

J. O. KINGSLAND, SR.
COMBINATION LOCK.
APPLICATION FILED SEPT. 7, 1910.

1,016,331.

Patented Feb. 6, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

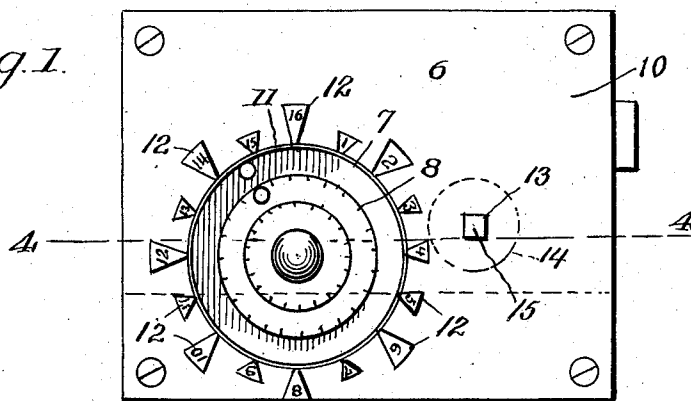


Fig. 2.

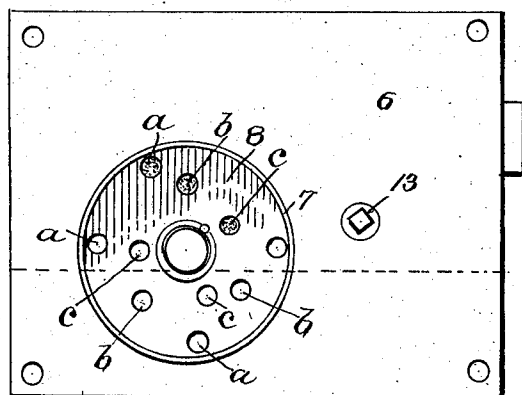
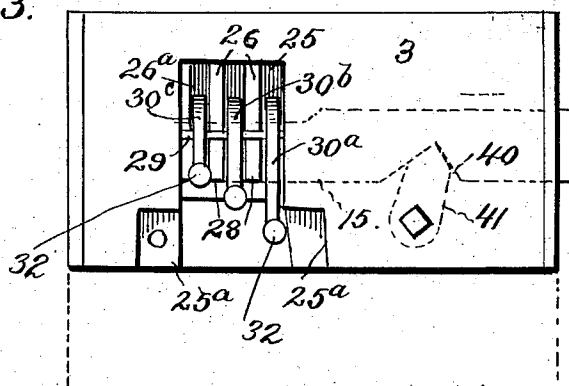


Fig. 3.



Inventor

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Witnesses

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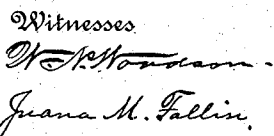
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1,016,331.

2 SHEETS—SHEET 2.

Fig. II.



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UNITED STATES PATENT OFFICE.

JAMES O. KINGSLAND, SR., OF BROOKLYN, NEW YORK.

COMBINATION-LOCK.

1,016,331.

Specification of Letters Patent.

Patented Feb. 6, 1912.

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To all whom it may concern:

Be it known that I, JAMES O. KINGSLAND, Sr., citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

My invention relates to locks and more particularly to combination locks in which a number of disks are used which have to be turned to a predetermined position before the bolt can be shot or retracted, the primary object of the invention being to provide a very simple, cheap and easily manipulated lock particularly adapted for slot machine cabinets or other small articles where locks are applied, but not necessarily limited to this as the lock might also be used for doors in place of the ordinary spring lock now in use thereon.

The invention comprehends the provision with a spring-actuated bolt, of one or more tumblers which automatically engage in a notch or notches in the bolt when the bolt is shot, and which prevent the retraction of the bolt. In conjunction with the tumblers a shield plate is used having a number of series of concentric perforations through its face, one or more of which perforations register with the free ends of the tumblers. A plurality of disks are provided on the face of the lock, which disks are formed with a plurality of inwardly projecting studs. The disks are movable together inward into the lock casing, and when the disks have been properly turned to bring the pins thereon into the proper predetermined arrangement, the pins will register with certain perforations in the shield plate or guard and therefore a depression of the disks will cause certain of the pins to pass through the perforations in the disk and engage with the aforesaid ends of the tumblers raising them out of engagement with the bolt, whereupon the spring retracts the bolt.

