Feb. 5, 1929. 1,701,099

R. S. CLARK

LOCKING MECHANISM

Filed Oct. 4, 1926

Fig-1

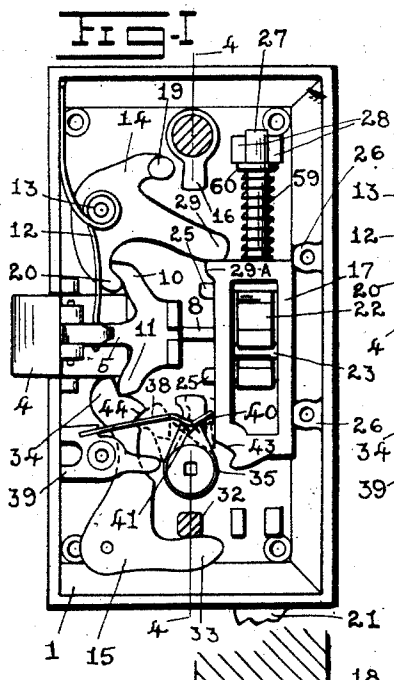


Fig-2

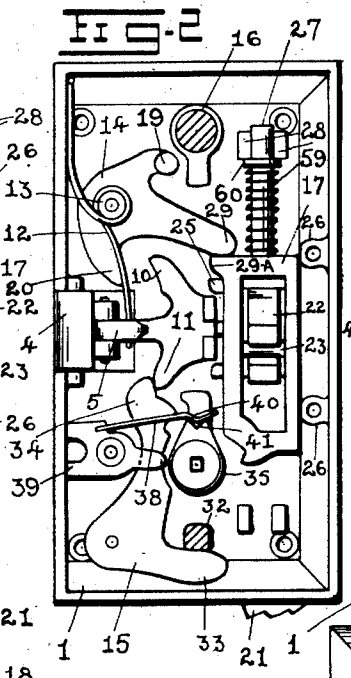


Fig-3

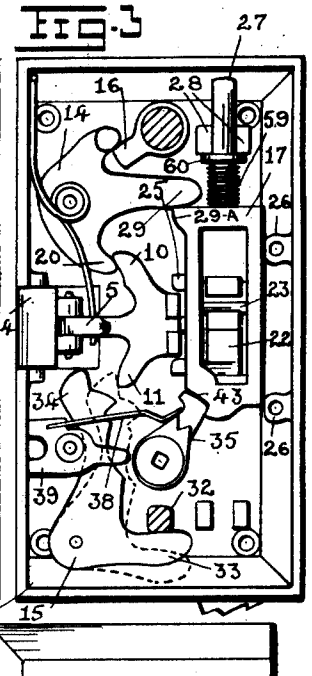


Fig-4

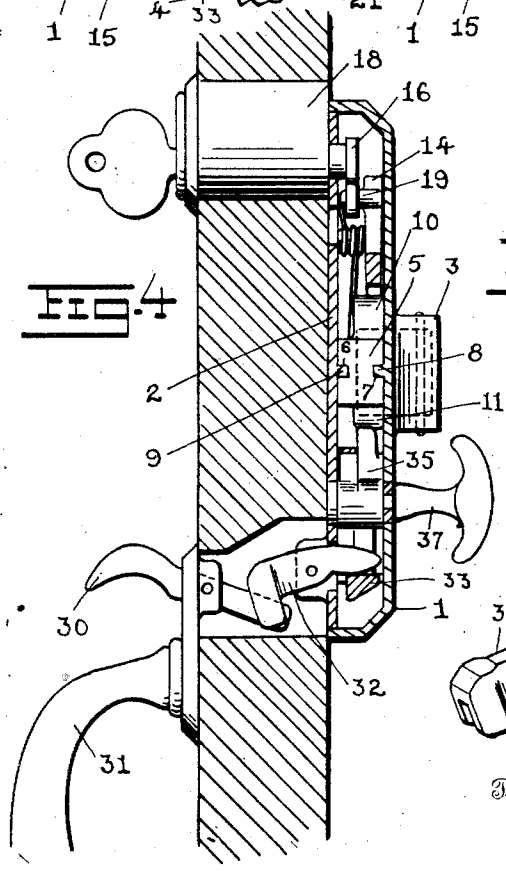


Fig-6

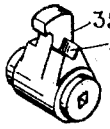


Fig-5

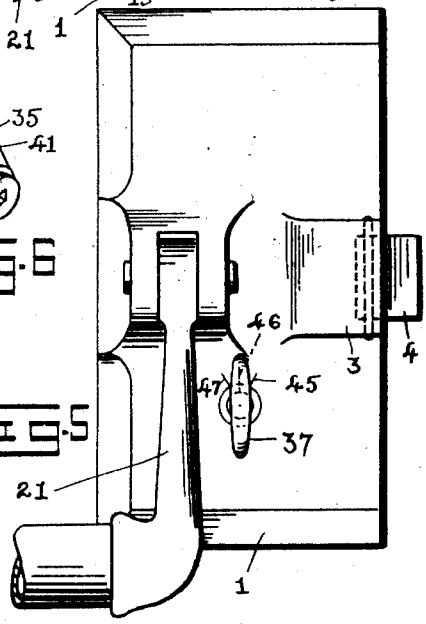
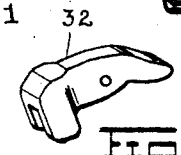


Fig-7



Inventor

Ralph S. Clark

By Frank Keiper

Attorney

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UNITED STATES PATENT OFFICE.

RALPH S. CLARK, OF ROCHESTER, NEW YORK.

LOCKING MECHANISM.

Application filed October 4, 1926. Serial No. 139,368.

The object of this invention is to provide an improved and simplified locking mechanism for door locks especially those having an emergency lock feature embodied therein.

Another object of this invention is to provide this locking mechanism with a latch mechanism in combination with a hold back mechanism that is operated from the inside of the door so that the part of the locking mechanism operated by a latch lever or knob on the outside of the door can be controlled by a key or latch on the inside of the door.

Another object of this invention is to so construct the hold back mechanism that it may be operated by a key or latch on the inside to hold the locking mechanism in an unlocked position.

These and other objects of this invention will be fully illustrated in the drawing, described in the specification and pointed out in the claims at the end thereof.

In the accompanying drawing:

Figure 1 is a rear elevation of the locking mechanism with the cover plate of the lock removed therefrom.

Figure 2 is a similar view of the locking mechanism after the locking bolt has been operated by the latch lever located on the outside of the door.

Figure 3 is a view of the locking mechanism similar to the view illustrated in Figure 1 after the locking mechanism has been operated by the emergency bar.

Figure 4 is a vertical sectional view of the locking mechanism as it appears mounted on a door, the section being taken on the line 4—4 of Figure 1.

Figure 5 is a front elevation of the complete lock as it appears mounted on the inside of the door.

