Nov. 15, 1938. R. BENJAMIN 2,136,584

COMBINATION LOCK

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Fig. 1.

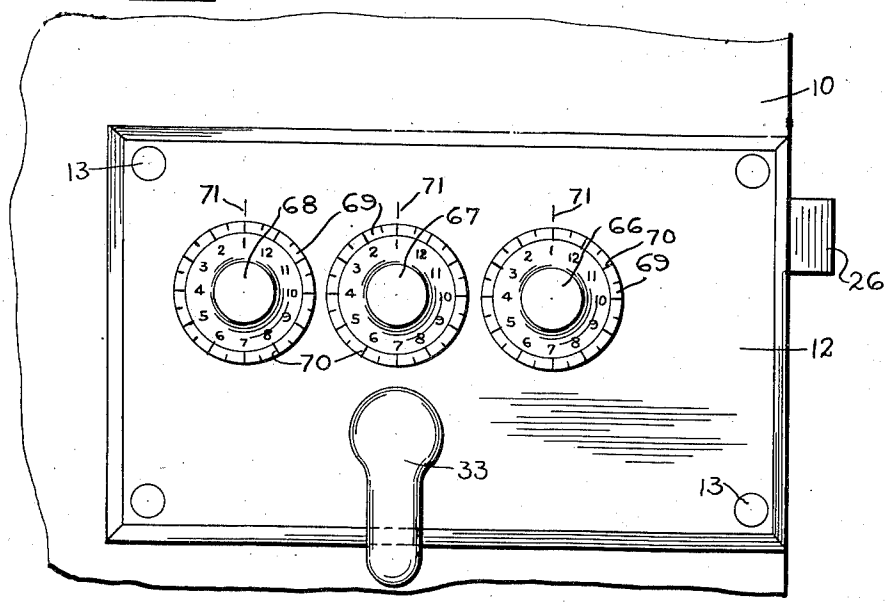
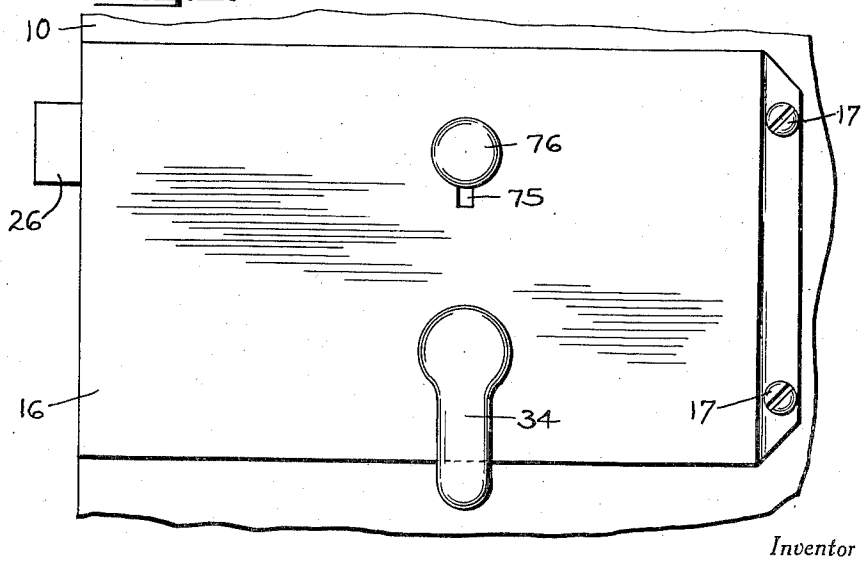


Fig. 2.



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Fig. 3.