The invention further comprehends certain means located on the inside of the lock whereby the tumblers may be released from their engagement with the bolt to permit the spring to retract the bolt.

My invention is shown in the accompanying drawings wherein:

Figure 1 is a face view of the lock, showing the actuating disks and knob; Fig. 2 is

a face view of the lock, the outer plate being removed to show the perforated shield; Fig. 3 is a face view of the lock, the outer plate and the shield-carrying plate being both removed so as to show the tumblers; Fig. 4 is a transverse section on the line 4—4 of Fig. 1; Fig. 5 is a vertical section on the line 5—5 of Fig. 4; Fig. 6 is an enlarged diametrical section of the actuating disks and the recess in which they are contained together with the shield plate; Fig. 7 is an enlarged vertical section on the line 7—7 of Fig. 5; Fig. 8 is a perspective view of the pin-carrying disks. Fig. 9 is a perspective view of the bolt detached from the lock casing; Fig. 10 is a perspective view showing the three locking tumblers disassembled; Fig. 11 is a detail fragmentary section showing a modified manner of holding the tumblers in engagement with the bolt.

Referring to these figures 2 designates a rectangular casing of any suitable material and composed of the plates 3 and 4 and the end plates 5. Mounted upon the face of the casing is a plate 6 which is relatively thick and is provided with a circular recess 7 extending entirely through it. The bottom of this recess is covered or closed by a guard plate or shield 8 provided with a plurality of sets or series of perforations lettered respectively *a*, *b* and *c*. These perforations are so arranged that they are cut by concentric circles and thus are arranged in concentric series relative to the center of the plate. The center of the plate bears against a coil spring 9 which projects outward and bears against a series of disks mounted in the recess 7, which disks show upon the face of the face plate 10. The face plate 10 is formed with a circular opening 11, and disposed at regular distances around this opening are a series of raised pointers 12 having numbers thereon, said numbers in the embodiment of my device illustrated running from 1 to 16. Preferably every other one of the pointers is larger than the alternate pointers. The face plate is also provided with an opening 13 for the passage of the shank of a knob 14, this shank being designated 15. The disks which are contained within the recess 7 and which are rotatably mounted therein, consist of a disk 16 of a diameter approximately equal to the diameter of the opening 11. Mounted on opposite sides of the disk 16 are the disks

17 and 17^a, both of the same size, which are connected to each other by a sleeve 18. The disk 16 is rotatable on this sleeve but independently of the disks 17 and 17^a. The sleeve 18 surrounds an interior shank 19 upon which are mounted the outer and inner central relatively small disks 20 and 20^a, and this shank 19 forms a central pivot pin to which is attached a knob 22. Each of the disks 17 and 16 are provided with outwardly projecting studs 23 whereby the disks may be easily manipulated, while each of the disks 16, 17^a, and 20^a are provided with inwardly projecting pins 24^a, 24^b and 24^c, these pins corresponding to the several sets of perforations *a*, *b* and *c*.

As illustrated in the drawing, the guard or shield plate 8 is provided with ten perforations arranged as shown in Figs. 2 and 6. The plate 16 is provided with four pins upon its circumference. The plate 17^a is provided with three inwardly projecting pins 24^b, and the plate 20^a is provided with three inwardly projecting pins 24^c. It will be obvious that when any one of these pins on the several plates are out of register with any one of the openings in the guard plate that it will be impossible to depress the disks 16, 17, 20, 17^a and 20^a against the force of the spring 9, and hence it will be impossible to project any one of the pins through the openings in the guard plate. When, however, the several pins on the several plates aline or register with the perforations in the guard plate then the disks as a whole may be moved inward by means of the knob 22. The inward movement of these pins or of certain of the pins acts to disengage the locking tumblers from the bolt, as will be now described.