Figure 6 is a detail perspective view of the hold back operating dog.

Figure 7 is a detail perspective view of the latch connecting lever.

In the several figures of the drawing like reference numerals indicate like parts.

The locking mechanism forming the subject matter of my present invention is an improvement over the locking mechanism illustrated in my prior Patent No. 1,539,350 issued May 26, 1925. In my present invention the locking mechanism is considerably simplified and its hold back mechanism is made more practical in its adaptation and operation.

As illustrated in the figures of the drawing the locking mechanism is mounted in the housing 1 which is closed at the rear by a suitable cover plate 2. The housing is fastened directly to the face or rim of the door and is, therefore, a rim lock in distinction from a mortised lock such as is illustrated in my prior patent above referred to.

The housing 1 is provided with a pocket 3 on one side thereof and in this pocket is pivoted the hinged latch bolt 4. In swinging the latch the latch bolt moves in and out of the opening provided in the side of the housing adjacent to the pocket 3 to engage the striking plate (not shown) to lock the door or disengage itself from it to unlock the door. Pivotally attached to the rear of the swinging latch bolt 4 is the connecting link 5. This connecting link is provided with the notches 6 and 7 one at the bottom and the other at the top into which engage the horizontal guide ribs 8 and 9 provided on the inside of the housing 1 and the cover plate 2 respectively. These guide ribs guide the connecting link in a straight line movement on the inside of the housing when it is moved by the operating levers that will hereinafter be described. The connecting link 5 is also provided with the upwardly projecting finger 10 and the downwardly projecting finger 11. Normally the connecting link 5 is forced to the left by the spring 12 as illustrated in Figure 1, in which position the hinged latch bolt 4 extends from the lock housing to engage the striking plate, (not shown). The spring 12 is anchored around the pivot post 13 and its free end extends along one side of the casing as illustrated in Figures 1, 2 and 3.

