July 21, 1931. C. J. PRINZLER 1,815,584

DOORBOLT MECHANISM

Filed March 22, 1929 4 Sheets-Sheet 1

Fig. 1.

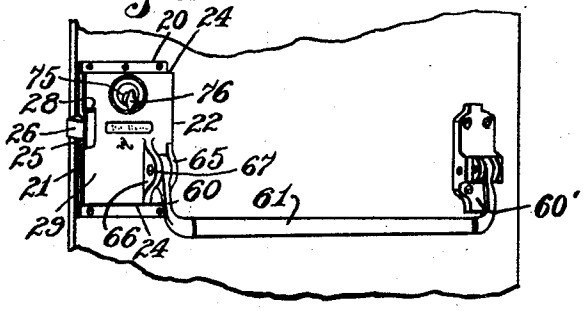


Fig. 2.

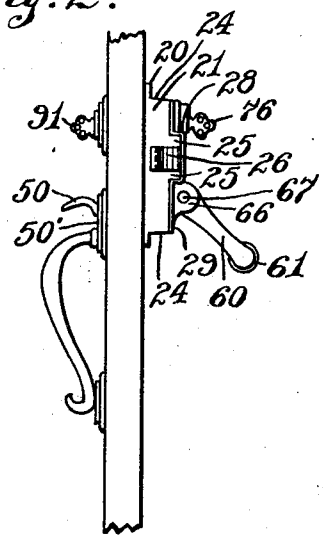


Fig. 3.

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DOORBOLT MECHANISM

Filed March 22, 1929 4 Sheets-Sheet 2

Fig. 4.

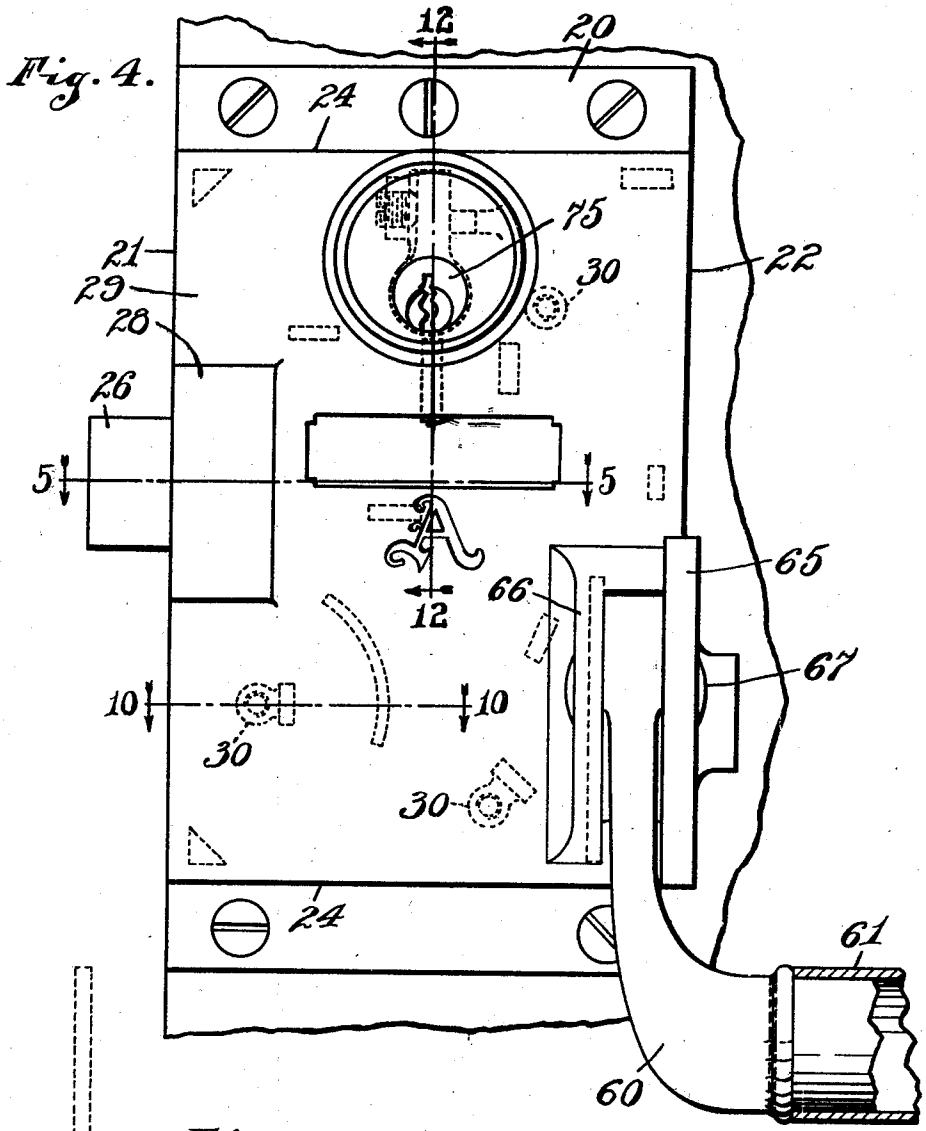
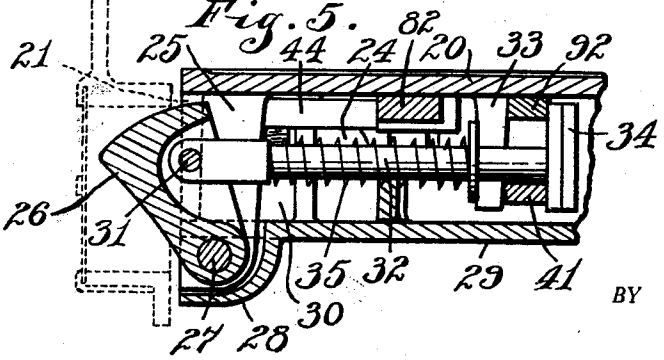


