 2.

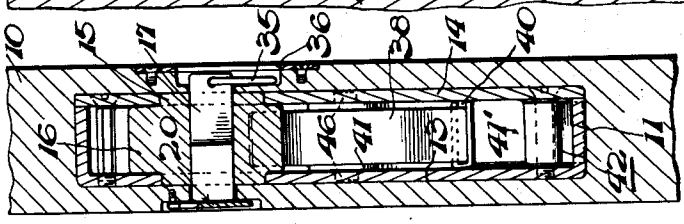


Fig. 3.

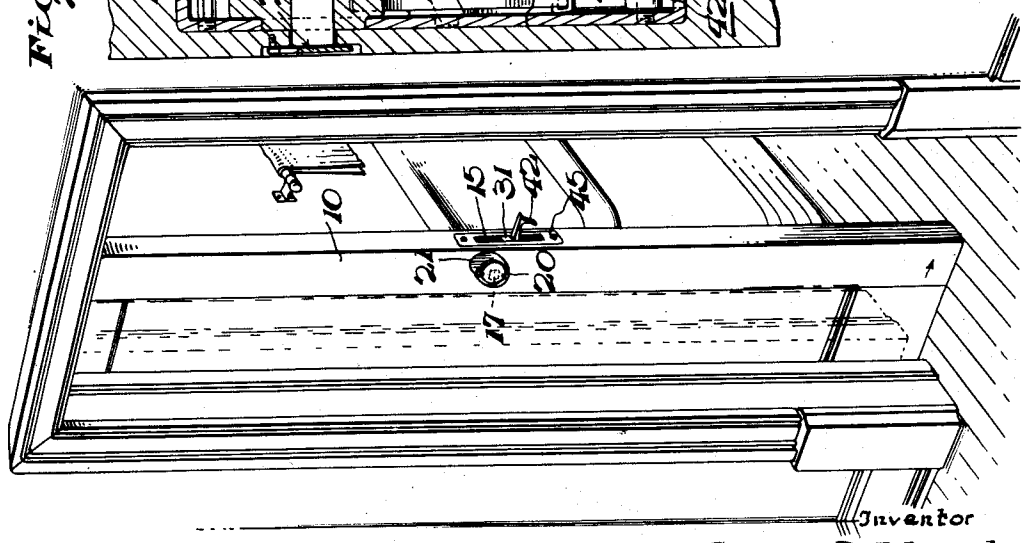


Fig. 1.

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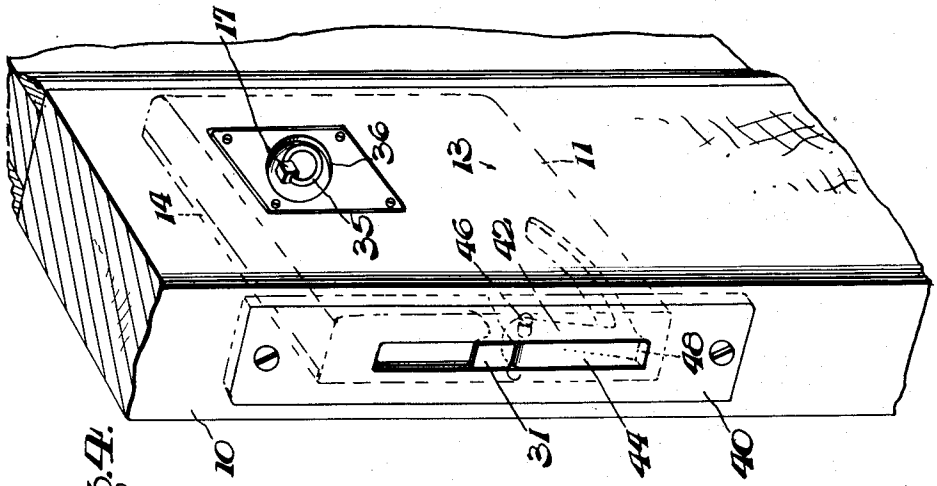


Fig. 4.

