Sept. 6, 1932. J. D. SMITH 1,875,768

SLIDING DOORLOCK

Filed March 9, 1931

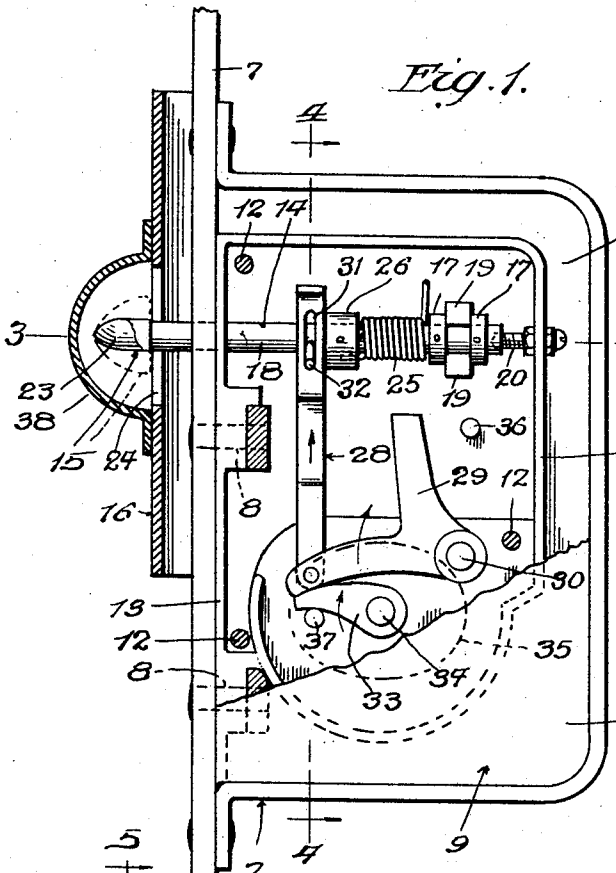


Fig. 1.

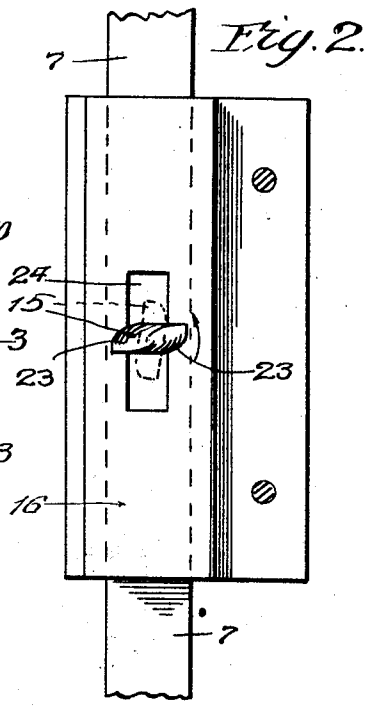


Fig. 2.

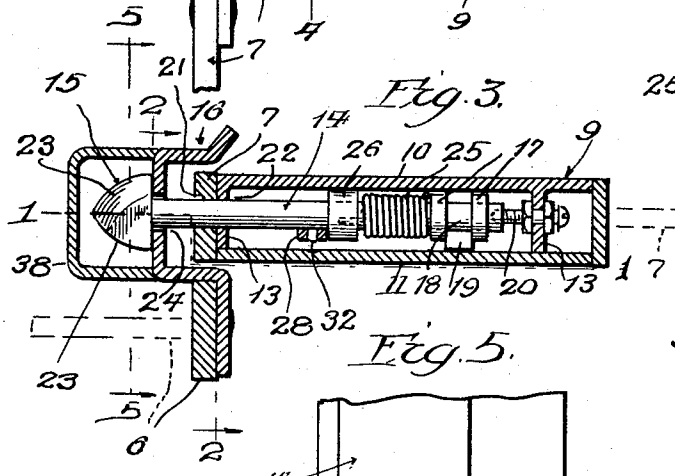


Fig. 3.

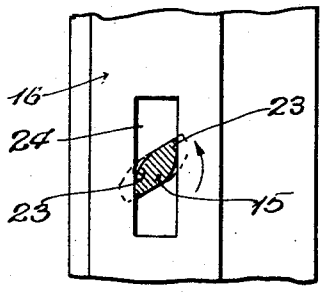


Fig. 5.