Fig. 5.



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DOORBOLT MECHANISM

Filed March 22, 1929 4 Sheets-Sheet 3

Fig. 6.

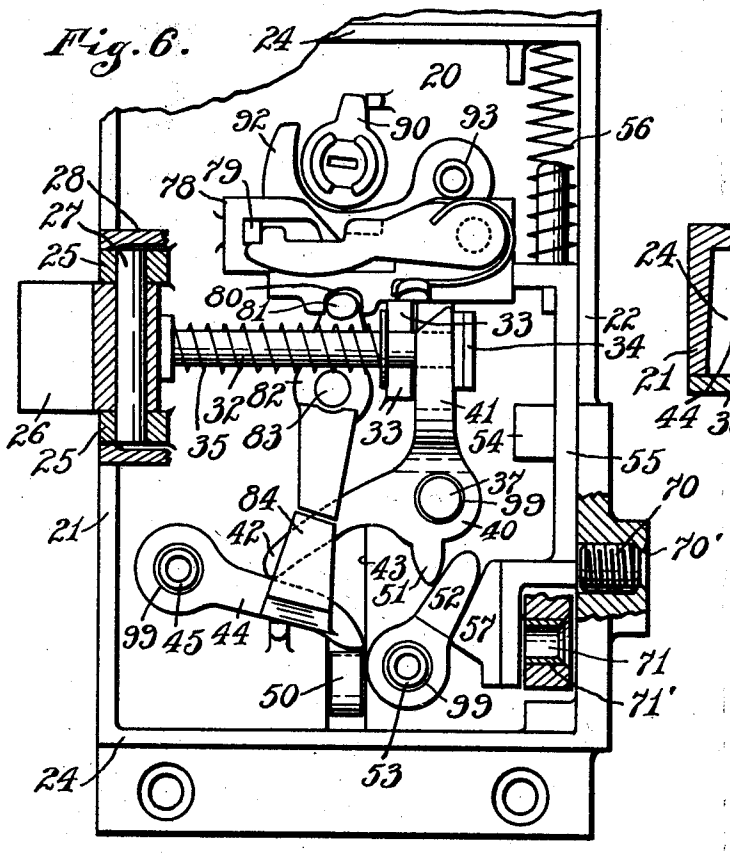


Fig. 10.

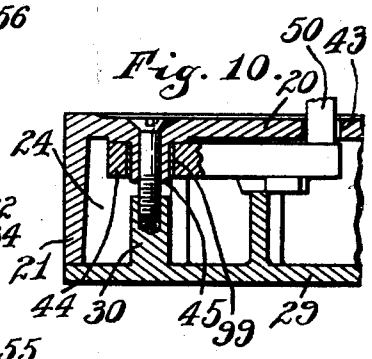


Fig. 7.