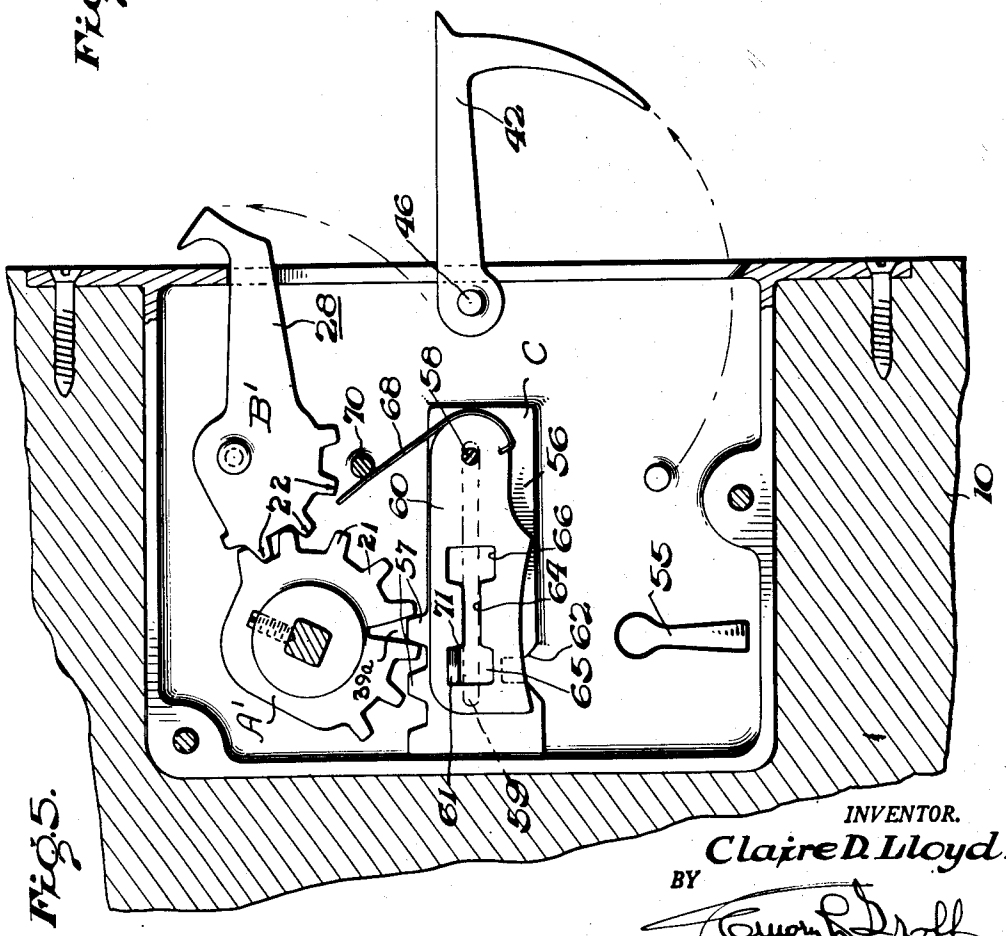


Fig. 5.

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SLIDING DOOR LOCK

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4 Claims. (Cl. 292—96)

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This invention relates to fasteners for sliding doors, and more particularly to features of construction which lend themselves to incorporation in either a fastener for more or less temporary privacy, or a lock for more permanent security.

Sliding doors and swinging doors are, of course, well known, but sliding doors are preferable to doors of the swing type where conservation of room space is of importance. Therefore, the present invention is primarily intended to be applied to a sliding door for bedrooms, bathrooms, and similar enclosures where the corners or wall space of the room are left free for the placing of furniture or other equipment, and the present invention has for its primary object the provision of a key-less lock having a novel arrangement wherein the same may be locked from the inside of the room only for temporary privacy. To that end, the invention provides a combined latch and lock structure having a convenient finger manipulated operator at one side only while the opposite side has a more or less concealed or non-obvious operator generally known only to authorized persons, for receiving an appropriate implement, such as a screw driver, to turn the latch and release the lock in the event of an emergency, when, for example, if a child should become locked in the room, or if a person therein has become incapacitated.