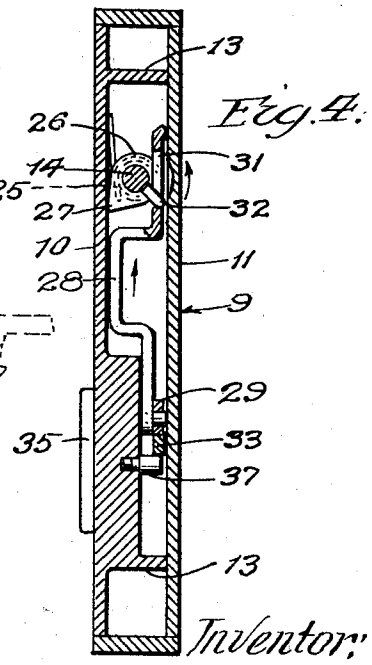


Fig. 4.

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Patented Sept. 6, 1932 1,875,768

UNITED STATES PATENT OFFICE

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SLIDING DOORLOCK

Application filed March 9, 1931. Serial No. 521,050.

This invention relates to sliding door locks, and its principal object is to provide a rotatable lock bolt which is automatically acted upon by an associated slotted keeper, during the final closing movement of the door, to turn the lock bolt into position for entrance through the slot of the keeper.

Another object is to provide novel means for ensuring the automatic operation of the bolt, despite the fact that the door is not hung properly. I have accomplished this result by providing the lock bolt with a head wider in one direction than the other and having spirally disposed cam-like edges which are adapted to be engaged by the side edges of the slot, regardless of any slight misalignment of the door, whereby the wider part of the bolt head is thereby turned into parallelism with the slot and thrust therethrough during the final closing movement of the door, and thereafter automatically turned at right angles to the slot so as to lockingly engage with the keeper.

The invention consists, therefore, in the several novel features hereinafter fully set forth and claimed.

The invention is clearly illustrated in the drawing accompanying this specification in which—

Figure 1 is a view partly in side elevation and partly in vertical longitudinal section of a sliding door lock embodying a simple form of the present invention, part of one of the side plates of the lock casing being broken away, and the line of section being indicated at 1—1 in Fig. 3;

Fig. 2 is a view partly in end elevation and partly in vertical cross section taken on the line 2—2 of Fig. 3;

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical cross section taken on the line 4—4 of Fig. 1; and

Fig. 5 is a view partly in end elevation and partly in vertical cross section taken on the line 5—5 of Fig. 3, illustrating the bolt head in a position occupied when passing through the slot of the keeper.

Referring to said drawing, the reference character 6 (see Fig. 3) designates a fragment of an enclosure having a door opening adapted to be closed by a sliding door, a fragment of which is seen at 7. The sliding door is provided with door hangers (not shown) as is customary, whereby the door is opened and closed by sliding movements. Secured to the door, as by screws 8, is the lock casing 9 which usually comprises two side plates 10 and 11 secured together by screws 12, one of the side plates being provided with a marginal flange 13 which abuts against the inner face of the other side plate and provides a chamber between the side plate for receiving the operating mechanism of the lock.

Rotatably mounted in the lock casing 9 is a lock bolt 14 which projects through the edge portion of the door 7 and is provided with a head 15 adapted to engage with a keeper 16, bolted or otherwise secured to the enclosure 6. The lock bolt is held against endwise movement as by a pair of collars 17, pinned or otherwise rigidly fastened to the shank 18 of the lock bolt and disposed on the two sides of a pair of lugs 19 which are formed on the side plate 10 and straddle the shank of the lock bolt. The rear end of the bolt may be rotatably mounted upon a pin 20 secured in the flange 13, and the forward end of the bolt turns in aligned openings 21 and 22 formed in the front edge of the door and adjacent the flange 13 of the lock casing.

The bolt head 15 is formed with an approximately flat portion, having a greater dimension in one direction than the other, and is of tapered formation. The tapering side edges 23 are eccentrically disposed with respect to the axis of the bolt, as shown in Figs. 2 and 5, so as to form cam-like surfaces which are acted upon by the side edges of the slot 24 of the keeper, while the bolt head is passing through said slot during the final closing movement of the door. The side edges of the bolt taper from the base to a point located in the axis of the bolt, whereby the bolt will always find its way into the slot of the keeper despite the fact that the door may not be hung exactly right. The slot 24 is elongated in a vertical direction and is relatively narrow, but of less width than the longest dimension of the bolt head.

Normally the longest dimension or major axis of the bolt head extends crosswise of the plane of the door and crosswise of the slot and is yieldably held in such position by a coiled spring 25 which encircles the shank of the lock bolt and has one end bearing against the side plate 10 and the other end in engagement with a collar 26 pinned or otherwise secured to the shank of the lock bolt. The collar 26 is formed with a toe 27 which is held in engagement with the side plate 10 by the coiled spring 25, thus positioning the bolt head to normally stand at right angles to the plane of the door, and, consequently, at right angles to the major axis of the slot 24.