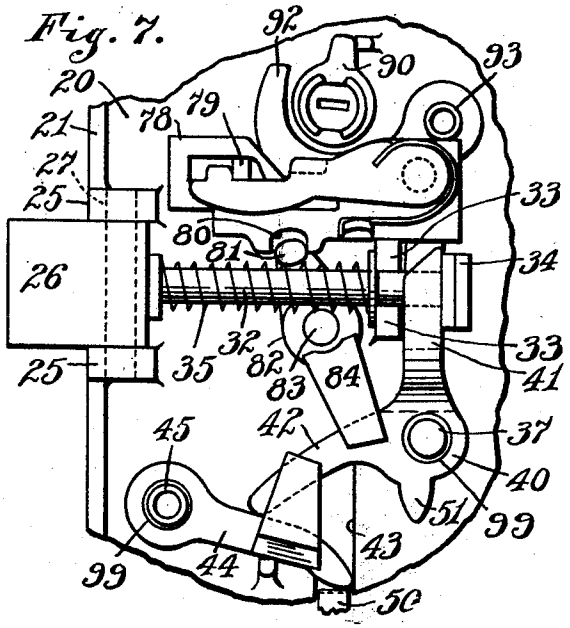
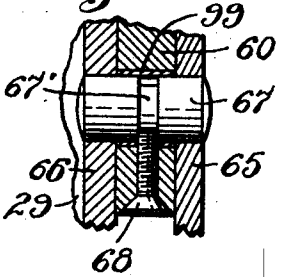


Fig. 11.



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July 21, 1931. C. J. PRINZLER 1,815,584

DOORBOLT MECHANISM

Filed March 22, 1929 4 Sheets-Sheet 4

Fig. 8.

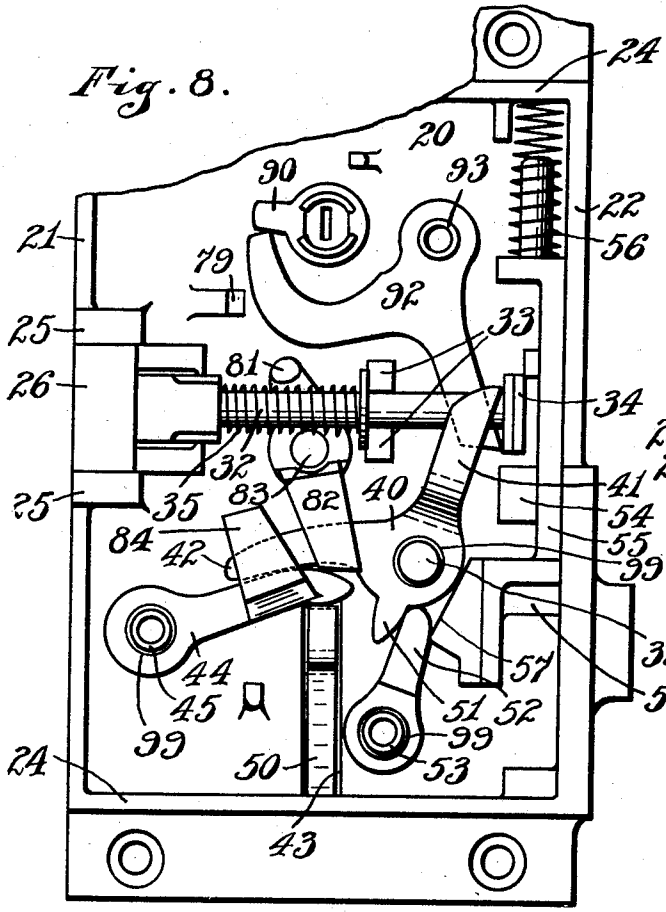


Fig. 12.

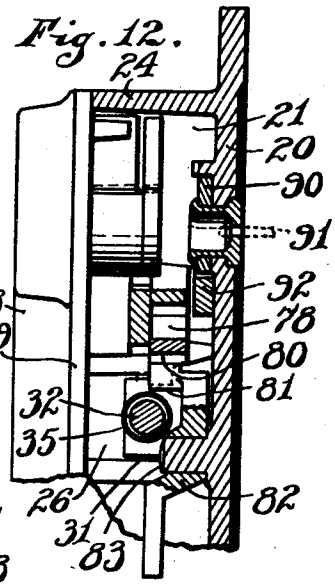
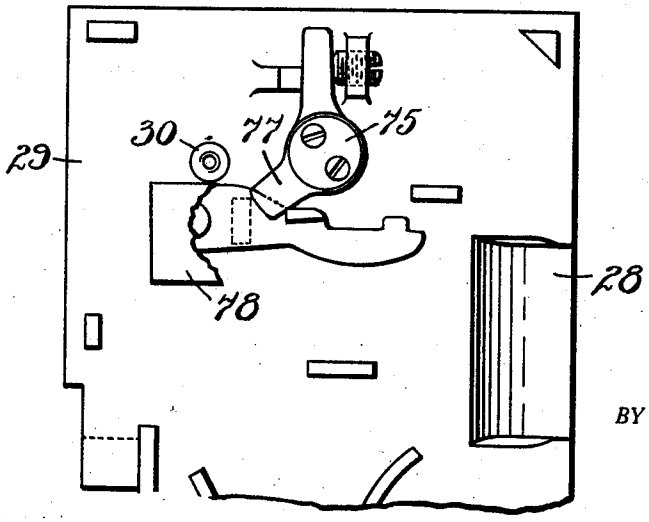