A distinctive object for both temporary privacy and permanent security lock structures is to provide a novel gear connected actuator and lock bolt for swinging said bolt upward into locked position and for returning the said bolt into unlocked position, including a snap action spring arrangement connected therewith.

Another object is to provide a lock for sliding doors having a combined latch and locking bolt including an upturned hooklike latch end adapted to swing upward into the keeper plate on a door jamb, so that any lifting of the door permitted by looseness is the sliding track thereof will more securely engage the bolt.

A further object is to provide a key controlled sliding rack for imparting movement to the gear connected actuator and combined latch and lock bolt whereby the distinctive features thereof may be incorporated in a permanent security lock structure controlled by a key from either side of the door.

With the above and other objects in view, the invention consists in the construction, arrangement and combination of parts hereinafter more fully described and particularly pointed out in the appended claims.

In the drawings, like parts throughout the several views are given similar reference characters and are thus identified in the following detailed description:

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Figure 1 is a perspective view of the outside of a sliding door showing the key-less form of the invention including a countersunk socket opening for releasing the privacy lock in the event of an emergency.

Figure 2 illustrates the preferred embodiment of the invention partly in elevation and partly in cross section, so as to more clearly show the working parts thereof.

Figure 3 is a cross section view taken through the lock casing along the line 3—3 of Figure 2.

Figure 4 is a fragmentary perspective of the inside of a door showing the locking means for the embodiment shown in Fig. 2.

Figure 5 is a vertical sectional view showing a key controlled arrangement for operating the lock.

In its primary aspect the invention includes an actuator A and a combined latch and locking bolt B interconnected by gear teeth. These features may be embodied in a key-less privacy lock as shown in Figs. 1–4 and a key operated security lock as shown in Fig. 5.

Referring to Figs. 1 and 2, which illustrate the privacy lock, there is shown a sliding door 10, and a lock casing 11 which may be of two or more parts, for example, with top and bottom plates 13 and 14, as shown. In each top and bottom cover of the casing 11 is an opening in which fits the extended ends of the actuator A which includes a hub 15 formed on each side of a gear 16. This hub has a four-cornered central opening extending through it. When the top and bottom cover plates 13 and 14 are in place, the gear is journalled in the casing by the hub ends, so that the gear 16 may be turned in the opening by a four-cornered stub shaft 17 which extends approximately half-way into the opening through the hub 15 from the exterior of the interior side of the door 10, while the opposite end of the hub opening goes through to the exterior side of the door and is slightly countersunk therein and covered by a pivoted cover plate 20, see Figs. 1 and 3.

The gear 16 is preferably of the segment type having teeth 21 formed around only a part thereof. These gear teeth are positioned so as to constantly mesh with cooperating teeth 22 carried upon a segment 23 having a pivot opening therein for a pivot pin 24 mounted between the cover plates 13 and 14 of the casing 11.

Extending from the segment 23 as an integral part is the shank 26 of the swinging combined latch and lock bolt B including a bolt 28. This

member 28 includes a hooked-end latch portion 29 of foot-like shape. Said portion 29, for example, comprises an upturned toe 30, a flat end surface 31 and an arcuate or arched surface 32 each of which is shaped to serve a particular purpose in either the locked or unlocked position of the bolt 28.

