Nov. 15, 1927. 1,649,424

C. TIRONE

DOOR LOCK

Filed Oct. 18, 1926

Fig. 1.

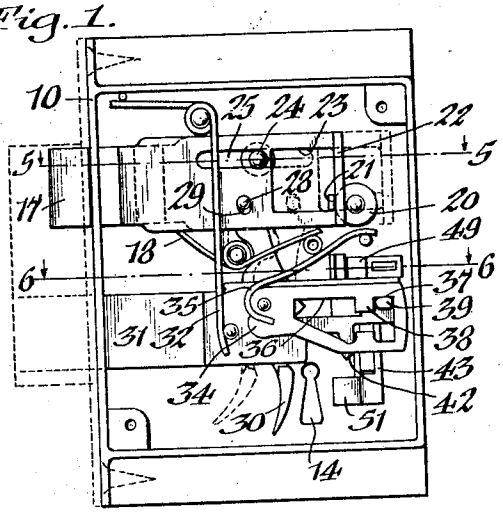


Fig. 2.

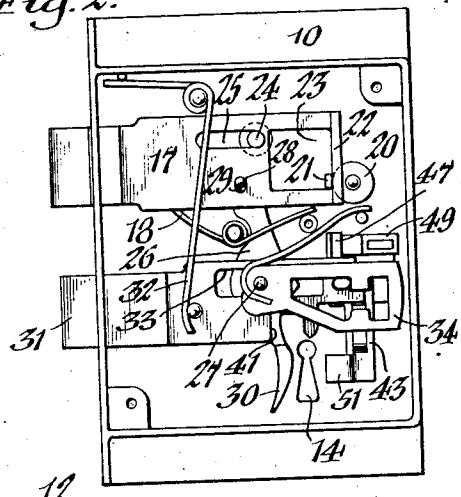


Fig. 3.

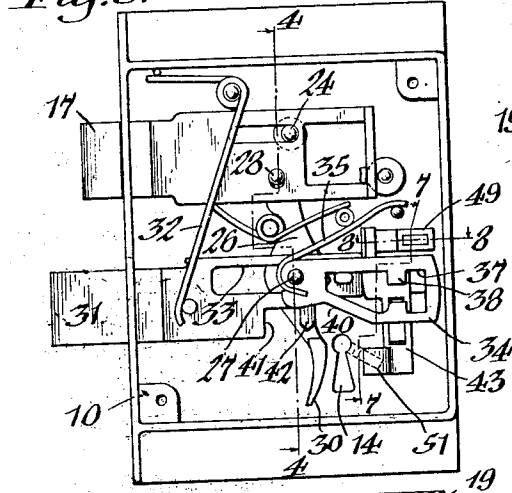


Fig. 4.

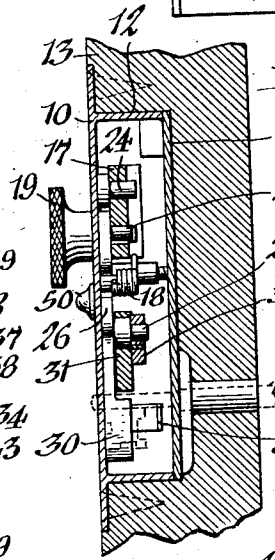


Fig. 7.

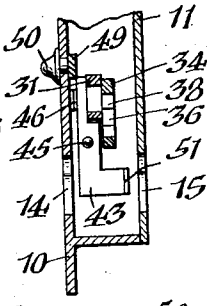


Fig. 5.

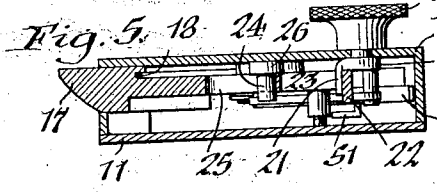


Fig. 9.

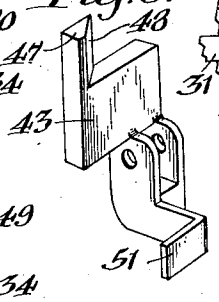


Fig. 8.

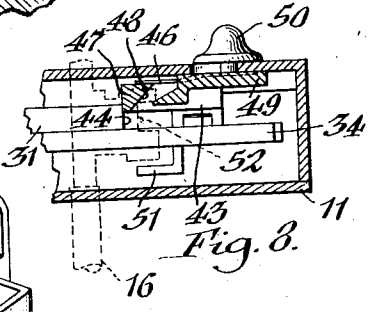
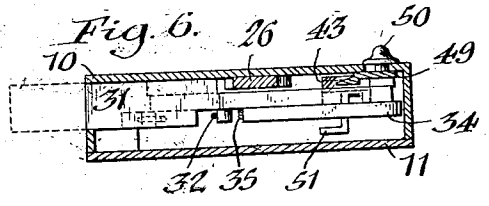


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES TIRONE, OF BUFFALO, NEW YORK.