Fig. 9.



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UNITED STATES PATENT OFFICE

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DOORBOLT MECHANISM

Application filed March 22, 1929. Serial No. 349,090.

The object of my invention is to produce a latching lock especially designed for use as a retaining means for doors which may be used for ordinary traffic and for panic exits, of such character as to be accurate through a long life; sturdy in construction; low cost fabrication and readily and accurately manipulated at all times by the panic bar, and readily key controlled.

The accompanying drawings illustrate my invention, Fig. 1 being a perspective, on a small scale, of the complete lock in place on a door; Fig. 2 an edge elevation, on the scale of Fig. 1; Fig. 3 an elevation of the edge opposite to and parallel with that shown in Fig. 2, practically full size and in partial vertical section; Fig. 4 an elevation of the inner face of the lock; Fig. 5 a fragmentary section on line 5—5 of Fig. 4; Fig. 6 a section parallel with the face of the casing and with the latch protracted and dogged against actuation from the outside, but free to be retracted by actuation of the panic bar; Fig. 7 an elevation of parts shown in Fig. 6 with the parts in position to permit manipulation of the bolt from the outside; Fig. 8 an elevation of the parts shown in Fig. 6 with the latch retracted by key means and thumb means from the outside, the tumbler mechansim being omitted; Fig. 9 a fragmentary elevation of parts of the dogging mechanism; Fig. 10 a section on line 10—10 of Fig. 4; Fig. 11 a section through the pintle of the panic bar; and Fig. 12 a section on line 12—12 of Fig. 4 of the key control for the dogging means and the outside key control.

In the drawings 20 indicates the base of the casing comprising the side walls 21, 22 and top and bottom walls 24, 24 forming a compartment within which the major portion of the movable elements are mounted.

Wall 21 is slotted midway of its height the slot being flanked top and bottom by inwardly projecting ears 25, 25 between which is pivoted the latch-bolt 26 on a pin 27 supported by the ears and held in axial place by a housing 28 which encompasses the ears and is part of a face plate 29 held in place by screws passing through the base and into threaded bosses 30 (dotted lines Fig. 4) on the inner face of the face plate (Fig. 10).

Pivoted to bolt 26, at 31, is rod 32 projected between fingers 33, 33, carried by base 20 and provided at its free end with a head 34. Surrounding rod 32 and abutting at one end on said rod and at the other end on fingers 33, 33, is a bolt projecting spring 35.

Pivoted on a post 37, on base 20, is a bolt-retracting lever 40 which, for convenience, I will hereafter designate the main bolt-retracting lever. Lever 40 has one arm 41 projected to overlie rod 32 between head 34 and fingers 33, 33 and engages head 34 in bolt-retracting direction only. Lever 40 has another arm 42 projected across the upper end of a vertical slot 43 formed through base 20 and this arm is underlaid by an actuator lever 44 pivoted on a post 45 and projecting across slot 43 in the opposite direction. The under edge of arm 42 and upper edge of lever 44 contact with each other and, because these levers are pivotally supported on opposite sides of the contacting portions, these surfaces may be readily so formed as to have a rolling engagement with each other. As a consequence these surfaces need not be accurately machined but may be ordinary cast surfaces which, however, will coact with but little friction and wear.

Slot 43 is continued below the lowest position of actuator lever 44 an amount sufficient to permit the insertion of a thumb-actuated lever 50 which is part of any ordinary fitting 50′ designed for attachment to the outer face of the door and for actuation by the thumb of an operator.

