C. A. BERRY.

COMBINATION LOCK.

APPLICATION FILED JULY 2, 1914.

1,121,458. Patented Dec. 15, 1914.

Fig. 1.

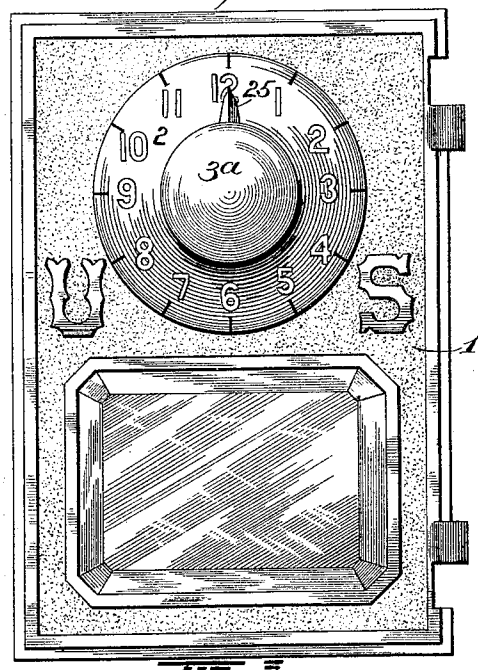


Fig. 2.

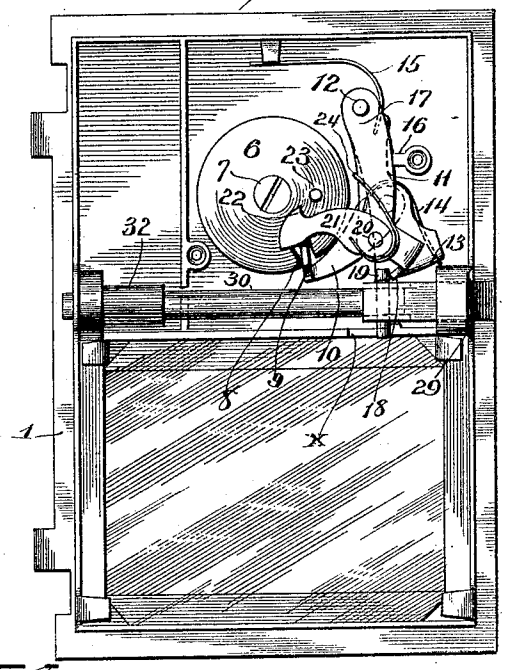


Fig. 3.

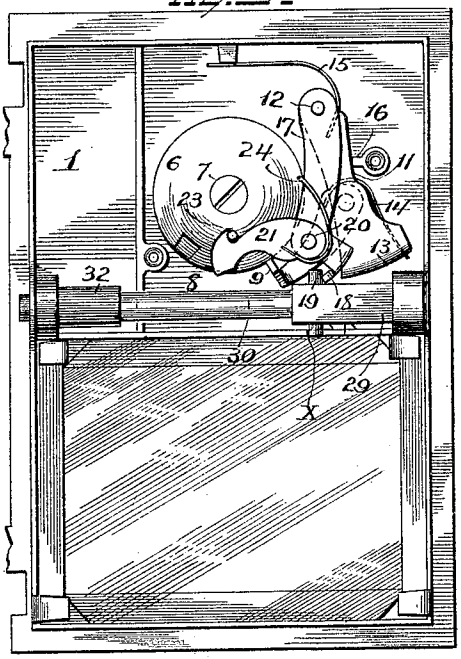


Fig. 4.

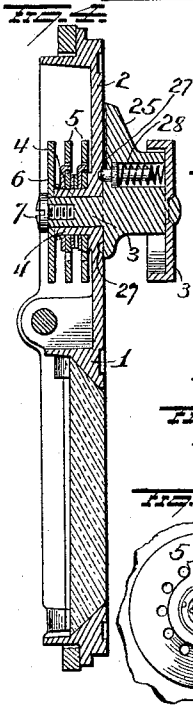


Fig. 6.

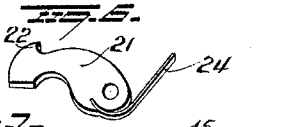
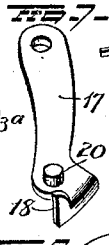


Fig. 7.



