

O. KATZENBERGER.
COMBINATION LOCK.
APPLICATION FILED SEPT. 14, 1910.

1,049,868.

Patented Jan. 7, 1913.

Fig. 1

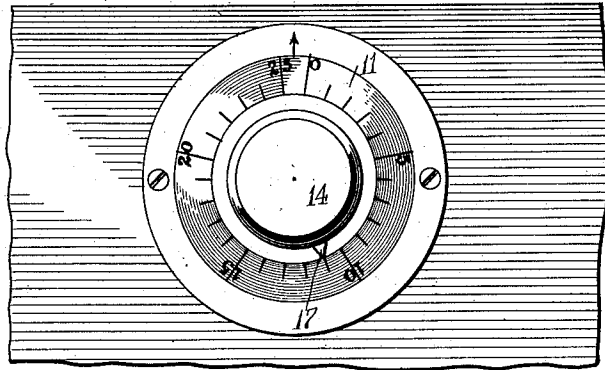


Fig. 2

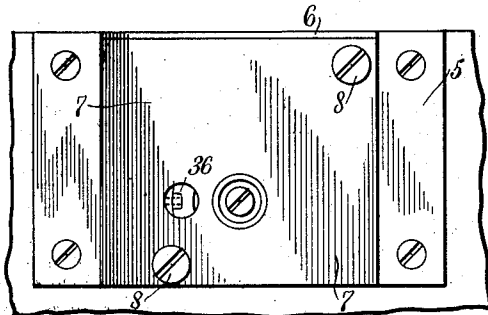


Fig. 3

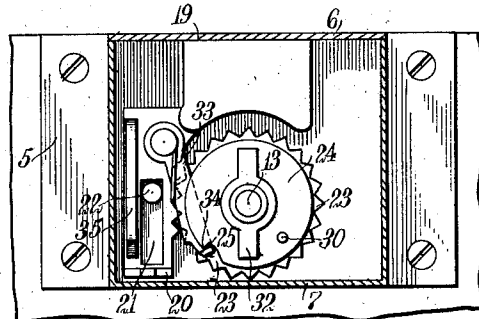


Fig. 4

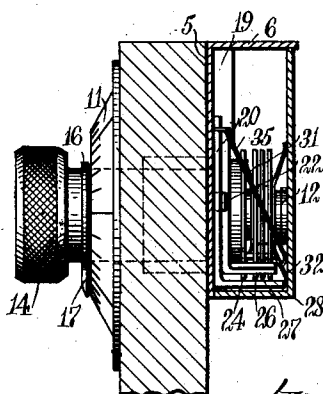


Fig. 5

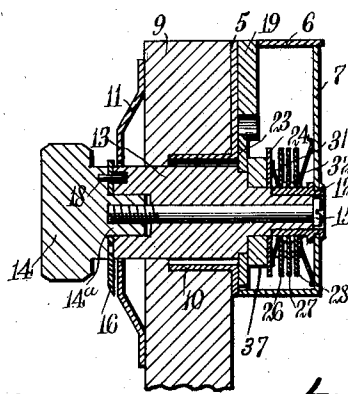


Fig. 6

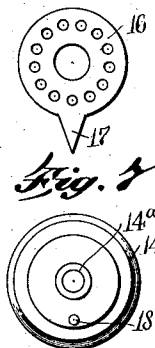
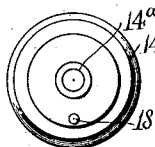


Fig. 7



WITNESSES:
H. A. Smith
Wm. H. Smith

Fig. 8

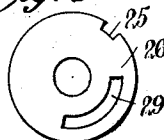
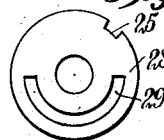


Fig. 9



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UNITED STATES PATENT OFFICE.

OSCAR KATZENBERGER, OF CHICAGO, ILLINOIS.

COMBINATION-LOCK.

1,049,868.

Specification of Letters Patent.

Patented Jan. 7, 1913.

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To all whom it may concern:

Be it known that I, OSCAR KATZENBERGER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Combination-Lock, of which the following is a full, clear, and exact description.

The invention is an improvement in combination locks, and has in view a relatively simple and compact lock construction of this character, in which the combination can be easily and readily altered without access within the lock case, and, further, to prevent the engagement of the pin or finger with the disk tumblers from being detected in the working of the knob; also to provide for the positive actuation of the lock bolt in both directions.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front view of a combination lock as applied to a door or other closure and embodying my invention; Fig. 2 is a rear view of the same; Fig. 3 is a similar view showing the lock case in vertical section; Fig. 4 is a vertical section through the lock case adjacent to and longitudinally of the knob spindle; Fig. 5 is a similar section centrally of the knob spindle; Fig. 6 is a face view of the indicator; Fig. 7 is an inner end view of the knob; Fig. 8 is a face view of one of the disk tumblers; and Fig. 9 is a similar view of another of the said tumblers.

