June 27, 1933. M. C. MAXWELL ET AL 1,915,897

LOCK KEY

Filed April 28, 1933

Fig. 2a Fig 2

Fig 1

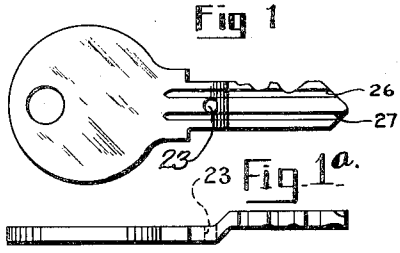


Fig. 1a.

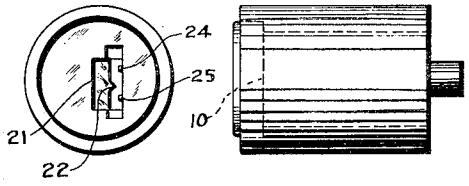


Fig 3

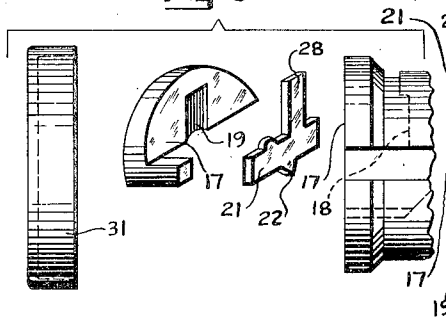


Fig 4

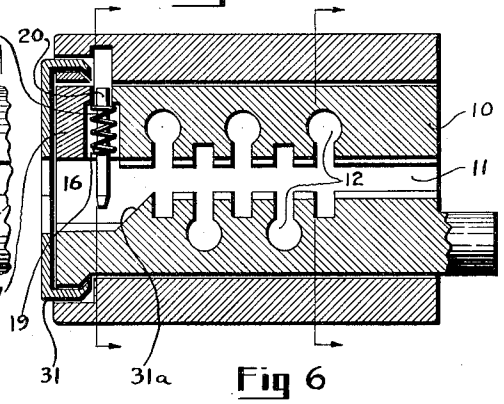


Fig 5

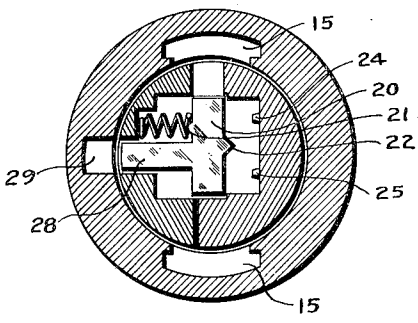


Fig 6

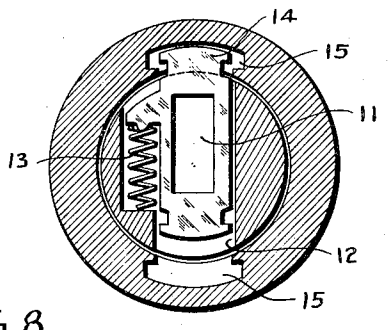


Fig. 8.

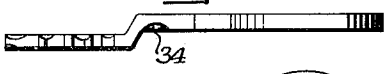
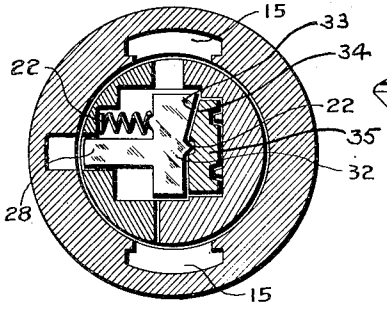


Fig 7



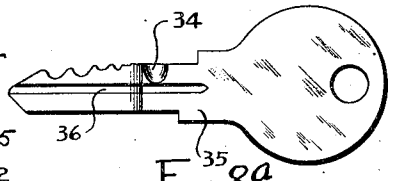


Fig. 8a

BY

INVENTOR
Maxwell C. Maxwell
Frank E. Thompson
A. H. Golden
ATTORNEY

Patented June 27, 1933 1,915,897

UNITED STATES PATENT OFFICE

MAXWELL C. MAXWELL AND FRANK E. THOMPSON, OF STAMFORD, CONNECTICUT

LOCK KEY

Application filed April 28, 1933. Serial No. 668,394.

This application is a continuation in part of our application, Serial No. 578,994, filed on December 4, 1931, for a lock, the new structure forming an improvement thereon.

The invention relates to anti-pick locking devices, and more especially to means for preventing the picking of tumbler cylinder locks and especially those having plate or disc tumblers. It is an object of our invention to devise a key, for a lock where the lock has for cooperation with the key, a shutter or other keyway controlling and determining member. This controlling member is adapted to operate in the keyway of a cylinder plug, and to be actuated by the particular key of our invention, so that unless the particular key is utilized, it will be impossible to release and rotate the plug in a conventional manner.

