R. E. RUNKLE.

COMBINATION LOCK.

APPLICATION FILED MAR. 16, 1906.

929,712. Patented Aug. 3, 1909.

Fig. 1.

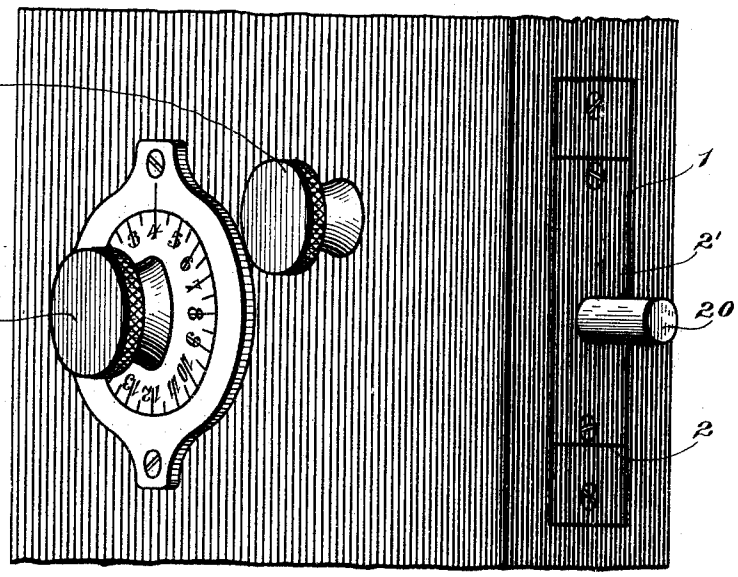


Fig. 2.

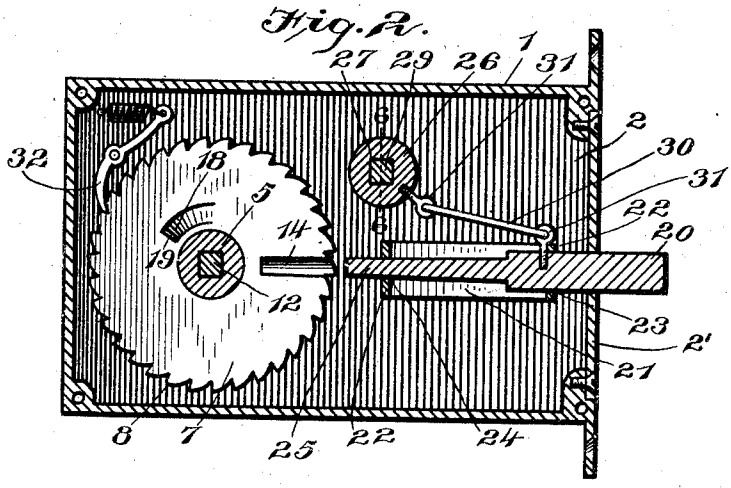


Fig. 3.

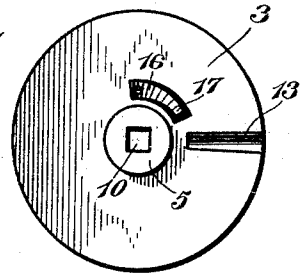


Fig. 4.

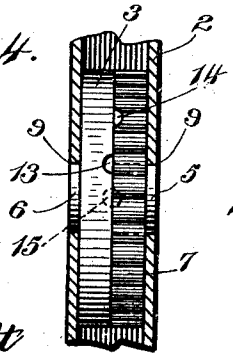


Fig. 6.

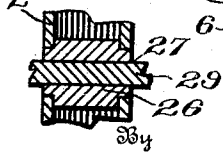
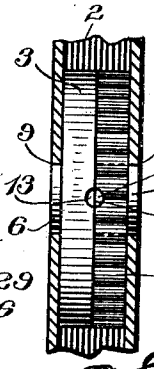


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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COMBINATION-LOCK.

No. 929,712. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed March 16, 1906. Serial No. 306,452.

To all whom it may concern:

Be it known that I, RALPH EVANS RUNKLE, a citizen of the United States, residing at El Reno, in the county of Canadian, Oklahoma, have invented certain new and useful Improvements in Combination-Locks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to "combination locks", and has for its object to provide a device of this class which is particularly designed to be used on dwelling doors, chests, trunks or in any capacity in which a sliding bolt lock is usually employed.

A further object of my invention is to provide a combination lock which is particularly simple in its construction, cheap to manufacture, easy of repair, strong, durable and efficient.

With these objects in view my invention consists in the novel construction of the lock, and particularly in the construction of rotating disks.