The casing plate 3 is cut away as at 25, the cut away portion being laterally enlarged as at 25^a at the lower edge of the plate 3. The recess 25 so formed is designed to accommodate the actuating ends of the tumblers. The cutaway portion 25 is crossed by vertical bars 26 shown as formed by slotting a plate 27, this plate being provided with outwardly projecting lugs 28 which are arranged in alinement with the bars 26 and act to guide the tumblers. A pivot pin 29 passes across the recess 25 just above the lugs 28, and mounted on this pivot pin are a plurality of tumblers 30^a, 30^b and 30^c corresponding to the three disks, the three series of perforations in the guard plate and the three sets of pins on the three disks. Each of the tumblers has the form shown in Fig. 10, that is, the upper active end of each tumbler is curved and extended at right angles to the body of the tumbler as at 31 forming a bolt-engaging detent. The shank portion of each tumbler preferably extends down considerably below the pivot pin 29 and then is provided on its extremity with

a small disk 32 of a diameter corresponding to the diameter of the perforations in the guard plate 8. As before remarked the three tumblers are of different lengths, that is, the lower portions of the tumblers differ in length so that when the tumblers are in position as shown in Fig. 10, the tumbler 30^a will extend below the tumbler 30^b, and this in turn below the tumbler 30^c. Thus the lower extremity of the tumbler 30^a will register with any one of the perforations *c*, the tumbler 30^b will register with any one of the perforations *b*, and the tumbler 30^c with any one of the perforations *a*. The extremities 31 of the tumblers extend into a slotted plate 33 which has slots alining with the spaces between the bars 26. Thus when the tumblers are in a locking position the upper ends of them will be securely engaged in the slots 26^a and the slots 33^a. Preferably the plate 33 is spaced from the inner face of the inside plate 4 by means of spacing members 34 of any suitable desired character.

One of the end plates 5 is formed with a bolt opening 35 through which the bolt 36 is adapted to project. The bolt 36 is carried in any suitable guides so as to have an easy sliding movement, and the side face of the bolt near its forward end is provided with the outwardly projecting under cut lug 37 with which the free end of the spring 38 engages. As shown, this spring has a V-shape, one end of the spring engaging against the inner end of the plate 5 while the free end of the spring is received within the under cut lug 37. It will thus be seen that this spring acts to retract the bolt. The upper edge of the bolt is provided with the upwardly projecting stop lug 39 while the under edge of the bolt near its forward end is formed with a notch 40 in which engages an arm 41 attached to the shaft 15, which in turn is attached to the knob 14. By rotating the knob in one direction it will be obvious that the bolt will be projected against the force of the spring, and that when the knob is released the spring will cause the retraction of the bolt. In order to provide for the engagement of the bolt by the tumblers when it is shot to prevent its retraction, I form the upper edge of the bolt near its rear end with one or more notches 42, the number of notches corresponding to the number of tumblers. On small locks as will be later referred to, only one tumbler need be used, in which case only one notch is formed in the upper edge of the bolt, while on large locks where a plurality of tumblers are used a plurality of notches is provided. In vertically disposed locks the tumblers will engage with the notches 42 by gravity, the ends 31 of the tumblers being heavier than the ends 30, but where the locks are horizontally disposed, or where gravity is

not deemed sufficient for the purpose, springs 47 may be used in order to force the tumblers into engagement with the notches, as shown in Fig. 11. I do not wish to limit myself to the arrangement of springs shown as it is obvious that many different arrangements to this end might be provided.

It is of course necessary to provide means whereby the bolt may be retracted from inside the door without the necessity of rotating the dials or disks, and to this end I provide a shaft 43 which passes inward through the inner casing plate 4 near the rear end of the casing, and which is supported within the casing in any suitable manner. This shaft 43 carries upon it the radially extending arm 45, and exterior of the casing plate is formed with the knob or handle 46. By rotating this handle so as to carry the finger or arm 45 upward and into engagement with the ends 31 of the tumblers it will be obvious that the tumblers will be moved upward and out of engagement with the notches in the bolt 36. This releases the tumblers from the bolt and permits the spring to retract the bolt. The bolt is again shot by rotating the knob 13 and as soon as the bolt has been shot the tumblers will again engage the bolt and hold it locked.