DOOR LOCK.

Application filed October 18, 1926. Serial No. 142,204.

This invention relates to improvements in key-operated locks for doors and the like.

One of its objects is the provision of a lock of this character which is strong and durable in construction, which is positive and reliable in operation, and which is not liable to get out of order.

Another object of the invention is to improve the bolt-operating mechanism of the lock with a view of preventing unauthorized persons from opening it even though they have a key which might partially open the same.

Other features of this invention reside in the construction and arrangement of its parts which will be hereinafter more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:—

Figure 1 is an outside face view of my improved lock with the cover plate removed and showing the main locking bolt open. Figures 2 and 3 are views similar to Fig. 1, but showing the main locking bolt in its partially and fully locked positions, respectively. Figure 4 is a transverse vertical section taken substantially in the plane of line 4—4, Fig. 3. Figures 5 and 6 are horizontal sections taken on the correspondingly numbered lines in Fig. 1. Figure 7 is a fragmentary transverse vertical section on line 7—7, Fig. 4. Figure 8 is an enlarged fragmentary horizontal section on line 8—8, Fig. 3. Figure 9 is a perspective view of the main bolt-locking catch or trigger.

Similar characters of reference indicate corresponding parts throughout the several views.

The casing 10, in which the various parts of the lock mechanism are housed, is rectangular in shape, being closed on its outer side by a cover 11 and adapted to be fastened in a recess 12 in the inside face of the door 13 by screws or other fasteners. The inside wall of the casing and its cover have alining key holes 14 and 15, respectively, for receiving the ordinary type of door-key 16.

Mounted in the upper portion of the casing is a sliding latch-bolt 17 normally held in its projected position by a spring 18 and adapted to be retracted to its unlocked position from the inside of the door by a knob 19 and from the outside by the key 16. Said knob carries a disk 20 having an outwardly-facing lug 21 engaging the flanged rear wall 22 of an opening 23 formed in the latch-bolt. The latter is guided on a pin 24 engaging a longitudinal slot 25 therein and is actuated by the key through the medium of a thrust lever 26 fulcrumed intermediate its ends on a pivot pin 27 and having an outwardly-projecting stud 28 on its upper arm loosely engaging an opening 29 in the latch-bolt. The lower arm of this thrust lever terminates in a tail 30 with which the bit of the key is adapted to engage for rocking said lever in a direction to retract the latch-bolt.

Arranged below and parallel with the latch-bolt 17 is the main locking-bolt 31 which partly overlies that portion of the thrust lever above its tail 30 and which is held in and urged to its retracted position by a spring 32, the same being guided on the pivot pin 27 engaging a longitudinal slot 33 in said bolt. A vertically-swinging tumbler 34 overlies the rear portion of the locking-bolt and is fulcrumed on the pivot pin 27, a spring 35 serving to return the tumbler from its inclined bolt-releasing position to its substantially horizontal bolt-engaging position. This tumbler contains a slot 36 having a notch 37 and tooth 38 formed in its upper edge and with which a stop pin 39 on the locking bolt is adapted to engage for holding the latter in its open retracted position or in its initial projected position shown in Figs. 1 and 2, respectively. The lower edge of the tumbler adjacent its fulcrum is inclined to provide a cam face 40 with which the key-bit is adapted to engage for swinging the tumbler upward to release it from the locking-bolt stop pin 39 during the projecting and retracting movements of the bolt. In its lower edge the locking-bolt has a pair of longitudinally spaced shoulders 41, 42 with which the bit of the key is adapted to successively engage when the key is given two turns, the first turn projecting the bolt to the position shown in Fig. 2 and the second turn to that shown in Fig. 3. It will be noted that the shoulder 42 is in the form of a depending tooth and the location of the shoulders is such that the toothed-shoulder is out of the path of the key-bit, during the first turn, while the companion shoulder 41 is in its path to project the bolt 31 from its fully retracted position to its initially locked position. After the first turn of the key, the toothed shoulder is in position to be intercepted by the key-bit and

thus cause the bolt to be thrown to its fully locked position upon the next turn of the key.