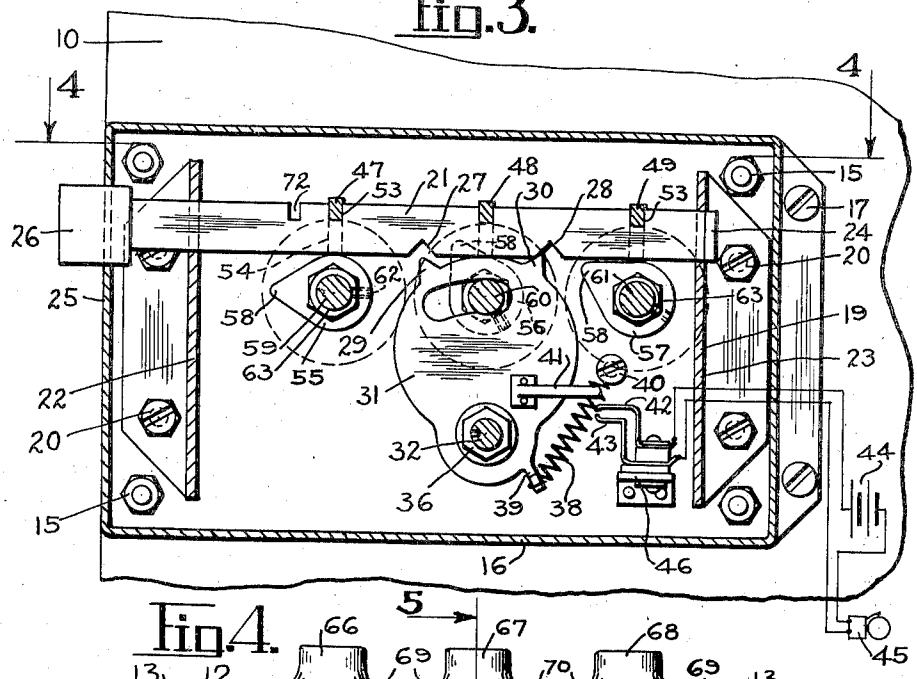
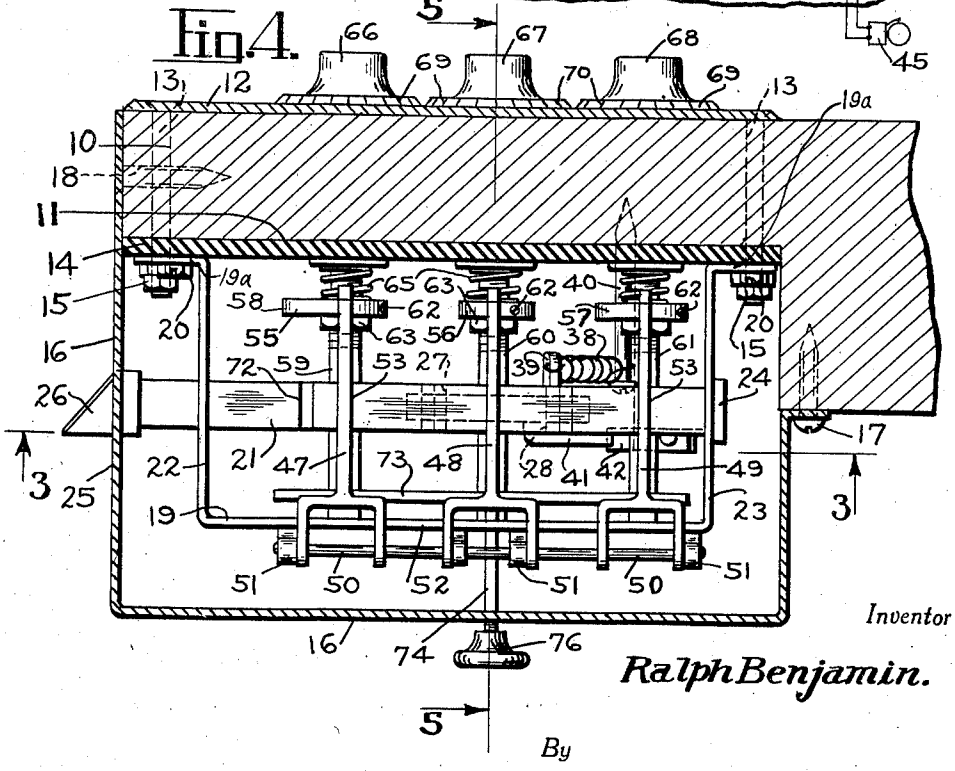


Fig. 4.