In order to operate the lock the several disks 20, 17 and 16 are set with the index points on said disks in coincidence with the index pointers 12. This may be easily accomplished even on a dark night, for the reason that the pointers are raised above the surface of the plate 10 and hence may be easily felt with the fingers. The several disks are rotated as before remarked, until the pointers thereon coincide with the proper pointers on the face plate, and when this is accomplished the several pins 24^a, 24^b, and 24^c will register with the several openings or perforations in the guard plate 8. When this has occurred pressure is applied to the knob and the disks forced inward. The three uppermost pins, in the form of my invention shown in the drawings, will engage with the three tumblers and will force these tumblers out of their locking engagement with the bolt, thus permitting the bolt to be retracted. If, however, the proper combination has not been made it will be obvious that at least one of the pins will not register with one of the holes or perforations in the guard plate, and hence that it will block and prevent the inward movement of the disks and therefore prevent the actuation of the tumblers. It is obviously impossible for any one to throw back the bolt unless each disk is in its correct position, and it will also be impossible to find any one of the combinations by pressing the button and turning the disks, as the pegs when made of proper length will simply

slide along on the bottom of the recess 7 and pass over the holes. Two of the combinations might be accidentally set correctly but unless the third disk is in proper position the lock could not be opened.

As before remarked, it is not absolutely necessary that three tumblers should be used as one tumbler would answer the purpose where no great amount of strain is to be placed upon the bolt. It will be obvious that it is just as difficult to set the disks for the proper combination as it would be if three tumblers are used. While I have referred to merely one tumbler being used, and have shown three tumblers, it will be obvious that I might use more than three tumblers, and that I might provide a greater number of disks than three without in any manner departing from the spirit of my invention.

It is obvious that my invention is simple, compact, readily assembled and taken apart, and that it is adapted for a large number of uses where the ordinary combination lock would be difficult to put in place.

What I claim is:

1. The combination with a locking member and a tumbler engaging the same, of movable tumbler-actuating means adapted when moved in one direction to disengage the tumbler from the locking member, and a shield interposed between the tumbler actuating means and the tumbler and normally preventing the movement of said actuating means toward the tumbler but permitting said movement when the actuating member has been moved into a predetermined relation with the shield.

2. The combination with a locking member and a tumbler engaging the same, of a rotatable tumbler actuator axially movable toward the tumbler to disengage it from the locking member, and a shield interposed between the locking member and the actuator normally preventing the axial movement of said actuator but permitting the movement when the rotatable member has been rotated into a predetermined position with relation to the shield.

3. The combination with a locking member and a tumbler engaging the same, of a rotatable and axially movable tumbler actuator movable toward the tumbler to disengage it from the locking member, and a shield interposed between the locking member and the tumbler actuator normally preventing the axial movement of said actuator, the shield and tumbler actuator being provided with coacting pins and openings adapted to register with each other and preventing the axial movement of the tumbler actuator into engagement with the tumbler unless the pins and openings register.

4. The combination with a locking member and a tumbler engaging the same, of a

tumbler actuator comprising a plurality of cooperating disks movable together toward or from the tumbler to disengage the latter from the locking member and rotatable independently of each other, and a shield interposed between the actuator and the tumbler having an opening registering with the end of said tumbler and normally preventing the axial movement of said disks but permitting said movement when the disks have been rotated into certain predetermined relation with regard to said shield.

5. The combination with a locking member and a tumbler engaging the same, of a tumbler-actuating means including a plurality of independently rotatable disks, said disks being movable together toward the tumbler to disengage the latter from the locking member, and a shield interposed between the tumbler and the tumbler-actuating means and having an opening registering with said tumbler, said shield normally preventing the axial movement of said tumbler-actuating means, the shield and rotatable disks constituting the actuating means being provided with coacting pins and openings adapted to register with each other, the pins preventing the axial movement of the tumbler-actuating means unless the pins and openings in the shield are in register.

6. In a lock, a bolt, a tumbler engaging the bolt, a shield provided with a plurality of perforations, one of which registers with the tumbler, and coacting independently movable disks axially shiftable toward the shield and having pins projecting from their inner faces, the number of the pins being the same as the number of perforations in the shield and the pins being adapted to pass through the perforations to permit one of the pins to actuate the tumbler.

7. In a lock, a bolt, a tumbler engaging the bolt in one position, a shield provided with a plurality of perforations, one of which registers with the tumbler, coacting independently rotatable disks movable together toward or from the shield, said shield being interposed between the tumbler and the rotatable disks and pins projecting from the inner faces of the disks, the number of said pins being the same as the perforations in the disk and having the same relative arrangement whereby the pins may pass through the shield when the disks have been rotated to their proper positions, one of said pins engaging with the tumbler to disengage it from the lock.