In the construction of my improved lock, I preferably provide a lock case which is made up of a back or attaching plate 5 having a bolt flange 6, and a cover 7, having inwardly-turned flanges at three sides adapted to seat on the back plate, with the fourth and open side closed by the bolt flange 6 when the case is assembled, the cover being secured in place by screws 8, which are threaded into the plate 5. The back plate is extended on opposite sides of the case beyond the cover to receive the screws or other devices for securing the lock to the door or other closure 9, and has a tubular member or boss 10, which is extended from its rear face, and, when the lock is applied, let into an opening formed

in the closure from the inner side. A dial 11 is designed to be attached to the outside of the closure, as is the usual practice, and is arranged concentrically with the tubular extension 10. In the cover 7 of the lock case is riveted or otherwise suitably secured an inwardly-extending bearing 12, in which is journaled the reduced inner end of a knob or operating spindle 13, this spindle being of sufficient length to extend from the lock case through the closure and the dial 11, at which point it is provided with a removable knob 14, the knob being detachably secured by a screw 15 which passes axially through the spindle and is accessible for operation at the outside of the lock case. The head of the screw, as shown, is arranged within the bearing 12, with the threads engaging a boss 14^a formed on the inner end of the knob 14, this boss being received in a corresponding recess formed in the outer end of the knob spindle. Interposed between the knob and the spindle is an indicator 16, shown in detail in Fig. 6 to comprise a pointer 17 extending from a perforated disk. Any one of the perforations of the disk is adapted to be engaged by a pin or projection 18, shown to be carried by the knob 14. By this arrangement, the pointer can be readily adjusted relatively to the knob and spindle.

A bolt 19 is slidable through the flange 6 adjacent to the back plate 5, and has an attached rack 20 arranged within the case, the rack having a guide slot 21, into which projects from the plate 5, a guide pin 22.

Attached to the spindle 13, within the lock case is a pinion 23, and an adjacent main tumbler disk 24, the pinion arranged to mesh with the rack and disengage the same immediately before the bolt is fully projected, thereby rendering it impossible to reengage the projecting bolt by merely rotating the knob 14, without a proper setting of the tumblers. Interposed between the pinion 23 and the main tumbler disk 24, is a washer 37, for the purpose of spacing these two members apart, and in order to bring the set of tumblers beyond the shoulder formed at the inner end of the bolt 19. The main tumbler disk 24 is provided with a notch 25, as are also tumbler disks 26, 27 and 28, rotatably mounted on the bearing 12, washers being placed between the last-named disks to keep them apart. The disks 26, 27 and 28

27 and 28 are each provided with a concentric slot 29, the slots of the disks increasing in length in passing toward the disk 28, and serving to receive a setting pin 30, fixed to the main disk 24. The disks 26, 27 and 28 are also pressed together by springs 31 and 32, which causes them to work with a uniform friction, whereby it is not possible to detect the engagement of the setting pin 30 therewith in operating the knob.

A spring-pressed operating member or lever 33 is pivoted to the rack and is provided at its free end with a finger 34, adapted to engage within the notches 25 of the several tumbler disks when these notches are brought into register. The notch 25 of the main disk 24, as best shown in Fig. 3, is beveled at one edge to throw the finger 34 out upon the continued revolution of the operating spindle in the same direction after the bolt is fully projected.

In drawing out or locking the bolt the gear wheel engages the slide or rack 20 and moves the rack 20 until the same is entirely disengaged from the gear wheel. A continued movement of the various disks will naturally cause the end of finger 34 to move out of notch 25 as finger 34 cannot move any farther outward, the same being pivotally connected with the rack 20. The reverse movement of the gear wheel and the respective disks will cause the disk to be rotated until the finger 34 is allowed to snap over into the notch 25. After this has occurred further continued movement will cause the disk 24 to pull against the finger 34 until the gear wheel has engaged the rack 20, whereupon the gear wheel will cause a continued movement of the rack and a consequent withdrawal of the bolt.

A spring 35 is best shown in Fig. 4 to be attached to the rack, and extends to and bears against the opposite wall of the lock case and operates to firmly press the bolt and rack to the back plate 5 and cause the lock to work with sufficient stiffness.