My invention further consists in certain other details of construction and in combinations of parts which will be first fully described and afterward specifically pointed out in the appended claim.

Referring to the accompanying drawing: Figure 1 is a perspective view showing lock applied to the door in the capacity of a mortise lock. Fig. 2 is a vertical longitudinal section through the lock. Fig. 3 is an elevation of the inner face of one of the rotating disks. Fig. 4 is a vertical transverse section through a portion of the casing showing the rotating disks in end elevation and in position for locking the bolt. Fig. 5 is a similar view showing position of the rotating disks in position allowing bolt to slide, and Fig. 6 is a vertical transverse section taken through casing on line 6—6 of Fig. 2.

Like numerals of reference indicate the same parts throughout the several figures in which:

1 indicates the lock and 2 the casing which may be of any convenient construction and which may be varied or altered according to the use to which the lock is to be adapted, but for a mortise lock it is preferably as shown in Fig. 2, and 2′ is the removable face plate.

3 indicates the inner rotating disk which as shown in Figs. 3 and 4 is provided with a hub 5 on one side thereof and a similar hub 6 on its opposite side, said hub 5 being longer than hub 6 for a purpose which will now be described.

7 indicates the outer rotating disk, which as shown in Figs. 2, 4 and 5 is mounted on the hub 5 of the disk 3, said disk 7 having its entire periphery constructed to form ratchet teeth 8.

Referring to Figs. 4 and 5 it will be seen that the casing 2 is wide enough to accommodate the said two disks 3 and 7 and that an opening 9 is formed in each side of the casing within which openings the hubs 5 and 6 of disk 3 extend thus allowing said disks a free rotary movement within the casing 2.

Referring now to Figs. 2 and 3 it will be seen that a polygonal opening 10 is formed centrally in the disk 3, said opening extending entirely through said disk.

Referring now to Fig. 1 it will be seen that a knob 11 is illustrated, the rod 12 for said knob being polygonal as shown in Fig. 2 and is constructed to enter the polygonal opening 10 in the disk 3, by which construction the disk 3 is rotated with the knob 11. As shown in Figs. 3, 4 and 5 the disk 3 is provided with a radial semicircular groove 13 which extends inwardly from the periphery of the disk, and referring to Figs. 2, 4 and 5 it will be seen that the disk 7 is provided with a similar groove 14; both of said grooves being semicircular, a circular hole or opening 15 is formed when the two grooves are brought together as shown in Fig. 5.

It will be seen from the drawings that the semicircular grooves 13 and 14 in the disks 3 and 7 are on the inner faces of said disks and do not extend entirely across the peripheries of the said disks.

Referring to Fig. 3 it will be seen that on the inner face of the disk 3 is disposed a small flat spring 16 having its free end 17 slightly raised; and referring to Fig. 2 it will be seen that a gradually inclined groove 18 is formed in the inner face of the disk 7, said groove terminating abruptly to form a wall 19 in the face of the disk, said groove being disposed in path of the spring 16 on the disk 3.

20 indicates the locking bolt, which is arranged within the casing 2 and is guided pref-

erably in a guide 21, the transverse walls 22 of which are provided with openings 23 and 24 through which the bolt freely slides, the inner portion 25 of said bolt being considerably reduced in diameter as shown in Fig. 2 so as to be capable of entering the hole or opening 15 formed by the two grooves 13 and 14 in the disks 3 and 7.

Referring to Fig. 6 it will be seen that a barrel 26 is journaled in the sides of the lock casing, said barrel being provided with a polygonal opening 27 as shown in Fig. 2; and referring to Fig. 1 it will be seen that a knob 28 is illustrated, said knob being provided with a polygonal rod 29 constructed to enter the opening 27 in the said barrel by which construction the said barrel may be rotated by said knob. Connecting the said barrel 26 with the locking bolt 20 is a link 30 secured to both members in any convenient manner or by screw eyes 31 as shown in Fig. 2.

Conveniently pivoted within the casing is a spring actuated pawl 32 arranged to be normally in engagement with the ratchet teeth on the disk 7 by which construction the said disk is held against rotation in one direction; but is free to be rotated in the opposite direction. Secured on the shaft 12 in rear of the knob 11 is a dial (Fig. 1) having thereon a series of numbers and spaces as is usual on dials employed in connection with combination locks, a fixed point or line being associated with said dial under which the numbers on the dial successively pass.

By reason of the construction of the semicircular groove 14 in the disk 7 the succession of ratchet teeth 8 on said disk is unbroken so that the said groove 14 passes under the pawl 32 just the same as if the disk 7 were not provided with a groove 14 there being no jar or interruption to the ratchet teeth which would give any outward indication of the location of the groove 14 in the disk 7.

