

July 12, 1927.

W. H. HOFFMANN

1,635,714

DOORLOCK

Filed Dec. 2 1925

2 Sheets-Sheet 1

Fig. 1.

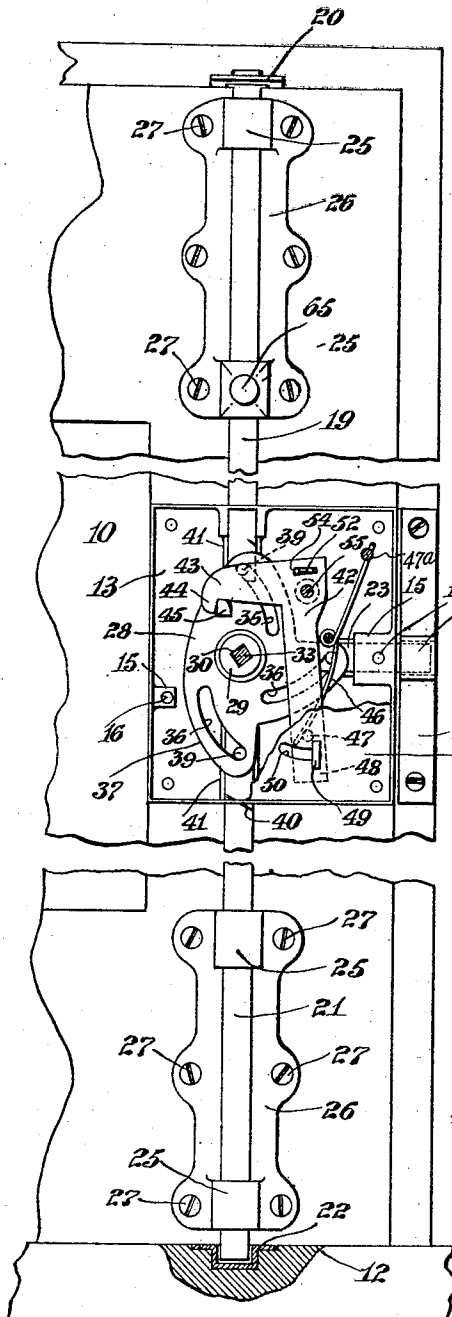


Fig. 2.

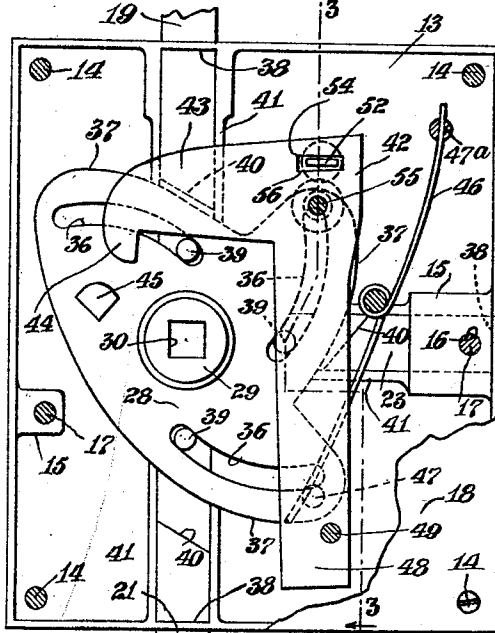
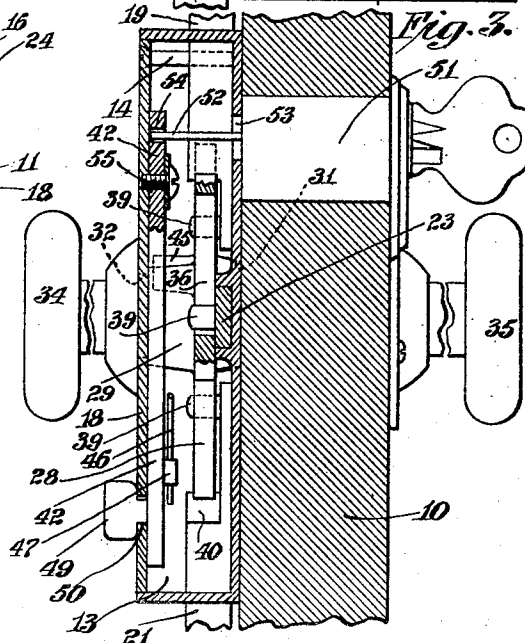


Fig. 3.