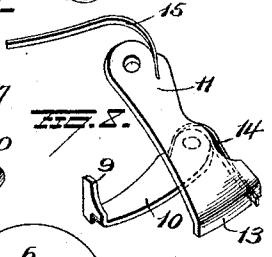


Fig. 8.

Fig. 9.

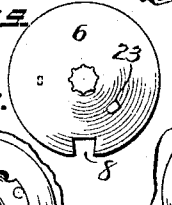


Fig. 10.

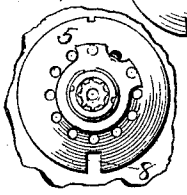


Fig. 11.

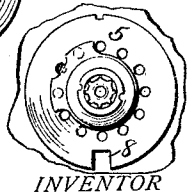
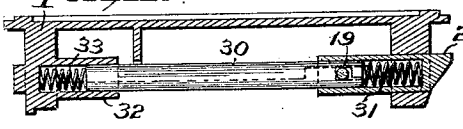


Fig. 5.



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UNITED STATES PATENT OFFICE.

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COMBINATION-LOCK.

1,121,458. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed July 2, 1914. Serial No. 848,623.

To all whom it may concern:

Be it known that I, CHARLES A. BERRY, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Combination-Locks; and I do hereby 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.

My invention relates to an improvement in combination locks, and it consists in the novel system of levers through which the dial may be connected with the bolt for retracting the latter. In a lock of this sort, especially when used on a post office box, it is obviously desirable that when the combination has once been set to unlock the box, it should not, through inadvertence, be left in the set position, so that when the door has been slammed shut any unauthorized person could come along and by simply turning the knob open the box. The device herein shown makes certain of this disconnection by means of the lever system, and especially through the operation of the combined bolt retracting and fence disconnecting lever, the operation being such that the disconnection occurs before the bolt even begins to be retracted, so that a disconnection does not depend on the action of the bolt but is positive, and an incident to the setting up and operation of the combination.

In the accompanying drawings, Figure 1 is a view in front elevation showing the lock applied to a post office box; Fig. 2 is a view in rear elevation of the same, showing the parts in the position they assume when the tumblers and disk have been set into position for retracting the bolt; Fig. 3 is a view showing the bolt retracted; Fig. 4 is a view in vertical longitudinal section taken through the dial, knob tumblers and cam; Fig. 5 is a view in transverse section showing the construction of the bolt; Fig. 6 is a view of the combined bolt retracting and fence disconnecting lever; Fig. 7 is a view of the bolt engaging lever; Fig. 8 shows the fence lever carrier and the fence lever; Fig. 9 is a view of the cam and Figs. 10 and 11 are views of the disk tumblers.

In the drawing I have shown the improvement in connection with the door of a post office box. This door 1 carries a dial 2, through which the spindle 3 of knob 3^a passes, and is provided with an inwardly projecting integral sleeve 4 in which the knob spindle is mounted. The disk tumblers 5 are mounted to rotate on the sleeve 4, and the cam 6 is secured by screw 7 to the outer end of the spindle 3, and turns with the latter, and operates to rotate the tumblers in the well known manner. The cam 6 and tumblers 5, are of approximately the same diameter and each tumbler, and also the cam if desired, is provided at its periphery with a notch 8, into which the tongue 9 of the fence lever 10 enters after the tumblers have been set up to the proper combination to retract the bolt. Fence lever 10 is pivotally mounted on a stud on the fence lever carrier 11, which is pivotally mounted on stud 12 on the inner face of the door 1, and is provided with a bent end 13, slotted to receive the free end of spring 14, which latter tends to normally hold the tongue 9 in contact with the peripheries of the tumblers and cam. Lever carrier 11 is provided with a spring 15 which tends to normally hold the free end of the carrier away from the tumblers, its movement away from the tumblers being limited by the fixed stop 16.

Pivotally mounted on stud 12, in rear of the carrier lever 11, is the bolt engaging lever 17 provided at its free end with bent tongue 18, which rests in a position to engage pin 19 carried by the bolt, so as to retract the latter, and is provided on its rear face with the stud 20, on which the combined bolt retracting and fence disconnecting lever 21 is mounted. This lever is provided with a hook 22, adapted to take under the pin 23 on cam 6, and with a spring 24, the free end of which bears against the side wall of lever 17, and tends to carry the hook 22 on lever 21 away from pin 23.