The segment gear 16 and the shaft 17 are turned by a ring or handle 35 pivoted to the end of the shaft 17. The ring 35 is pivoted so as to be housed in a recess 36 in the wood portion of the door, as shown in Figure 3. When the ring 35 is pulled out and turned to rotate shaft 17, turning motion is imparted to gear 16. The turning of gear 16 is yieldably resisted by a flat resilient bar spring 38, see Figure 2. The end of the bar spring 38 seats in a V-notch 39 in the gear 16 and the other end of the spring seats in the V-notch 40 of a lug 41' secured to the cover plate 14 of the casing 10.

The lug 41' is secured in said casing below V-notch 39 in the gear 16 at a distance less than the length of the bar spring 38. That is, the bar spring is longer than the distance between the bottom of each V-notch, to thereby maintain the spring 38 bowed in off center positions to one side or the other of a normal straight line position, so as to produce an off-center snap action to the left or right when said gear is turned in a clockwise or counterclockwise direction to swing the bolt 28 to either an unlocked or a locked position.

When the bolt 28 is retracted within the casing 11 in an unlocked position, the flat surface 31 of the hooked end 29 is flush with the door face plate 45, and the arcuate surface 32 is in frictional engagement with the circular edge of an annular base 41 of a door pull out member 42. The door pull out member 42 is pivoted on a pin 46 and includes, an elongated shank 43 having an outer flat surface edge 44, which like the surface 31 of the bolt 28 seats within the casing 11 flush with the door face plate 45. When in retracted flush position, the door pull 42 may be pivoted outwardly from the casing by engaging the thumb under the edge 47 of the end of the shank 43, which on the opposite inner side slopes upward into the base of the hook portion of the door pull 42. To make insertion of the thumb under the edge 47 easy, it is spaced apart slightly from a beveled edge 50 on the bottom edge of the door face plate opening, out of which swing the bolt 28 and the door pull-out 42.

Locking operation—Figs. 1–4

When the segment gear 16 of the actuator is turned clockwise to the dotted line position shown in Figure 2, the spring bar 38 snaps from the full line position and kicks up the bolt 28 with the toe 30 going into engagement with the locking plate, not shown, mounted on the door jamb. The upwardly extending hooked end of the bolt 28 is of particular advantage as it provides for greater locking security. For example, in the manufacture of a sliding door track there is usually allowed some looseness between it and the door. This permits a slight lifting of the door. In some sliding door locks this lifting may permit disengagement of the hook locking device, but with the present up-turned hook, which swings upward when the door is lifted, the hook more securely engages the door jamb locking plate.

Unlocking operation

When the segment gear 16 of the actuator member is turned counter-clockwise, the bar spring 38 will snap back into the full line position, shown in Figure 2, and through the intermeshing gear teeth 21 and 22 snap the bolt 28 back into the casing 11. In this position the face 31 of the bolt and the face 44 of the door pull 42 are flush with the door face plate 45, and when the ring 35 is pushed into the recess 36, the door may then be pushed into its recess in the wall.

With a slight modification of the embodiment shown in Figure 2, a key operated security lock may be constructed, as shown in Figure 5 of the drawings.

In this embodiment, the actuator A' and combined latch and bolt element B' are controlled by a key operated slide C. The lock casing 11, actuator gear 16, shaft 17, operating ring 35, bolt 28 and door pull 42 are substantially identical, except that actuator gear 16 has a few additional gear teeth, and are accordingly given the same reference numerals. The difference between the two embodiments resides in the addition of a key hole 55 in either side of the door communicating with the interior of the casing 11; the addition of a rack bar C including body 56 having teeth 57 in mesh with the teeth 21 on gear 16; and the elimination of the flat bar spring 38 and notched lug 41'.