Means are provided for manually rotating the lock bolt so as to bring the major axis of its head into parallelism with the major axis of the slot 24 for the purpose of unlocking the door, and in the simple form of mechanism shown, a link 28 is provided, one end of which is connected to a bell crank lever 29 fulcrumed upon the side plate 10 at 30, and the other end of which link is provided with an elongated slot 31 through which projects a pin 32 which is secured in and projects from the side of the shank 18 of the lock bolt. The bell crank lever 29 also provides means whereby the bolt mechanism may be actuated by a proper door key, as is customary.

An arm 33 fast upon the spindle 34 of a knob or handle 35 engages with an arm of the bell crank lever 29, and, when rotated in the direction of the arrow thereon (see Fig. 1), raises the link 28 and turns the lock bolt 14 in the direction indicated by the arrows in Figs. 2, 4 and 5 by reason of the engagement of the lower end of the slot 31 with the pin 32, thereby bringing the bolt head 15 into parallelism with the slot 24. A stop pin 36 projecting from the side plate 10 limits the movement of the bell crank lever 29 in the direction to unlock the lock, and a stop pin 37 limits the movement of the arm 33 in the opposite direction. It will be noted that by reason of the elongated slot 31 in the link 28, the pin 32 is free to move therein when the lock bolt is turned independently of the manual actuating mechanism. If desired, a hood or other cover 38 is provided over the slot 24 so as to prevent access to the bolt head when in locking engagement with the keeper.

As has been explained, the bolt head normally is held with its major axis extending at right angles to the plane of the door and is moved into position parallel with the major axis of the slot 24 either by reason of the engagement of its tapered edges with the side edges of the slot during the final closing movement of the door or by turning the knob or handle 35, or by actuating the lock mechanism with a proper key. When the door is being closed, the tapering and sloping cam-like edges 23 of the bolt head engage with the side edges of the slot 24, and, as a result, the bolt is turned in the direction of the arrows in Figs. 2 and 5 until the head is brought into parallelism with the slot, whereupon the entire bolt head passes through the slot and immediately thereafter the spring 25 returns the bolt to its normal position with the major axis of the bolt head extending across the slot and engaging the edge portions of the keeper adjacent the slot, thereby securely locking the door to the enclosure. To unlock the door, the knob must be turned, or the bell crank lever 29 moved back by a proper key to bring the bolt head into parallelism with the slot. From the above it will be seen that despite the fact that the door may not be hung with great precision, the head of the bolt will find its way through the slot in the keeper as long as the pointed end of the head enters the slot.

I claim as new, and desire to secure by Letters Patent:

1. A sliding door lock comprising in combination a lock casing, a lock bolt having a shank rotatably mounted and held against endwise movement in said casing, and having a head on one end of tapered formation, the side edges of which are eccentric with respect to the axis of the bolt, a keeper having an elongated slot extending at right angles to the normal plane of the bolt head, the side edges of which slot are adapted to engage the side edges of the bolt head and thereby rotate the bolt head into parallelism with the slot during the final closing movement of the door, a stop member on the bolt co-acting with the casing to position the bolt head in locking position at right angles to the slot, a spring engaging the lock bolt, co-operating with said stop member to yieldably hold the bolt head in locking position, a radially extending pin on the bolt, a slotted bolt actuating link through which said pin extends, and manually operable means for actuating the link.

2. A sliding door lock comprising in combination a lock casing, a lock bolt rotatably mounted and held against endwise movement therein, said lock bolt protruding from the casing and having a flattened head on its protruding end, the side faces of which are flat and of less extent than the remainder of the head and the side edges of which taper from the base of the bolt to a point located in the axis thereof along curved lines running in oblique directions from the flat side faces of the head, spring return means for yieldably holding the bolt head in locking position, a keeper having an elongated slot which extends at right angles to the normal plane of the bolt head and is formed with parallel side edges which co-operate with the tapered side edges of the bolt head to rotate the latter into parallelism with the slot during the final closing movement of the door,

and independently acting manually operated bolt unlocking mechanism.

3. A sliding door lock comprising in combination a lock bolt rotatably mounted and held against endwise movement therein, said lock bolt protruding from the casing and having a flattened head on its protruding end, the side faces of which are flat and of less extent than the remainder of the head and the side edges of which taper from the base of the head to a point located in the axis thereof along curved lines running in oblique directions from the flat side faces of the head, a keeper having an elongated slot extending at right angles to the normal plane of the bolt head and formed with parallel side edges which co-operate with the tapered curved side edges of the bolt head to rotate the latter into parallelism with the slot during the final closing movement of the door, a stop member on the lock bolt co-acting with the casing to position the bolt head in locking position at right angles to the slot, a spring engaging the lock bolt and co-operating with said stop to yieldingly hold the bolt head in locking position, and manually operable unlocking means for the bolt.

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