The sliding dog is moved to the right to withdraw the latch bolt by either one of the bell crank levers 14 or 15. Of these the bell crank lever 14 is pivoted on the pivot post 13 and is operated by either the barrel lock crank 16 or the spring pressed sliding member 17. The barrel lock crank is mounted on the inner

end of the barrel lock 18 which extends through the door and is suitably mounted therein with the inner end of its barrel, to which the crank 16 is attached, located on the inside of the housing 1. The bell crank lever 14 is provided with the lug 19 with which the crank 16 engages when moving into the position illustrated in Figure 3. This is done on the rotation of the key of the barrel 18, which turns the crank and engages the lug 19 of the bell crank lever 14. The finger 20 of the bell crank lever in turn engages the finger 10 of the connecting link 5 and moves the sliding dog and its latch bolt 4 into the position illustrated in Figure 3. In this way the turning of the key on the outside of the door operates the barrel lock 18 and in turn operates the bell crank lever 14 and sliding dog 5.

The same result is secured by the operation of the swinging bar 21. This bar is pivoted on the outside of the housing 1 and a bifurcated extension 22 thereof projects into the housing 1 and straddles the cross pin 23 carried by the sliding member 17. The sliding member comprises a rectangular frame and is guided in a straight line motion between the lugs 25, 25 on one side and the lugs 26, 26 on the other side. The cross pin 23 is located in the middle of the frame and when the bar 21 is rocked downwardly, it moves the sliding member 17 upwardly from its normal position illustrated in Figures 1 and 2 to the position illustrated in Figure 3.

The sliding member 17 is also provided with an extension rod 27, which extends from the rectangular frame into a short guide channel formed by the lugs 28. A compression spring 59 surrounds this extension rod and is interposed between the washer 60 held against the lugs 28, 28 and the top of the rectangular frame. This compression spring is compressed when the sliding member is moved by the swinging bar 21 and its expansion returns the swinging bar to its normal position when the swinging bar is released.

The sliding member 17 operates the hinged latch bolt thru the bell crank lever 14 which for this reason is provided with the finger 29. This finger normally rests on top of the overhanging lug 29^A provided on one side of the frame of the sliding member. When therefore the sliding member is raised on the operation of the swinging emergency bar the bell crank lever is rocked by the finger 29 which in turn withdraws the latch bolt as described in connection with the operation of the key of the barrel lock 18.

The latch mechanism for operating the locking mechanism comprises the swinging latch 30 which is mounted to swing above the handle 31 on the outside of the door. The inner end of this swinging latch engages into the grooved lever 32 pivoted in the cover plate 2 of the lock and projecting into the inside of the housing 1. The inner end of the swinging lever 32 normally rests on top of the finger 33 of the bell crank lever 15 so that by depressing the latch lever 30 the bell crank lever 15 is rocked and swings the finger 34 on the other end of the bell crank lever 15 to the right from the position illustrated in Figure 1 into the position illustrated in Figure 2. In doing so the finger 34 of the bell crank lever 15 engages the lower finger 11 of the sliding dog 5 and forces it to the right to withdraw the latch bolt in the same manner as is described in connection with the operation of the barrel lock 18 in operating the locking mechanism thru the bell crank lever 14.

The hold back for holding the locking mechanism in its unlocked position is accomplished by the swinging dog 35. This dog is pivoted in bearings located in the housing and its cover plate respectively and in the hub of the dog is provided a square hole so that the turning latch 37 can be engaged therein to turn the dog 35 to the right or left. The dog is held in a neutral vertical position by the leaf spring 38 which is anchored in the lug 39. This spring has a V shaped bend 40 at the outer end which engages into the V shaped groove 41 provided on the periphery of the hub of the dog 35. The engagement of the V shaped bend 40 of the spring 38 with the V shaped groove 41 of the dog 35 holds the dog in the vertical neutral position from which it may be turned either to the right or the left by means of the turning latch 37. When the dog is turned to the right and the sliding member 17 is in its lowermost position as illustrated in Figures 1 and 2 the dog rests against the side of the sliding member and is yieldingly forced against it by the leaf spring 38 which in this position has been disengaged from the V shaped groove and rests against the left hand side of the dog 35. As soon as the sliding member 17 is raised by the swinging bar 21 to unlock the locking mechanism and withdraw the hinged latch 4, the dog 35 is forced by the spring 38 into the angular groove 43 provided in the lower left hand corner of the sliding member 17. The engagement of the dog into this groove holds the sliding member back and prevents it from returning to its normal position so that as long as the dog is kept in engagement with the sliding member the locking mechanism is held unlocked in the position illustrated in Figure 3. To release the locking mechanism from this unlocked position the latch turn 37 is turned to withdraw the dog 35 from engagement with the groove 43 in the sliding member so that the expansion of the spring 59 returns the sliding member 17 and the swinging bar 21 to their normal position while the swinging latch bolt swings out of the housing to engage the striking plate.