Means independent of the tumbler 34 are provided for holding the locking bolt 31 in its fully projected position. The preferred means shown in the drawings, particularly Figs. 7, 8 and 9, consists of a locking catch or trigger 43 movable into and out of engagement with the rear edge 44 of the locking bolt. This catch is disposed between said bolt and the inner wall of the casing 10, and it is fulcrumed on a pivot pin 45 arranged lengthwise of the bolt. A flat spring 46 constantly tends to throw the upper arm of the catch outwardly into engagement with the bolt, and such upper arm has an extension 47 having a beveled face 48 with which a sliding keeper 49, controlled by a knob 50 on the inside of the door, is adapted to engage for holding the catch clear of the bolt when desired. The lower arm of this catch terminates in an offset lip or flange 51 with which the bit of the key 16 is adapted to engage for unlocking the bolt from the outside and allowing it to be returned by its spring 32 from the position shown in Fig. 3 to that shown in Fig. 2. In releasing the catch with the key, the latter is placed in the position shown by dotted lines in Figs. 3 and 8, wherein the key-bit is behind the catch-lip 51, so that when the key is pulled outwardly the catch is actuated. When the keeper 49 is in its released position, the catch 43 bears against the inner side of the locking-bolt ready to snap into locking engagement therewith when it is fully projected.

Briefly stated, the operation of this improved lock is as follows:—

Assume the parts to be in the position shown by full lines in Fig. 1, wherein the latch-bolt 17 is projected and the locking-bolt 31 is fully retracted. To open the door from the inside, the knob 19 is rotated to retract the latch-bolt, and to accomplish the same act from the outside, the key 16 is placed in the key-hole and turned a quarter of a revolution in a clockwise direction to shift the thrust lever 26 and said latch-bolt to the position shown by dotted lines in said figure. In projecting the locking-bolt, from either inside or outside of the door, to the successive projected positions shown in Figs. 2 and 3, respectively, the key is turned two complete revolutions, the first turn releasing the tumbler 34 momentarily from the locking-bolt stop pin 39 to allow the key, upon engagement with the shoulder 41, to project the bolt its initial step, and the second turn acting likewise to project the bolt to its fully locked position, the same being held in such position by the catch 43. To unlock the bolt 31 from the inside, the keeper 49 is slid in a direction to release the catch 43 and allow the bolt to be returned by its spring 32 to the position shown in Fig. 2, after which the key is employed to effect the final withdrawal of the bolt. When unlocking the bolt from the outside, the key-bit is first engaged with the catch-lip 51 to release the bolt and permit its initial return, the key being then turned in an obvious manner to effect its complete withdrawal.

It will be observed that the key-bit is provided with a ward or notch 52 which is wide enough to freely pass and clear the locking bolt 31 in turning the key in a direction to effect its final opening movement.

I claim as my invention:—

1. A lock comprising a main locking bolt, a latch-bolt, separate means for yieldingly resisting the projection of the locking-bolt and the retraction of the latch-bolt, and separate key-operated means for operating said bolts independently of each other, said means being disconnected from each other and arranged in the path of movement of the key to be directly actuated thereby.

2. A lock comprising a main locking-bolt, a latch-bolt, separate means for yieldingly resisting the projection of the locking-bolt and the retraction of the latch-bolt, and independent key-controlled means for releasably holding said locking-bolt in its retracted and projected positions and for moving said latch-bolt to its retracted position, respectively, said means being operable successively by the same key.

3. A lock comprising a casing having a key-hole therein adapted to receive a key, a main locking-bolt having means for yieldingly resisting the projection thereof to its locked position, said bolt being moved to such position by the key, means controlled by the latter for releasably holding the locking-bolt in its projected position, a latch-bolt having means for yieldingly holding it in projected position, and means operable by the key for moving said latch-bolt to its retracted position, said locking bolt holding means and said latch-bolt operating means having key-engaging parts located at different points in the path of movement of the key.

4. A lock comprising a casing having a key-hole therein adapted to receive a key, a projectable locking-bolt having a key-engaging shoulder, a retractable latch bolt, a key operated thrust member for actuating said latch-bolt, and a tumbler for said locking-bolt, the tumbler, the locking-bolt shoulder and the thrust member being arranged to be successively engaged by the key during its turning movement.

5. A lock comprising a casing having a key-hole therein adapted to receive a key, a projectable locking-bolt having a key-engaging shoulder, a retractable latch-bolt, a thrust lever connected with said latch-bolt and having a key-engaging tail, and a tum-

bler for said locking bolt, the tumbler, the locking-bolt shoulder and the thrust lever being arranged to be successively engaged by the key during its turning movement, and said thrust lever being operable by a fractional turn of the key in one direction to operate the latch-bolt independently of the locking bolt.

6. A lock for doors, comprising a projectible locking-bolt, a key for operating said bolt, a pivoted catch having one arm arranged to interlock with the bolt for holding it in its locked position, a key-engaging part on the other arm of said catch, and a sliding keeper for the catch controlled from the inside of the door.

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