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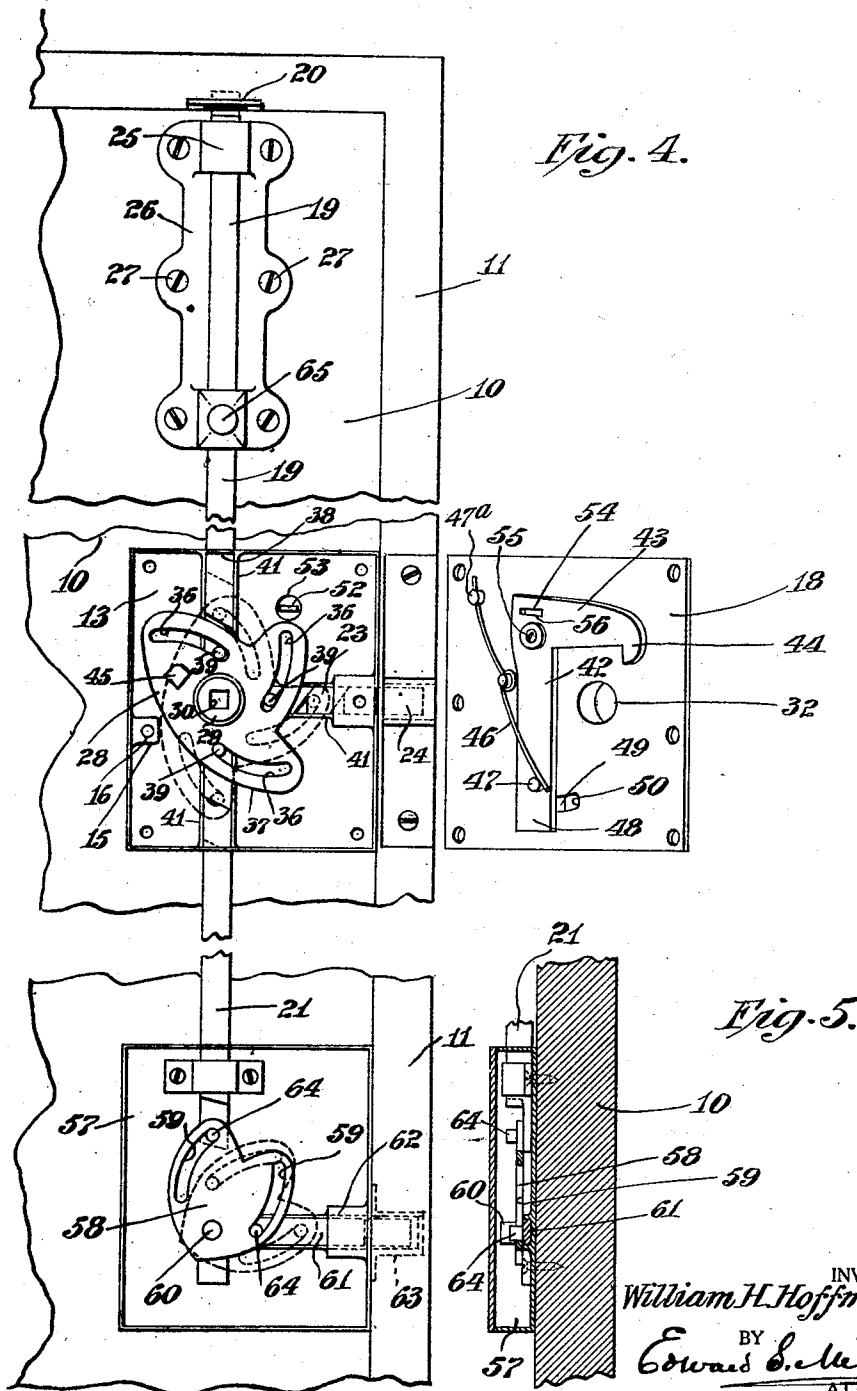
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UNITED STATES PATENT OFFICE.