Lever 40 is provided with a third arm or tooth-like projection 51 which projects downwardly and is engaged by an actuator arm 52 pivoted on a post 53. The mutually engaging surfaces of arm 52 and tooth 51 are so formed that the interaction closely approximates a relative rolling action so as to reduce friction and wear.

Vertically slidable alongside the inner face of wall 22, between that face and a lug 54, is a sliding actuator 55 which, for convenience, I call the panic actuator. This slide is normally and yieldingly held in its lowest position by a spring 56. Slide 55 carries a cam shoulder 57 which engages with

arm 52 and is adapted to swing said arm against tooth 51. It will be noticed that, as cam 57 moves upwardly its line of contact with arm 52 recedes from the axis of said arm and, at the same time, the line of contact between arm 52 and tooth 51 approaches the axis of lever 40 so that the action of the slide tending to retract the latch-bolt 26 is one of rather rapidly increasing leverage insuring positive and full retraction of the latch bolt.

The lower end of slide 55 is a cam surface 58 formed so as to have a rolling coaction with the inwardly projected arm 59 of the lever 60 at one end of the panic bar 61, at the opposite end of which is a similar lever 60′, which lacks, however, any inwardly extending arm.

Lever 60 is pivotally supported, between an ear 65, carried by wall 22, and an ear 66, carried by the face-plate 29, by a pin 67 (Fig. 11) which is held axially in place by a screw 68 threaded through the hub of arm 60 and projected into an annular groove 67′ in pin 67.

It is sometimes desirable to hold the latch-bolt in retracted position and for that purpose a screw 70 is threaded in ear 65 and is adapted to be projected into or withdrawn from a hole 71 formed in arm 59 in such position that when screw 70 is in hole 71 the panic bar 61 is held in its inner position and slide 55 is held in its upper position. In order to insure against wear, hole 71 is bushed by a steel bushing 71′. Screw 70 is formed at its outer end for manipulation only by a special key and the outer end of the bar in which it is threaded is peened in, as indicated at 70′ to just permit the withdrawal of screw 70 from hole 71. (Fig. 6).

In order to lock the latch bolt against unauthorized manipulation by means of lever 50, I provide a key-controlled dogging mechanism manipulable from the inside of the door, as follows:

Mounted in face plate 29 is a cylinder lock 75 of common form controlled by a key 76. The inner end of this lock is provided with the usual arm 77 which acts upon a sliding tumbler mechanism 78 of common form which coacts with a post 79. One element of the tumbler mechanism is provided with a notch 80 in which lies a finger 81 carried by a dogging lever 82 pivoted at 83 on the base 20. The lower end of lever 82 overlies arm 42 of lever 40 so as to hold said lever in place, and is adapted to be moved into and out of the path of movement of a finger 84 carried by lever 44 in such manner that, when lever 82 is in the position shown in Fig. 6 lever 44 is blocked, in its lowest position, against movement in latch-retracting direction.

In order that the latch-bolt may be retracted from the outside of the door even when lever 50 has been blocked against movement, I provide a rotatable finger 90 which is journalled in base 20 and adapted to be rotated by the key-actuated mechanism 91, of well-known form, accessible from the outside of the door. Finger 90 is arranged to engage one end of a lever 92 pivoted at 93 on base 20 and having its other end arranged between head 34 and fingers 33, the arrangement being such that, when finger 90 is key turned to the position shown in Fig. 8, lever 92 will act to move rod 32 inwardly and retract the latch.

In view of the fact that my device is designed primarily for use in connection with a panic exit which, nevertheless, is commonly and currently used many and most times for ordinary traffic, it is highly important that the ordinary use shall not result in any such wear or change of relative condition of parts as to put the parts in such condition that a push on the panic bar 61 would fail to fully and very positively retract the latch even though a heavy pressure was being exerted against the inner face of the door. The parts which have thus far been described, except parts 27, 34 and 90, are most conveniently made of bronze and I have found, in practice that the levers which are most often actuated, such as 40, 44, 52 and 60 (and their supporting parts) are likely to so wear at their pivot points that, in course of time the panic bar cannot be positively relied upon to fully retract the latch, practice having shown that a bronze-to-bronze support of these levers tends toward undesirable wear. I meet this difficulty by bushing these levers with steel bushings 99.