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Fig.5.

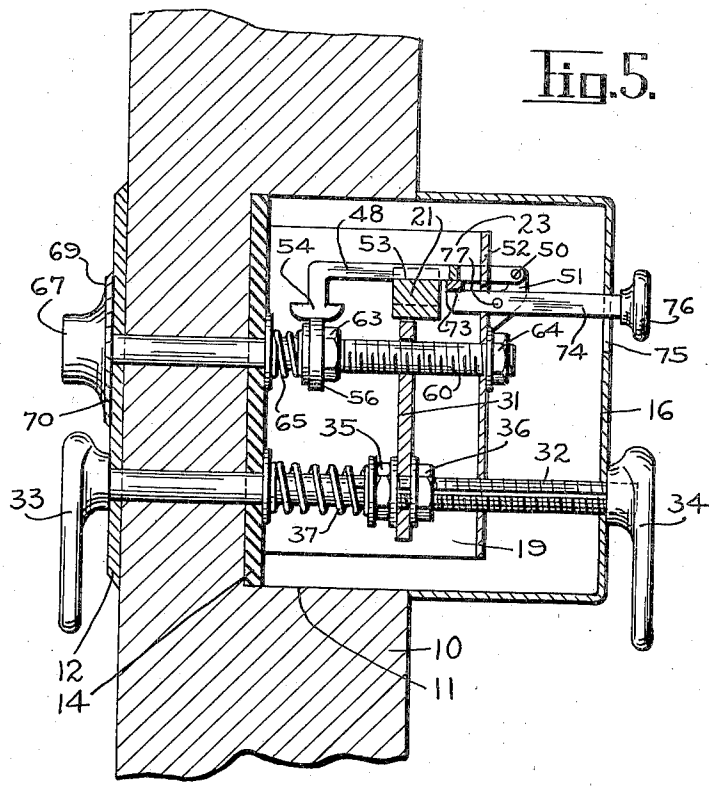
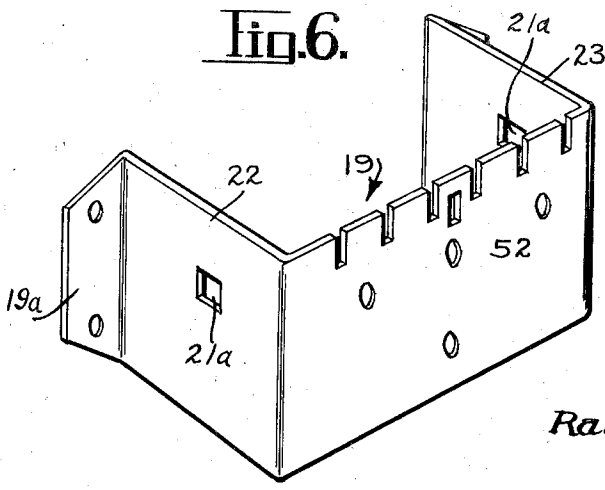


Fig.6.



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UNITED STATES PATENT OFFICE

2,136,584

COMBINATION LOCK

Ralph Benjamin, Waterbury, Conn., assignor of twenty-five per cent to Leonardo Mancini and twenty-five per cent to Nicholas Mancini, both of Waterbury, Conn.

Application December 31, 1937, Serial No. 182,758

6 Claims. (Cl. 70—150)

This invention relates to improvements in door locks, and more particularly to a keyless combination lock having a plurality of latch bolt holding rockers, each of which is individually actuated by a separate indicating knob.

One object of this invention is to provide a combination lock of the above nature in which each locking rocker is operated by a rotatable cam adapted to be manually turned by an indicating knob to permit the proper combination for unlocking the door to be easily obtained.