Lever 21 normally rests on tongue 9 of fence lever 10, and the latter is, as before explained, held in contact with the peripheries of the tumblers and also the cam if the latter be of the same diameter as the tumblers, by the spring 14. When the tongue 9 of lever 10 is bearing against the periphery of any one or more of the tumblers, the spring 24 holds lever 21 out of the path of movement of the pin 23 on cam 6, thus permitting the cam and tumblers to be freely rotated without moving any of the levers, and consequently without moving the

bolt. If now the tumblers and cam be set up by proper manipulation of the knob, so as to bring the notches 8 in the cam and tumblers into alinement with tongue 9 on lever 10, the latter will be moved by its spring 14, in a direction to carry its tongue 9 into the notches 8 and as the free end of the lever 21 rests on said tongue 9, it also will be carried upwardly toward the axis of the cam and tumblers, and into the path of movement of pin 23 on the cam 6, as shown in Fig. 2, which is the position of the parts after the tumblers and cam have been set up by the knob and dial to unlocking position. If when the lever 21 is in engagement with the pin 23 on the cam, the knob be turned to the left (looking at the door from the front), the pin 23 will drag the lever 21 and the bolt operating lever 17 to the right. The movement of lever 17, owing to the engagement of its tongue 18 with pin 19 on the bolt will carry the latter to the right, or in a direction to retract the bolt. As the cam 6 is rotated in a direction to retract the bolt, the pin 23 is moved downwardly, and acting on the lever 21, forces it downwardly until it has covered the notches 8, and forced the tongue 9 of fence lever 10 into the plane of the periphery of the cam, thus freeing the cam and tumblers from the lever 21 and permitting them to be rotated by the knob. As soon as the tongue 9 is released or forced out of the notches in the tumblers and cam, the levers 10 and 11 are forced to the left by spring 15, thus removing the possibility of a second operation without first resetting the tumblers on the proper combination. Further rotation of the disk 6 to the left drags the levers 21 and 17 to the left and the tongue 18 on the lever 17, engaging with pin 19 on the bolt, retracts the latter.

As soon as the tension is released from knob 3^a the lever 21 is carried out of connection with pin 23 by spring 24 and levers 21 and 17 are both carried to the left by the projection of the bolt, thus removing all connection between the operating mechanism and the bolt. In order to retard the rotation of the knob, and hold it with its pointer 25 in line with any one of the dial numbers I have provided the latter with a series of sockets 27, and the knob 3^a with a spring pressed pin 28, located within a recess in the knob, the sockets 27 and pin 28, bearing such relation to the pointer 25, that when the latter is in line with any of the dial numbers the point of the pin 28 will be within one of the sockets 27. The bolt consists of a head 29 and a shank 30. The head is hollow from its outer end to receive spring 31 and an end of the shank 30, and the shank is connected to the head by the pin 19, which is secured to the shank and projects sufficiently to be engaged by the tongue 18 on lever 17. The head 29 is provided with an elongated slot through which pin 19 passes so as to permit the head to be retracted, as in closing the door, without necessarily forcing the shank rearwardly. The rear end of the shank is mounted in a socket 32 formed integral with the door and is backed up by a spring which tends to force the shank toward the head, but which gives or yields to permit of the necessary rearward movement of the shank when the latter is forced rearwardly by tongue 18 on lever 17.

In the operation of the lock the tumblers are set by first turning the knob say to the right, and stopping at the proper number then to the left stopping at another number, then to the right stopping at another number, and then slowly to the left. After the knob pointer has been set to the third number of the combination, the tongue 9 of lever 10 enters the notches 8 in the tumblers and cam. By now slowly turning the knob to the left, lever 21 which is now hooked to pin 23 on cam 6 is moved downwardly and acts as a cam to force the tongue 9 of lever 10 out of the notches, after which spring 15 shifts levers 11 and 10 to the left. A continued rotation of the knob to the left drags lever 21 with it, and the latter in turn pulling on lever 17 brings tongue 18 of the latter into contact with pin 19 on the bolt and retracts the latter. After the bolt has been fully retracted, a further turning movement of the knob is prevented by the lower end of pin 19 coming in contact with the projecting stop X on the door, and the door opened. As the knob is let go, the tension of pin 23 upon lever 21 is released and spring 24 will disengage 21 from the pin 23 and levers 17 and 21 will be carried to their normal position through the projection of the bolt by means of pin 19. In this lock the fence lever 10 is disengaged from the tumblers prior to the retraction of the bolt, and the bolt is then retracted by a continued rotation of the knob.