WILLIAM H. HOFFMANN, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO
ALICE J. L. DOLON, OF BROOKLYN, NEW YORK.

DOOR LOCK.

Application filed December 2, 1925. Serial No. 72,644.

This invention relates to new and improved door locking devices of the type which may be manipulated from both sides of the door, and which is provided with a plurality of locking bolts for fastening the door at several sides.

This invention is a further development of my invention patented February 17th, 1914, No. 1,087,585.

10 The principal object of my invention is to provide a locking device of this character which is relatively simple in construction and which may be readily attached to any door for the purpose of fastening the same in the jamb at several points about the top, bottom and side.

15 The invention is illustratively exemplified in the accompanying drawings in which Figure 1 is an elevational view of my improved doorlocking system applied to an ordinary hinged door; Fig. 2 is an elevational view of the locking mechanism the outer cover plate being removed; Fig. 3 is a vertical sectional view of the same taken on line 3—3 of Fig. 2; Fig. 4 is a view similar to Fig. 1 showing a modification for projecting a portion of one of the bolts at an angle to the longitudinal axis of the bolt itself, the cover plate of the main locking mechanism being shown in perspective and separated from the mechanism; and Fig. 5 is a vertical sectional view of mechanism for projecting a portion of the bolt at an angle.

20 Referring to the drawings, 10 denotes the door proper; 11 the casement and 12 the sill or saddle, all of which may be constructed in any of the well known styles. A lock casing 13 is attached to the inside face of the door, closely adjacent to the open side and substantially midway of the height thereof. The casing 13 comprises a rectangularly shaped metal box having its closed side disposed against the face of the door and attached thereto by a plurality of screws 14. Integral lugs 15 project outward from the bottom of the casing 13 and are provided with tapped openings 16 to receive screws 17 which hold a cover plate 18 in position over the locking mechanism enclosed within the casing.

25 In accordance with the present invention I prefer to employ three bolts, and as illustrated in Fig. 1, there is one bolt 19 projecting upward from the top of the casing

13 to engage a keeper 20 arranged in the overhead section of the casement 11; a second downwardly projecting bolt 21 adapted to be received by a countersunk keeper 22 disposed in the sill 12; and a third bolt 23 which is thrown from the upright side of the casing and enters a keeper 24 arranged on the upright of the door casement 11. The portions of the bolts 19 and 21 adjacent to the extreme ends of the door are guided in their movements by guides 25 integral with door plates 26 which are attached to the inside face of the door by screws 27. It will be clear thus far that when the door is closed and the bolts projected, as illustrated in Fig. 1, the door will be rigidly held at three places and is practically impossible for an unauthorized person to open unless the door is removed in pieces.

30 The bolts 19, 21 and 23 are controlled from the locking mechanism in the casing 13, which mechanism comprises a triple cam plate 28 having a hub 29 projecting from both faces thereof and provided with a square spindle hole 30. The hubs 29 are machined at their ends to bear in openings 31 and 32 disposed in the casing 13 and cover plate 18, respectively. A square spindle 33 projects through hole 30 and carries a knob 34 on cover plate 18 at one end, and the other end projects through an opening in the door 10 to receive an outside knob 35. The cam plate 28 is arranged to oscillate through a certain arc of substantially 45 degrees, by movement of the knobs and spindle 23 and is provided with three slots 36, each of which starts from a point adjacent to the hub 29 and extends towards the circumference of the cam in a direction at an angle to the radius thereof. Each slot 36 is illustrated in curved form and the marginal portions of the plate are to parallel the slots to provide curved surfaces or edges 37. Each bolt enters the casing 13 through an opening 38 and at its inner end is reduced in thickness and carries a pin 39 which operates in one of the slots 36. The reduced portion of the bolt starts from a point back of the pin 39 forming a shoulder 40 disposed at an angle with respect to the longitudinal axis of the bolt. The disposition of the surfaces 37 and shoulders 40 enables the cam plate to operate on one eighth of a rotation to throw the bolts the maximum distance necessary to ensure proper locking position

in the keepers. I have found it possible to project a bolt $\frac{3}{4}$ of an inch by means of the disposition and shape of the curved slots 36, illustrated in Fig. 1, such projection