When the combination is destroyed, the spring-controlled member 33 rides on the periphery of each combination disk, and when the combination has been set up this spring-controlled member drops into the respective notch of each combination disk. The main combination disk 24 being fastened to spindle 13, said member will engage the notch in said disk and move the bolt a sufficient distance to engage the rack when the spindle is rotated.

The cover 7 of the lock case is provided with a peep-opening 36, through which the notches 25 of the tumblers are observable when brought into register with the finger 34 of the operating lever, and when the bolt is in a projected position.

To change the combination the screw 15 is loosened sufficiently to permit the knob

14 to be manually pulled axially away from spindle 13 a sufficient distance to cause the pin 18 carried by knob 14 to move out of engagement with spindle 13 and indicator 16 and then the indicator 16 is revolved on the boss 14^a to any desired extent.

With the indicator disengaged from the pin 18 it is reengaged in any of the perforations of the ring or disk, after which the screw 15 is again tightened. To determine the new combination, the knob is revolved to the left until the notch 25 of the disk 28 is seen through the peep-opening 36 to register with the finger 34, and the number with which the pointer 17 registers, noted. Then, the knob is revolved in the opposite direction until the notch 25 of the disk 27 registers with the finger 34, and the position of the pointer of the indicator again noted. The knob is then turned to the left until the notch 25 of the disk 26 is brought into register with the finger and the notches of the remaining disks, and when the position of the pointer of the indicator is noted, the combination is had. In both determining the combination and operating the lock, however, the knob should be given one or more turns to the left.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a combination lock, an operating spindle, a bolt having a rack rigidly attached thereto, a pinion carried by the spindle and arranged to mesh with the rack and pass out of engagement therewith when the bolt is fully projected, a series of rotary tumblers, and a lever pivoted to the rack engaging said tumblers when the tumblers are brought to a prescribed position to move said bolt when disengaged from said pinion.

2. In a combination lock, an operating spindle, a bolt, a rack fixed to the bolt, a pinion fixed to the spindle and meshing with the rack, except when the bolt is fully projected, a series of relatively rotatable tumblers arranged on the spindle, each having a peripheral notch, and a spring-pressed member movable with the rack and arranged to engage in the notches of the tumblers when the notches of the latter are brought into register to project the bolt.

3. In a combination lock, a lock case having a peep-opening, an operating spindle rotatable within the case, rotary tumblers arranged within the case mounted on the spindle, a dial surrounding the spindle, a knob detachably connected to the spindle, an indicator comprising an apertured plate interposed between the knob and spindle in a position to traverse the dial and adjustable relatively to the spindle, means holding said plate in position, a bolt slidable within the case, and means to engage the tumblers when the latter are in a prescribed

position, and operatively connect them to the bolt, observable at the point of engagement, together with the said tumblers, through the said peep-opening.

- 5 4. In a combination lock, a lock case, an operating spindle rotatably mounted in said case formed with an aperture, a rotary tumbler mechanism arranged within the case and operable by the spindle, a knob remov-
10 ably applied to the spindle, a perforated indicator arranged between the knob and spindle and rotatably adjustable thereto, a pin carried by said knob adapted to be inserted in one of the perforations in said indicator and in the aperture in said spindle
15 for preventing the knob from moving relative to the spindle, and a device adapted to bind the knob and spindle, accessible for operation only from the back of the case.
- 20 5. In a combination lock, an operating spindle, a bolt, a rack by which the bolt is actuated, a series of notched rotary tumblers operated by the spindle, a pinion carried by the spindle and arranged to mesh with the
25 rack, said bolt when fully projected being out of engagement with the rack, and a lever movable with the bolt and having a finger arranged to engage with the notches of the tumblers when said notches are in regis-

try to actuate said bolt when disengaged 30 from said pinion.

6. In a combination lock, a bolt, a rack in connection with the bolt, a pinion arranged to mesh with the rack, except when the bolt is fully projected, a series of rotary tum- 35 blers, one of which is fixed relatively to the pinion and the others revoluble relatively thereto and to each other, and a lever movable with the bolt and rack, swinging relatively thereto, the lever having a projecting 40 finger, each tumbler having a peripheral notch with which the said finger is adapted to engage when the notches of the several tumblers are in register, the notch of the tumbler fixed relatively to the pinion being 45 beveled at one edge to throw the finger of the lever out of engagement when the pinion is revolved in the direction to project the bolt after the pinion passes out of engagement with the rack. 50

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OSCAR KATZENBERGER.

Witnesses:

OLGA LUND,

GEO. L. RICHARDSON.