A further object is to provide a combination lock of the above nature in which the rockers normally rest by gravity in locking position, and are adapted to be raised therefrom by turning the rotary cams to the proper combination.

A further object is to provide a combination lock of the above nature which will be simple in construction, easy to operate, compact, noiseless, inexpensive to manufacture, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawings, one form in which the invention may be conveniently embodied in practice.

In the drawings:

Fig. 1 is a front fragmentary view of a door upon which the improved combination lock of this invention has been installed.

Fig. 2 is a rear fragmentary view of the same.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 4.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is an enlarged perspective view of the interior frame member of the lock.

Referring now to the drawings wherein like reference characters designate like parts throughout the several views, the numeral 10 denotes the latch edge of a door to which the lock of this invention has been applied. The edge 10 has a recess 11 on one side, as shown in Figs. 4 and 5, for receiving the lock mechanism, and on the other side is provided with an escutcheon plate 12 secured to the door by bolts 13, which pass through said plate 12, the door edge 10, and a plate of electrical insulating material 14, such as Bakelite, seated upon the base of said recess 11. The plates 12 and 14 are held in position by a plurality of nuts 15. Provision is also made of a hollow cover 16 secured to the side edge of the door, as by screws 17, and to the end edge of said door, as by screws 18, which cover serves to enclose the lock mechanism, the latter being supported by a U-shaped frame 19 having base flanges 19a, which are fastened to said door as by headed screws 20.

A longitudinal latch bolt 21 is slidably mounted in slots 21a formed in the legs 22 and 23 of the U-shaped frame 19. The latch bolt 21 has an enlarged head 24 at its inner end to limit the outward movement of the bolt by engaging the leg 23 of the frame 19, and said bolt extends forwardly beyond the leg 22 of said frame through an opening in the front wall 25 of the cover 16. The forward end of the bolt 21 is also enlarged and has on its end a beveled latch 26 which is adapted to engage in the usual latch plate secured to the adjacent door frame (not shown).

A pair of spaced-apart V-shaped notches 27 and 28, respectively, are provided in the underside of the bolt 21 and are disposed in alinement with a pair of lugs 29 and 30, respectively, formed on a rocking actuating plate member 31. The plate member 31 is fastened to a knob shaft 32, see Fig. 5, which extends transversely through the mechanism and has a pair of exterior knobs or handles 33 and 34 secured upon the opposite extremities thereof. The plate member 31 is keyed to the shaft 32 and is clamped in position thereon by a pair of nuts 35 and 36 threaded on the shaft 32. A spring 37 is coiled about the shaft 32 and reacts between the plate 14 and the rocking plate 31 to maintain the parts in place and to impose friction thereon.

In order to constantly urge the rocking plate 31 into the bolt-locking position shown in Fig. 3, provision is made of a spring 38 secured to a lug 39 formed on said plate 31 and to a post 40 on the door. Assuming the rockers 48 to be in raised position, the shaft 32 may be rotated by either of the knobs 33 or 34 to rock the plate 31 clockwise, as shown in Fig. 3, and will cause the lug 30 to leave the notch 28 and the lug 29 to enter the notch 27 and force the latch bolt 21 rearwardly to unlock the door. When the knob is released, the spring 38 will automatically protract the bolt 21 by rotating the member 31 in a counter-clockwise direction, as shown in Fig. 3, by the engagement of the lug 30 in the notch 28 of the bolt 21—the enlarged head 24, by its engagement with the frame member 23, limiting further movement of the bolt 21. The action of rocking the plate 31 clockwise, as shown in Fig. 3, will cause a finger 41, extending from said plate 31, to force a movable contact 42 into electrical engagement with a fixed contact 43 to close an electrical circuit, including a battery 44 and a bell 45, or

other signal means. Such a circuit is shown diagrammatically in Fig. 3. The contacts 42 and 43 are suitably mounted upon a bracket 46 in position to be engaged by the finger 41.