5 taking place by a one eighth rotation of the cam plate. To guide the bolts at their inner ends the closed side of the casing 13 is provided with spaced tracks 41 which embrace the bolts at opposite sides thereof.

10 An inverted L-shaped tumbler 42 is pivoted to the cover plate 18 at an elevation above the opening 32 and at one side thereof. The shorter arm 43 is provided at its end with a downwardly projecting hook 44 which is normally held in engagement with

15 a lug 45 on the face of the cam plate 28 to prevent rotation thereof unless the tumbler 42 is moved to release the plate 28. A spring 46 is carried by the cover plate 18. One end of the spring is arranged to engage

20 a stud 47 projecting from the longer arm 48 of the tumbler, and the other end engages a stud 47^a on the cover plate. The tumbler 42 may be operated from the inside of the door 10 by means of a finger

25 piece 49 carried by the arm 48 and extending through an arcuate slot 50 in the cover plate 18.

The tumbler 42 is operated from the outside of the door by means of a cylinder 51 of any well known type which is embedded in the door proper and is manipulated from the outside by a key in the usual manner, and which is provided on its inner end with

30 a flat bar or blade 52 projecting into the casing 13 through an opening 53 in the closed side. The free end of the blade 52 is loosely disposed in a slot 54 in the tumbler 42 directly over the pivot 55 of the latter. The upper edge of the slot 54 is parallel with the flat surface of the blade 52 so as to enable the latter to lift the tumbler

40 when the blade is rotated by the key. The lower edge 56 of the slot 54 is inclined downward towards the outer end of the shorter arm for the purpose of allowing the tumbler to be rocked by the finger piece 49 from the inside without affecting the position of the blade 52. Since the tumbler 42 is adapted

45 to be operated manually by either the key mechanism from the outside or the finger piece 49 from the inside of the door, the slot 54 is especially designed to insure the key actuation and also to permit the inside actuation on the finger piece without obstruction by the blade 52. For this reason

50 the slot is tapered or flared and also it is noted that it is longer than the width of the blade, the clearance between the blade and the wider end of the slot allowing ample angular movement of the tumbler to disengage the hook from the lug 45 as a result of

55 the inside actuation at the finger piece.

It has been found that in some conditions

60 there is serious objection to the use of the

countersunk keeper arranged in the sill or floor, as shown in Fig. 1, because the cavity thus formed often becomes clogged with dirt and other material which prevents proper engagement of the bolt projected therein. In order to overcome this objection and still retain the fastening point closely adjacent to the lower portion of the door, I provide a construction illustrated in Figs. 4 and 5, which shows the lower bolt 21 cut off short of the bottom of the door and having its lower free end disposed in a second casing 57 attached to the inside face of the door directly under the first casing 13.

Arranged within the casing 57 is a double cam plate 58 pivoted on the center line of the longitudinal axis of the bolt 21 and provided with curved slots 59 having their inner ends closely adjacent to the pivot 60 of the plate, while the slots project at an angle to the radii of the plate. A second bolt 61 is slidably mounted in the casing 57 at right angles to the bolt 21 and is arranged to project through a boss 62 in the side wall of the casing and into a keeper 63 in the casement 11 of the door. The inner ends of both bolts 21 and 61 are reduced in thickness to slide under the cam plate 58 and each carries a projecting pin 64 to operate in a slot 59. In accordance with this embodiment of the invention, the lower corner of the door may be securely fastened without resorting to a sill keeper, the fastening taking place at the side instead of at the bottom.