Manipulation of the outside thumb piece will raise lever 50, thus swinging levers 44 and 40, as shown in Fig. 8, to cause retraction of the latch. Parts 52, 55, 90 and 92 would, however, remain in the position shown in Fig. 6. Similarly, when lever 90 is actuated by a key from outside the door lever 92 acts against head 34 to retract the latch and all of the other parts remain stationary. When the panic bar 61 is pushed toward the door slide 55 is driven upwardly, cam 56 crowds arm 52 against tooth 51, causing lever 40 to retract the latch and the remaining parts are stationary. All three of these latch-retracting mechanisms might, however, be simultaneously actuated and all would concurrently act to retract the latch-bolt without causing any interference.

The normal day-time position of the dogging lever 82 is the inactive position shown in Figs. 7 and 8. By properly turning key 76, arm 77 will act upon the tumbler mechanism to first release it from post 79 and then shift it from the position shown in Fig. 7 to the position shown in Fig. 6, thus throwing the lower end of the dogging lever into the path of movement of finger 84 and thus blocking lever 50 and locking the door against entry from the outside except by means of the key

lock 91, but the mechanism controlled by panic bar 61 is not in any way obstructed.

I claim as my invention:

1. A lock mechanism comprising a housing containing a bolt, a bell crank lever having one arm arranged to act on said bolt in a retracting direction, a second lever having a portion arranged to have engagement with the other arm of said lever and projecting toward the pivot of the first lever, said last-mentioned lever being actuable from the exterior of the housing along a line between the pivots of the two levers, and shiftable means adapted to prevent actuation of said second lever.

2. A lock mechanism comprising a housing containing a bolt, a bell crank lever having one arm arranged to act on said bolt in a retracting direction, a second lever having a portion arranged to have a one-way engagement with the other arm of said lever and projecting toward the pivot of the first lever, said last-mentioned lever being actuable from the exterior of the housing along a line between the pivots of the two levers, and a dogging lever movable into and out of blocking position relative to said second lever.

3. A lock mechanism comprising a housing containing a bolt, a bell crank lever having one arm arranged to act on said bolt in a retracting direction, a second lever having a portion arranged to have engagement with the other arm of said bell crank lever and projecting toward the pivot of said bell crank lever, said second lever being actuable from the exterior of the housing along a line between the pivots of the two levers, a slide, a cam carried by said slide, one-way actuating means between said cam and the first lever, and means for actuating said slide.

4. A lock mechanism comprising a housing containing a bolt, a bell crank lever having one arm arranged to act on said bolt in a retracting direction, a second lever having a portion arranged to have engagement with the other arm of said bell crank lever and projecting toward the pivot of said bell crank lever, said second lever being actuable from the exterior of the housing along a line between the pivots of the two levers, a slide, a cam carried by said slide, and a lever engaged by said slide and rotatively coacting with the first lever.

5. A lock mechanism of the character specified in claim 2 containing a slide, a cam carried by said slide, and one-way actuating means between said cam and the first lever, and means for actuating said slide.

6. A lock mechanism of the character specified in claim 2 containing a slide, a cam carried by said slide, a lever engaged by said slide and rotatively coacting with the first lever.

7. A lock mechanism comprising a casing containing a bolt two levers independently pivoted upon laterally separated pivots and having overlapping portions in rolling contact, the first lever having a portion acting in retracting direction on the bolt and the second lever having a force-receiving portion accessible from the exterior of the casing along a line between the two pivots.

8. A lock mechanism of the character specified in claim 7 containing a radially projecting tooth carried by the first lever, a cam slide, a panic lever movably mounted on the casing and having a portion projected into said casing and engaging the cam slide, and a third lever pivoted at a point laterally separated from the pivots of the first two levers and interposed between the cam and the tooth of the first lever and having a rolling engagement with said tooth.

9. A lock mechanism comprising a base casing of bronze and an integral pivot post, a bolt, a bolt-actuating bronze lever pivoted on said post, and a steel annulus interposed between the post and lever.

10. A lock mechanism comprising a base casing having a slotted side wall with pin-supporting ears flanking said slot, a latch-bolt pivotally supported in said slot between the ears on a pin passing through said ears and latch, and a face plate covering the open end of the casing and having a housing embracing said ears.

11. A lock mechanism comprising a base casing one wall of which carries an outstanding ear, a face plate closing said casing and carrying an outstanding ear aligned with and laterally spaced from the first ear, and a panic lever pivotally supported between said ears.

12. A lock mechanism of the character specified in claim 11 having a pivot-pin supported by the ears, extended through the ears and provided with an intermediate annular groove, and a fastener mounted in the panic lever and extended into said groove.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 5th day of March, A. D. one thousand nine hundred and twenty-nine.

CARL J. PRINZLER.