The latch bolt 21 is adapted to be locked in protracted position by means of a plurality of transverse rockers or tumbler bars 47, 48 and 49, each of which is pivotally mounted at one end upon a rod 50 which is supported by four brackets 51, which are rigidly secured to the front member 52 of the U-shaped frame 19. The transverse rocker bars 47, 48 and 49 overlie the latch bolt 21 and are adapted to drop into three cooperating slots 53, respectively, provided in the top of the latch bolt 21 (see Fig. 3). At this time the bolt 21 will be prevented from being retracted rearwardly. Each rocker bar 47, 48 and 49 is provided with a downturned T-shaped lug 54, which lugs are adapted to ride upon the peripheral surfaces of three cams 55, 56 and 57, respectively. Each cam 55, 56 and 57 is provided with a high point 58 which, when the respective cam is rotated, smoothly and quietly raises the respective bar 47, 48 and 49 out of its cooperating slot 53.

The cams 55, 56 and 57 are mounted upon three transverse shafts 59, 60 and 61, respectively, adjustably secured upon said respective shafts by means of set screws 62. Lock nuts 63 threaded upon each of the shafts 59, 60 and 61 are adapted to tightly engage the cams 55, 56 and 57, respectively. The shafts 59, 60 and 61 extend from the plate 12 through the door edge 10, the plate 14, and the front member 52 of the U-shaped frame 19,—each being secured in this position against axial movement by a nut 64 threaded on the inner end thereof. Compression springs 65 are coiled about each of the shafts 59, 60 and 61 and react against said cams 55, 56 and 57 to exert sufficient pressure thereon to prevent the accidental twisting of said cams by vibration of the lock or slamming of the door.

In order to operate the combination of the lock, provision is made of three knobs 66, 67 and 68 upon the end of each of the shafts 59, 60 and 61 outside the escutcheon plate 12. Each of the knobs 66, 67 and 68 has a dial portion 69 provided with a scale 70 marked about its periphery adapted to cooperate with a vertical indicating line 71 marked on the plate 12 above each dial.

By means of this construction it will be seen that the high point 58 of each cam 55, 56 and 57 may be located in alinement with the desired number on the dial 69 by loosening the set screws 62, and that by turning the cams on their respective shafts and then tightening the set screws, any desired combination of numbers may be obtained. By turning the dials to the proper combination, the rocker bars 47, 48 and 49 will be raised out of the bolt 21. The latch bolt 21 may then be retracted by manipulation of either of the knobs 33 or 34, permitting the door to be opened. In order to maintain the bolt 21 in retracted position, provision is made of a slot 72 in the bolt 21 in position to have the bar 47 drop therein after the bolt 21 is retracted.

In order to permit all of the rocker bars 47, 48 and 49 to be simultaneously removed from the slots 53 by a person located within the house, provision is made of a short bar 73 extending longitudinally below the transverse bars 47, 48 and 49. A transverse rod 74 is secured to the bar 73 and extends outwardly through a slot 75 in the cover 16, being provided with a knob 76 upon its outer end. The rod 74 is pivotally mounted upon a pin 77 extending between the two central brackets 51 (see Figs. 4 and 5). By manually pushing the knob 76 downwardly, the bar 73 will simultaneously engage the bars 47, 48 and 49 and raise them from the slots 53. This will permit the retraction of the latch bolt when the handle 34 is subsequently turned.

Operation

To open the door from the outside it will merely be necessary to turn each dial 69 to the proper number of the combination, whereupon the rocker bars 47, 48 and 49 will be raised by the cam sections 58. Turning of the handle knob 33 will then cause the bolt to slide inwardly and unlock the door. After thus unlocking the door, the bolt 21 may be maintained in retracted position by turning the knob 66 so as to cause the bar 47 to drop into the slot 72.