It is evident that many slight changes might be resorted to in the relative arrangement of parts shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to confine myself to the exact construction and arrangement of parts shown and described but,

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:—

1. In a combination lock, the combination of a bolt, tumblers, a cam, a fence to engage the tumblers and a disconnecting lever which engages the cam when the combination is set, and which when the cam is rotated for unlocking, automatically disengages the fence from the tumblers.

2. In a combination lock, the combination

of a bolt, bolt operating lever, tumblers, a cam, a fence to engage the tumblers and a disconnecting lever which engages with the cam when the combination is set, and which when the cam is rotated for unlocking, automatically engages the fence and disconnects it from the cam and then acts upon the bolt operating lever to withdraw the bolt.

3. The combination with a knob and disk tumblers and cam actuated by the knob, of a bolt, lever mechanism for retracting the bolt, and means for moving said lever mechanism actuated by the cam into engagement with the cam.

4. The combination with a knob, and disk tumblers and cam actuated by the knob, of a bolt, lever mechanism for retracting the bolt, the said lever mechanism being normally out of engagement with the cam, and spring actuated devices for moving said lever mechanism into engagement with the cam.

5. The combination with a knob, and disk tumblers and cam actuated by the knob, the said cam having a pin projecting from its rear face, of a bolt, a lever having a hook to engage the pin on the cam the said hook being normally out of the path of movement of the pin, spring actuated devices for moving said hook into the path of movement of the pin and means for connecting said lever with the bolt actuating means whereby the bolt will be retracted by the movement of said lever.

6. The combination with a knob and disk tumblers and cam actuated by the knob, the said tumblers each having a notch in its edge, of a bolt, a lever adapted to be engaged by the cam and a spring actuated fence adapted to enter the notches in the tumblers and move said lever into engagement with the cam.

7. The combination with a knob, and disk tumblers and cam actuated by the knob, the said tumblers each having a notch in its periphery and the cam having a projection, of a bolt, a lever adapted to engage the projection on the cam and be actuated thereby, and a spring actuated fence adapted to enter the notches in the tumblers and move said lever into position where it will be engaged by the projection on the cam.

8. The combination with a knob, disk tumblers and cam actuated by the knob, the said tumblers each having a notch in its periphery and the cam having a projection, of a bolt, a lever normally out of contact with the projection on the cam, and a spring actuated fence adapted to enter the notches in the tumblers and lift said lever into position to be engaged by the projection on the cam, the said fence being removed from the notches in the tumblers by a cam action of the lever, prior to the bolt retracting movement of the latter.

9. The combination with a knob and disk tumblers and cam, the said tumblers each having a notch in its edge and the cam provided with a projection, of a bolt, a lever normally out of contact with the projection on the cam, and a fence lever normally in contact with the tumblers and adapted when it enters the notches in the latter to lift said first mentioned lever into position to be engaged by the projection on the cam.

10. The combination with a door, a knob, disk tumblers and cam the tumblers each having a notch in its edge and the cam having a rearwardly projecting pin, of a bolt, a bolt engaging lever pivoted to the door, a combined bolt retracting and fence disconnecting lever carried by the bolt engaging lever, a spring for normally holding said combined bolt retracting and fence disconnecting lever out of the path of movement of the pin on the cam, a fence lever carrier, a fence lever pivotally mounted on the latter and under the cam engaging lever, and a spring for holding the fence lever against the edges of the tumblers, whereby when the fence enters the notches in the tumblers it will lift the combined bolt retracting and fence disconnecting lever up into the path of movement of the pin on the cam.

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

CHARLES A. BERRY.

Witnesses:

EVERETT W. LYON,

HAROLD S. WISDOM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."