The dog 35 is also adapted to lock or

unlock the latch mechanism operated by the latch lever 30 from the outside of the door. For this purpose the latch turn 37 is turned to the left so that the dog 35 engages the groove 44 provided in the side of the bell crank lever 15 near the upper end thereof. The engagement of the dog 35 with the bell crank lever holds the bell crank lever against swinging so that it cannot be operated by the latch lever 30 as above described. When the latch mechanism is thus locked the only way the locking mechanism can be operated from the outside of the door is by means of the key of the barrel lock 18 while the operation of the locking mechanism from the inside of the door by means of the swinging emergency bar remains undisturbed.

The three positions of the locking dog operated by the latch turn 37 are indicated by the radial lines 45, 46 and 47 provided on the outside of the housing and grouped around the stem of the latch turn. Thus when the latch lever is placed parallel with the line 46 as illustrated in Figure 5 the dog 35 is held in its neutral position. When it is moved to the right parallel to the line 45 the dog is moved to engage the bell crank lever 15 to lock the latch mechanism and when it is moved to the left parallel to the line 47 the dog is moved in engagement with the sliding member 17 and holds back the swinging emergency bar 21 after it has been operated to unlock the emergency locking mechanism to keep the lock unlocked.

While I have described and illustrated the locking mechanism as being operated by both a barrel lock and a latch lever it is of course understood that either one of them or both may be omitted, so that the lock is operated by either the barrel lock or the latch lever in combination with the emergency bar or by the emergency bar alone. In this case the movement of the dog 35 will only have two positions, a neutral position in which it does not affect the locking mechanism and a position in which it engages the sliding member 17 and holds the swinging bar and the latch in their unlocked position.

I claim:

1. In a lock mechanism having a latch bolt and an operating member for said latch bolt, the combination of a second operating member, a swinging dog and means for swinging said dog in engagement with one or the other of said operating members and hold them in a predetermining position with relation to said latch bolt.

2. In a lock mechanism having a latch bolt, a sliding member for operating said latch bolt and a swinging emergency bar for operating said sliding member, the combination of a bell crank lever, adapted to operate said latch bolt, means for operating said bell crank and hold back means for locking said bell crank or said sliding member in a predetermined position.

3. In a lock mechanism having a latch bolt and an operating member for said latch bolt, the combination of a second operating member for said latch bolt, a swinging dog and means for swinging said dog to engage one of said operating members and hold it against movement with the latch bolt in its unlocked position or engage the other of said operating members and hold it against movement with the latch bolt in its locked position.

4. In a lock mechanism having a latch bolt and an operating member for said latch bolt, the combination of a bell crank, a latch lever and means connecting said latch lever with said bell crank, a swinging dog said dog being adapted to swing in opposite directions and means for swinging said dog in engagement with said bell crank lever when swinging in one direction and in engagement with said operating member when swinging in the opposite direction.

5. In a lock mechanism, the combination of a latch bolt, a pair of bell crank levers engaging said latch bolt, a latch lever engaging one of said bell cranks to operate said latch bolt, a barrel locking mechanism engaging the other of said bell cranks to operate said latch bolt, an actuating member, a swinging emergency bar operating said actuating member, said actuating bar engaging one of said bell cranks to operate said latch bolt on the swinging of said emergency bar, a swinging dog and means for swinging said dog into engagement with either said actuating bar and hold it in a predetermined position or swing it in engagement with the bell crank operated by said latch lever and prevent its operation by said latch lever.

6. In an emergency lock mechanism, the combination of a latch, a connecting link connected to said latch, a lug projecting from either side of said connecting link, a bell crank lever, a T shaped lever, each of said lugs of said connecting link being adapted to engage one of said levers, a latch lever engaging the free end of said bell crank lever, a crank engaging one of the free ends of said T shaped lever, a sliding member, adapted to slide at right angles to said connecting link, said sliding member engaging the other free end of said T shaped lever.

7. In an emergency lock mechanism, the combination of a latch, a connecting link connected to said latch, a lug projecting from one side of said connecting link, a T shaped lever, said T shaped lever engaging said lug on said connecting link, a crank engaging one of the free ends of said T shaped lever, a sliding member mounted to slide at right angles to said connecting link, said sliding member engaging the other free end of said T shaped lever, means for independently

swinging said T shaped lever to operate said latch and means for operating said sliding member to operate said latch.