The sliding rack bar C is mounted on a pin 58 and has an elongated slot 59 through which the pin projects on which pivots a tumbler plate 60. The tumbler plate 60 is shaped so as to cooperate with a lug 61 and a key notch 62 carried by the rack bar 56 on each side of the opposite end of the slot 59 from the pin 58. For example, the plate 60 has a slot 64 with enlarged openings 65 and 66 at each end to receive the lug 61 on the rack bar. As shown in Figure 5, the bolt 28 is in locking position and the rack bar has been moved to the extreme left of the casing 11 to thereby engage the lug 61 in the opening 65. Until moved to the right from this position by a suitable key to be inserted in the key hole 55, the tumbler plate 60 is yieldably urged downwardly onto the lug 61 by a bar spring 68. The spring 68 is curled at one end and anchored around the pivoted end of the plate 60 with its other end free, but in pressing engagement adjacent its free end against a stop lug 70, so as to constantly urge said tumbler plate downwardly over the lug 61 on the rack bar, until it is raised by a suitable key engaged in the notch 62 of the rack bar.

Thus, to unlock the bolt 28, a key of a form to engage in notch 62 will raise the tumbler plate 60 on pivot pin 58 and unseat the lug 61 on the rack plate from back of the shoulder 71 formed by opening 65 at the end of the slot 64. When this occurs the lug 61 becomes aligned with the slot 64 and thereby permits the rack bar 56 to be moved to the right over the pin 58, until the lug rides out of slot 64 into the opening 66, and the spring 68 urges and holds the tumbler plate 60 down on the lug 61, as the key leaves the notch 62 following a complete turn of the key.

With respect to the actuator A' and the bolt B' of Fig. 5, it may be pointed out that these parts may be readily substituted for the corresponding parts A and B of Fig. 2. That is to say, the slot 39*a* of the actuator A' of Fig. 5 may be used to receive the end of spring 38, in Fig. 2. Thus, the actuator or gear hub A' and

bolt B' of the key actuated type of lock may be interchangeable with the actuator A and bolt B of the security lock shown in Fig. 2.

In the second embodiment the door pull 42 is used in the same manner as explained in connection with the first embodiment and it is thought that the present invention can be well understood without further description.

While I have described and illustrated only two embodiments of my invention, it is to be understood that various changes and modifications, apparent to those skilled in the art, may be made without departing from the scope of the invention as defined by the appended claims.

I claim:

1. A lock for a sliding door comprising a hollow casing adapted to be disposed in a door lock recess, said casing having an opening in the front thereof, a shaft rotatably mounted in the casing, means on the exterior of the casing for rotating said shaft, a gear secured to and rotatable with said shaft, said gear having a slot therein, a member pivoted in the casing, said member having a hook at one end and being disposed so that it is rotatable between a position at which the hook thereof protrudes through said opening and a position at which the hook is retracted within the casing, abutments for limiting the movement of said member between said positions, a toothed segment carried by the said member in mesh with said gear, whereby said member may be moved between its said positions of protraction and retraction by rotation of said shaft, a lug secured within the casing having a notch therein, and a resiliently bowed bar having one end disposed in the slot and the other end in the notch to bias said gear in a direction defined by the position of the bar relative to a radial reference line between said gear and notch.

2. A lock for a sliding door comprising a hollow casing adapted to be disposed in a door lock recess, said casing having an opening in the front thereof, a shaft rotatably mounted in the casing, means on the exterior of the casing for rotating said shaft, a gear secured to and rotatable with said shaft, said gear having a radial slot therein, a member pivoted in the casing, said member having a hook at one end and being disposed so that it is rotatable between a position at which the hook thereof protrudes through said opening and a position at which the hook is retracted within the casing, abutments for limiting the movement of said member between said positions, a toothed segment carried by the said member in mesh with said gear, whereby said member may be moved between its said positions of protraction and retraction by rotation of said shaft, a lug secured within the casing having a notch therein facing said gear on the side of the slot thereof, and a resiliently bowed bar having one end disposed in the slot and the other end in the notch to bias said gear in a direction defined by the position of the bar relative to a radial reference line between said gear and notch.

3. A lock as defined by claim 1 in which the means for rotating the shaft comprises an operator attached to the shaft and recessed on one side of the casing.

4. A lock as defined by claim 1 in which the hook in its protracted position extends upwardly and rearwardly.

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