8. In a lock, a bolt, a tumbler engaging the bolt in one position, a shield provided with a plurality of series of perforations, each of said series being arranged concentrically around the center of the shield, one of said perforations registering with the tumbler, and a plurality of coacting independently rotatable disks mounted concen-

trically to the shield and movable toward or from the shield, said disks each having pins projecting from its inner face, the total number of the pins being equal to the total number of the perforations in the shield, said pins being adapted to pass through the shield when the perforations and pins are in register, one of said pins engaging the tumbler to release the locking member.

9. In a lock, a bolt, a tumbler engaging the bolt, a stationary shield provided with a plurality of perforations, one of which registers with the tumbler, a spring on the face of the shield, a plurality of independently rotatable coacting disks engaged by said spring and movable toward the shield, against the action of the spring said disks having pins projecting from their inner faces and adapted to project through said perforations when the disks are rotated to a predetermined position, and an index plate surrounding the disks and inclosing the same and having index points thereon with relation to which the disks may be rotated.

10. In a lock, a sliding bolt, an angular tumbler having one end heavier than the other and having its heavier end engaging said bolt to hold it in a locked position, a shield having a plurality of openings, one of which aligns with the unengaged end of the tumbler, and a plurality of independently rotatable disks, each having pins projecting inward from its face, said pins upon a proper rotation of the disks being registrable with the perforations, means whereby the disks may be moved toward the shield to force the pins through the perforations and disengage the tumbler from the bolt, a spring resisting the inward movement of the disks, and an index plate surrounding said disks and having a plurality of index points thereon by which the disks may be adjusted.

11. In a lock, a sliding bolt, an angular tumbler pivoted adjacent to the bolt, said tumbler having one end heavier than the other and having its heavier end engaged with the bolt, a member movable toward the free end of the tumbler to engage therewith and disengage the tumbler from the bolt, and a shield interposed between said movable member and the tumbler and having a perforation with which the member is adapted to register, said member and shield being relatively shiftable to bring the member into or out of alinement with the perforation in the shield, the shield preventing the inward movement of the tumbler engaging member unless in proper register with the perforation in the shield.

12. In a lock, a bolt having a plurality of notches in its edge, a plurality of angular tumblers each having one end heavier than the other, the heavier ends of said

tumblers engaging the notches, each of said tumblers differing in length from the other tumblers, a shield plate provided with a plurality of series of perforations, there being as many series as there are tumblers, one perforation in each series registering with the corresponding tumbler, and a plurality of rotatable disks mounted upon said shield plate, there being as many disks as there are tumblers and series of perforations, each of said disks having inwardly projecting pins adapted to pass through the perforations in the shield plate, the number of pins being equal to the number of perforations in the shield plate, and means whereby said disks may be moved inward to force the pins into engagement with the tumblers.

13. In a lock, a bolt having a plurality of notches in its edge, a plurality of angular tumblers each having one end heavier than the other, the heavier ends of said tumblers engaging the notches, each of said tumblers differing in length from the other tumblers, a shield plate provided with a plurality of series of perforations, there being as many series as there are tumblers, one perforation in each series registering with the corresponding tumbler, and a plurality of rotatable disks mounted upon said shield plate, there being as many disks as there are tumblers and series of perforations, each of said disks having inwardly projecting pins adapted to pass through the perforations in the shield plate, the number of pins being equal to the number of perforations in the

shield plate, and means on the inside of the lock adapted to have rotative movement into engagement with said tumblers to disengage the tumblers from the locking bolt.

14. In a lock, a bolt having a plurality of notches in its edge, a plurality of angular tumblers each having one end heavier than the other, the heavier ends of said tumblers engaging the notches, each of said tumblers differing in length from the other tumblers, a shield plate provided with a plurality of series of perforations, there being as many series as there are tumblers, one perforation in each series registering with the corresponding tumbler, and a plurality of rotatable disks mounted upon said shield plate, there being as many disks as there are tumblers and series of perforations, each of said disks having inwardly projecting pins adapted to pass through the perforations in the shield plate, the number of pins being equal to the number of perforations in the shield plate, and a shaft supported adjacent to said tumblers and having a knob disposed upon the inside of the lock, said shaft being provided with an outwardly extending arm adapted when the shaft is rotated to engage beneath the angular ends of the tumblers and raise said tumblers out of engagement with the bolt.

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

JAMES O. KINGSLAND, SR. [L. S.]

Witnesses:

CHARLES S. PUTNAM,

DUNNELLE VAN SCHAICK.