8. In an emergency lock mechanism, the combination of a latch, a connecting link connected to said latch, a lug projecting from the side of said connecting link, a bell crank lever mounted adjacent to said connecting link and engaging said lug, a sliding member mounted to slide at right angles to said connecting link near its free end thereof, said sliding member engaging said bell crank to operate said latch on the movement of said sliding member and means for operating said sliding member.

9. In an emergency lock mechanism, the combination of a latch, a connecting link connected to said latch, a lever engaging said connecting link, a sliding member mounted at right angles to said connecting link, said sliding member engaging said lever to operate said connecting link on the movement of said sliding member, a second lever independently engaging said sliding dog and means adapted to engage said sliding member or said second lever to lock the one or the other against movement and prevent the movement of said latch by either one or the other of said sliding member or said second lever.

10. In an emergency lock mechanism, the combination of a latch, a connecting link connected to said latch, a lug projecting from the side of said connecting link, a bell crank lever mounted adjacent to said connecting link and engaging said lug, a sliding member mounted to slide at right angles to said connecting link near its free end thereof, said sliding member engaging said bell crank to operate said latch on the movement of said sliding member and means for operating said sliding member, and means for locking said sliding member in a predetermined position.

11. In an emergency lock mechanism having a latch bolt and operating member for said latch bolt, the combination of a second operating member, a swinging dog intermediate of said operating members, a V shaped groove in said dog, a spring pressed finger, a V shaped lug depending from said spring pressed finger and adapted to engage into said V shaped groove to hold said dog in a neutral position between said operating members, said lug also being adapted to engage either side of said dog to hold said dog in engagement with either the one or the other of said operating members.

12. In an emergency lock mechanism, the combination of a housing adapted to be mounted to the face of the door on one side thereof, a latch projecting from said housing, a connecting link at the inner end of said latch, an upwardly and forwardly projecting lug at the top of said connecting member, a fixed guide rib provided in said housing along side of said connecting link, guiding means carried by said connecting link, said guiding means engaing said guide rib to guide said connecting link in a straight line motion, a bell crank lever having a downwardly and rearwardly projecting end adapted to engage the under side of said upwardly and forwardly projecting lug of said connecting link and means for rocking said bell crank to move said connecting member and with it said latch in one direction.

13. In an emergency lock mechanism for a door, the combination of a latch, a connecting link pivoted to the inner end of said latch, an upwardly and forwardly projecting lug at the top of said connecting link, a fixed guide rib along side of said connecting link, guiding means carried by said connecting link, said guiding means engaging said guide rib to guide said connecting member in a straight line motion, a bell crank lever having a rearwardly and downwardly projecting end adapted to engage the under side of said upwardly and forwardly projecting lug of said connecting link, a sliding member adapted to move at right angles to said connecting link, said bell crank engaging one end of said sliding member, a swinging bar mounted to swing on the door, means connecting said swinging bar with said sliding member, and a locking dog adapted to engage the other end of said sliding member to hold said swinging bar, said sliding member, said bell crank, said connecting link and said latch against movement in one direction.

14. In an emergency lock mechanism, the combination of a housing, a latch projecting from said housing, a connecting link for said latch, an upwardly and forwardly projecting lug carried by said connecting link, a bell crank lever having a downwardly and rearwardly projecting lug adapted to engage under said upwardly and forwardly projecting lug of said connecting link, and means carried by said connecting link to hold said connecting link, in a straight line motion on the movement thereof caused by the swinging of said bell crank lever.

15. In an emergency lock mechanism, the combination of a latch, a connecting link for said latch, a spring member engaging said connecting link to move said latch and its link in one direction, a groove on one side of said connecting link, a fixed guide rib extending into said groove to guide said connecting link in a straight line motion while permitting a lateral rocking motion, a bell crank having a sliding connection with said connecting link and means for rocking said bell crank.

16. In an emergency lock mechanism having a latch bolt and an operating member for operating said latch bolt, the combination of the second operating member and a single dogging means engaging either the one or the other of said operating members to dog

them in a predetermined position without affecting the operation of the other of said operating members.

17. In a locking mechanism including a latch, a swinging operating bar, and a latch lever, the combination of means for transmitting the movement of said swing bar to said latch, means for transmitting the movement of said latch lever to said latch and a dog adapted to engage either one of said transmitting means and dog either one or the other of said transmitting means in a predetermined position without affecting the operation of the other of said transmitting means.

In testimony whereof I affix my signature.

RALPH S. CLARK.