After opening the door and entering the house, the user may release the latch 21 by manipulating the knob 76 to raise the bar 47 from the slot 72, whereupon the spring 38 will again protract the latch bolt 21 and latch the door. To again lock the door after it is latched, it will only be necessary to rotate the dials 69 to remove them from bar-raising position, whereupon the rocker bars 47, 48 and 49 will drop by gravity into their cooperating slots 53 and prevent retraction of the latch bolt 21 by means of either of the knobs 33 or 34. When the bolt is so locked, the door may be readily opened from the inside by merely pushing the knob 76 downwardly to simultaneously raise all of the bars 47, 48 and 49, and thereafter turning the knob 34.

If an unauthorized person endeavors to get in the premises, it will be necessary for him to frequently turn the door knob or handle 33 counterclockwise to see if he has employed the proper combination to unlock the door. Each time that he thus turns the door knob, the lug 41 will engage the movable contact 42 to close the electrical circuit and cause the burglar alarm bell 45, lamp or other signal to be operated.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a combination lock, a casing, a normally protracted latch bolt having a cross-slot in the top thereof, means to retract said latch bolt, a vertically movable bar adapted to drop into said slot whenever said bolt is in protracted position, manually rotatable means on one side of the lock to raise said bar out of the slot to permit retraction of said bolt, and a pivoted lever on the other side of the lock to also raise said bar.

2. In a combination lock, a casing, a normally protracted latch bolt having a plurality of spaced apart cross-slots in the top thereof, means to retract said latch bolt, a plurality of rocker bars in said casing pivoted on a horizontal axis, said bars being adapted to drop into said slots when the bolt is in protracted position to lock it in such position, and rotatable cam means extending out-

side of the lock to raise said bars out of said slots, respectively.

3. In a combination lock, a casing, a normally protracted latch bolt having a plurality of spaced-apart cross-slots in the top thereof, means to retract said latch bolt, a plurality of rocker bars in said casing pivoted on a horizontal axis, said bars being adapted to drop into said slots when the bolt is in protracted position to lock it in such position, rotatable cam means extending outside of the lock to raise said bars out of said slots, respectively, and pivoted means on the inside of said casing to simultaneously raise all of the bars to permit unlatching of said bolt.

4. In a combination lock, a casing, a normally protracted latch bolt having a plurality of spaced apart cross slots in the top thereof, means to retract said latch bolt, a plurality of horizontal rocker bars in said casing pivoted on a horizontal axis, said bars being adapted to drop into said slots when the bolt is in protracted position to lock it in such position, a plurality of rotatable cams having high sections adapted to raise each bar out of its slot in the bolt, individual means to rotate each of said cams, and indicating means on each of said cam rotating means to denote when the respective bar is raised by each cam.

5. In a combination lock, a casing, a normally protracted latch bolt having a plurality of spaced apart cross-slots in the top thereof, means to retract said latch bolt, a plurality of horizontal rocker bars in said casing pivoted on a horizontal axis, said bars being adapted to drop into said slots when the bolt is in protracted position to lock it in such position, a plurality of rotatable cams having high sections adapted to raise each bar out of its slot in the bolt, separate means to rotate each of said cams, indicating means on each of said cams rotating means to denote when the respective bar is raised by each cam, and pivoted means on one side of said casing to simultaneously raise all of the bars to permit unlatching of said bolt.

6. In a combination lock, a casing, a normally protracted latch bolt having a plurality of spaced apart cross slots in the top thereof, means to retract said latch bolt, a plurality of horizontal rocker bars in said casing pivoted on a horizontal axis, said bars being adapted to drop into said slots when the bolt is in protracted position to lock it in such position, a plurality of rotatable cams having high sections adapted to raise each bar out of its slot in the bolt, means to rotate each of said cams, indicating means on each of said cam rotating means to denote when the respective bar is raised by each cam, pivoted means on one side of said casing to simultaneously raise all of the bars to permit unlatching of said bolt, and means to change the position of each of said cams with respect to said rocker bars.

RALPH BENJAMIN.