Having thus described the several parts of my invention, and said parts being assembled within the casing, the disks in position shown in Figs. 4 and 5, its operation is as follows: The groove 18 in the face of the disk 7 being in the path of the spring 16 on the face of the disk 3, when said disk 3 is rotated by turning the knob 11 and dial in one direction, the said spring entering the slot 18 engages the wall 19 formed thereby and rotates the disk 7 in the direction contrary to the hands of a watch viewing the disk 7 as shown in Fig. 2. In this direction the disk 7 is free to rotate, the ratchet teeth 8 on its periphery passing under the pawl as is obvious. Considering therefore for the purpose of explanation that it is desired to unlock the lock which must be accomplished by sliding the locking bolt 20 inwardly, the disk 3 is rotated by turning the knob 11. When the spring on said disk engages the wall 19 in the disk 7 a locking engagement is formed between the two disks and the disk 7 is rotated with the disk 3. The knob 11 is rotated until the radial groove 14 in the disk 7 is in line with or directly behind the locking bolt 20 (Fig. 2), the extent of rotation sufficient to bring said radial groove 14 in this position being predetermined, and we will consider that it be until the numeral 4 on the dial be under the fixed point or line. As the rotation of the disk 3 in the contrary direction does not affect the disk 7, and as said disk 7 is held against contrary rotation by the pawl 32, the disk 3 is then rotated in the contrary direction until its radial groove 13 is in line with or directly behind the locking bolt 20, in which position it registers with the radial groove 14 in the disk 7 and with said groove forms a circular hole or opening 15 as shown in Fig. 5. The knob 28 operating the locking bolt is then turned which slides the said bolt into the circular hole or opening thus formed. The extent of rotation in the contrary direction sufficient to bring the radial groove 13 in the disk 3 being predetermined, rotation is ceased, which we will consider is when the numeral 11 is under the fixed point or line. The combination therefore to unlock the lock under the circumstances and viewing the dial from Fig. 1 would be, to turn to the right and stop at 4, then turn to the left and stop at 11. The explanation of this combination is as before stated; the rotation of the knob 11 to the right to numeral 4 brings the radial slot 14 in the disk 7 in line with or directly behind the locking bolt 20, while the rotation of the knob 11 to the left to the numeral 11 brings the radial slot 13 in the disk 3 in line with or directly behind the locking bolt 20 thus forming the opening 15 for the locking bolt to enter.

In order to lock the bolt 20 in its extended position the knob 11 is rotated to the right, the spring 16 on the disk 3 engaging the wall of the groove 18 rotating the disk 7 and carrying the radial groove therein out of line with the locking bolt, as for instance as shown in Fig. 4. As soon as either one or both of the radial grooves is out of line with the locking bolt, the said bolt cannot be moved, and first one radial groove must be brought into proper position and then the other before the bolt 20 can be slid. It is evident that it would be extremely difficult to operate or slide the bolt unless the combination were known, while the combination may be changed at pleasure by withdrawing the rod 12 from the disk 3 and turning it a quarter, half or three quarters of a revolution and again inserting the rod. In order to accomplish this, however, the removable plate 2′ must first be removed.

It is obvious that when applying this lock to a door the knobs 11 and 28 and dial may

be arranged on both sides of the door so that the door may be unlocked from either side. It is also evident that many slight changes and alterations may be made which would fall within the limit and scope of the following claim.

What I claim as my invention and desire to secure by Letters Patent of the United States, is:—

In a lock of the character described, the combination of a suitable casing, two rotatable disks side by side, one of said disks being provided on its periphery with an unbroken and an uninterrupted succession of ratchet teeth the entire width of the periphery of the disk, the other of said disks having a smooth unbroken periphery, the diameters of said two disks being uniform, a pawl in engagement with the first mentioned disk locking same against rotation in one direction, the other of said disks being capable of rotation in both directions, means on the inner faces of said disks for interlocking said disks when rotated in one direction, a radial groove on the inner face of each disk extending from the peripheries thereof toward the centers, the groove in each disk having a depth less than the thickness of each of said disks in such manner as to leave said toothed periphery regular and unbroken, a locking bolt associated with said disks, means for actuating said bolt from without the casing, said bolt being constructed to enter the radial grooves when said disks register with each other, a dial and suitable means associated therewith on the outside of the casing for rotating said disks, the whole arranged in such manner that the action of said pawl on the toothed disk is regular and uninterrupted by the said radial groove extending through the toothed periphery of said disk, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

RALPH EVANS RUNKLE.

Witnesses:

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