A brief description of the operations will suffice to clearly understand the simple movements involved in this invention. To release the bolts from the outside, the key is inserted in the cylinder 51 and the cylinder turned, whereupon the blade 52 rotates and lifts the tumbler 42. The hook 44 having then released the cam plate 28 the latter may be rotated by the knob 35 which need only rotate one eighth of a turn to retract the bolts and release the door. When the door is to be opened from the inside the finger piece 49 is moved to rock the tumbler 42 and then the inside knob may be rotated to retract the bolts. Reverse movement of the knob will project the bolts and the door is quickly locked. For swinging doors or for doors where check springs are used, all three bolts may be drawn in by one eighth turn of the knob and a set screw 65 in guide 25 tightened, thereby making the three bolts inoperative.

It will be noted in connection with the bolts 19 and 21 that they are arranged radially of the square opening 30 and that their axes are coincident, thereby producing a more attractive appearance than would otherwise be possible if it were not for the particular arrangement and curve of the slots 36 in the cam plate.

Having now described my invention what

I claim and desire to secure by Letters Patent is:

1. The combination with a lock casing, of a series of bolts guided to project axially thereof, at least two of said bolts being arranged coaxially of each other, a cam plate mounted for rotation within said casing and engaged with the inner end of each bolt, the cam plate carrying a lug movable in an arc of a circle, a tumbler yieldably engaging said cam plate lug to hold the bolts projected, and means operating to disengage the tumbler from the outside of said casing.

2. The combination with a lock casing, of a plurality of bolts radiating from a common center within the casing, a cam plate mounted for rotation in the casing at said common center of the bolts and provided with slots to receive the inner end of each bolt, a tumbler pivotally mounted upon a portion of the casing and yieldably engaging said cam plate to hold the bolts in predetermined position, said tumbler having a projection disposed outside the casing to cause the same to disengage the cam plate, and key actuated means operating to operate the tumbler.

3. The combination with a lock casing, of a plurality of bolts guided radially from a common center within the casing, a cam plate mounted for rotation in the casing at said common center of the bolts and provided with arcuate slots to receive the inner ends of said bolts, a cover for the casing, a tumbler mounted for rotation on said cover and yieldably engaging said cam to hold the bolts in a predetermined position, said cover having a slot therein, said tumbler being provided with a projection operating through said slot to actuate the tumbler, and key actuated means projecting through the other side of the casing and operating to actuate the tumbler.

4. The combination with a lock casing, of three bolts guided to project axially thereof and radially of a common center within the casing, a square spindle rotative in said common center, a triple slotted cam plate rotating with said spindle, each slot being dis-

posed to receive a projecting portion of the bolt, a cover for said casing, and inverted L-shaped tumbler mounted on the cover and operating to yieldably engage the cam plate to prevent rotation thereof and to hold the bolts projected, and means operating from the cover and from the opposite side of the casing to disengage the tumbler from the cam plate.

5. A lock, as claimed in claim 1, in which the tumbler is mounted for rotation and provided with a slot on one side of the tumbler pivot, said slot having its longitudinal walls not parallel, the means for disengaging the tumbler from the outside of the casing comprising a blade operating through an opening in the casing and the slot in the tumbler, and means on the other side of the pivot for actuating the tumbler.

6. In a lock, the combination of a plurality of radially disposed bolts guided to project axially thereof, a slotted cam plate mounted to rotate about the intersection of the axes of said bolts, each slot being arcuately formed and having its axis described by a line starting at the center of rotation of the plate and extended towards the circumference of the cam in a direction at an angle to the radius thereof, said cam plate having a lug projecting radially therefrom, a tumbler yieldably engaging said lug to prevent rotation of the cam plate and hold the bolts projected, said tumbler having a flaring opening, and a key operated blade projecting into said opening, the opening being longer than the width of the blade, whereby movement of the tumbler to release the cam by means other than the blade will not be prevented by the blade.

7. A lock as set forth in claim 1 including a guide plate for one of the bolts, said plate being spaced from the casing, and a locking device carried by said guide plate and cooperating with the bolt guided thereby for gripping it and thereby holding all the bolts from movement.

In testimony whereof I affix my signature.

WILLIAM H. HOFFMANN.