More particularly it is the object of our invention to devise a key having longitudinally connected portions lying in different planes, with each portion having special cooperation with locking tumblers, the key being as an entirety cooperable with a keyway determining member which is adapted to control the longitudinal and cross-sectional shape of a composite keyway. The preferred form which I will disclose embodies a key having a blade which is bent to form parts forward and rearward of said bent portion cooperable with locking elements arranged for operation in different directions.

Referring now to the drawing wherein a modification of our invention is shown, Fig. 1 shows a key adapted for the particular plug which we prefer to utilize, Fig. 1A being a side view thereof. Figs. 2 and 2A illustrate front and side views of a cylinder lock showing the application of our invention. Fig. 3 shows parts of the cylinder constituting our invention in the order in which they are assembled. Fig. 4 is a sectional view of the plug and cylinder with the tumblers removed. Fig. 5 is a section along the lines 5—5 of Fig. 4, while Fig. 6 is a section along the lines 6—6 of Fig. 4. Fig. 7 is a view similar to Fig. 5 showing a modified form of shutter. Figs. 8 and 8A are side and top views of a key cooperable with the modified shutter of Fig. 7.

Referring now more particularly to the drawing, and especially Fig. 4, it will be noted that we employ a plug 10 having a keyway 11 through the major portion thereof, and a series of tumbler chambers 12 leading into the keyway and having tumblers therein adapted to be actuated by a key in a manner well known to those skilled in the art. Each of the tumblers is spring pressed by a spring 13 (Fig. 6) in an upward locking direction so that its head portion 14 locks into a groove 15. Preferably, the heads of the tumblers are shaped as shown in the form of a T, and cooperate with similarly formed complementary slots in the main cylinder slot 15, so that surreptitious rotation for picking purposes will interlock the tumblers securely to the cylinder.

The keyway 11 is of normal size for cooperation with the key of Fig. 1, but is enlarged at the front of the plug, so as to form a relatively wide portion 16. Preferably, the front end of the plug is formed by cooperation of an insert section 17 adapted to fit into a cutaway portion 18 of the plug, so that the two will form the conventional type of plug front. The function of the two parts of the plug front is to form between them, an opening 19, this opening forming the bearing for a shutter 21 and a spring 20, which latter is adapted to press the shutter into the plug, as indicated in Figs. 4 and 5.

The end of the shutter cooperating with the key is equipped with a bit portion 22 which is adapted to ride against the side of the key until the hole 23 in the key comes opposite that bit. While the key is in contact with bit 22, it will force a leg portion 28 of the shutter into a cooperating slot 29 in the cylinder. Similarly, if any other portion of the shutter is contacted by an improperly shaped or manipulated tool or key, the portion 28 will be moved into the slot 29 to interlock the plug and cylinder. This acts to maintain the plug and cylinder against relative rotary movement during the insertion of the key and makes for easy key action because the tumblers do not ride hard against

the walls of slot 15 as is the case when the key is inserted with an incidental slight turning of the plug. It also prevents the application of the rotary torque to the plug required to assist in the use of a picking tool other than one shaped like the key. As will be indicated later, the shutter functions also to prevent the use of a picking tool even if shaped like the key of Fig. 1. Once the key has been fully inserted, the hole 23 will correspond to the bit 22, and the leg portion 28 will be spring pressed out of the slot 29, so that if the tumblers have been properly positioned, the plug will now be free for rotation relatively to the cylinder.

As will be quite apparent, the operation of the shutter in cooperation with the enlarged portion 16 of the keyway, acts to so limit the longitudinal shape of the keyway as viewed in Fig. 2, that it is necessary to use the offset key shown in Fig. 1. The key will properly be inserted against the bits 24 and 25 which ride in the grooves 26 and 27 of the key, guiding it until the end of the key abuts the sloping portion 31*a* from which point it is guided into the narrow portion 11 of the keyway. In its final position, the key will have part thereof lying in the narrow opening portion below the shutter illustrated in Fig. 4, while its tumbler setting portion will rest in the keyway 11, thus forming, in effect, a key having parallel leg portions and operating in a keyway of the same shape.

It will be furthermore apparent that the operation of the bit 22, and the bits 24 and 25 cast integrally with the plug will so limit the width of the keyway that the insertion of a tool for surreptitiously setting the tumblers will be very difficult, and operation of that tool will more than probably cause movement of the shutter into a plug locking position, thus preventing the application of picking torque as has already been indicated. If a picking tool shaped like the key of Fig. 1 is utilized for picking the tumblers, it is quite obvious that any slight rotation of the plug from its position of Fig. 5, as will necessarily be required to apply picking torque thereto, will lock the shutter 20 in positive offset keyway determining position, since the tongue 28 will be removed from opposite the slot 29. It will then be impossible to withdraw the key shaped picking tool, or to move it backwards and forwards as is necessary if it is to act individually on the tumblers as is understood by those skilled in the art.

Preferably, also, an armor cap 31 is adapted to fit over the insert 17 and the plug 10 and to be pressed over as shown in Fig. 4 to protect the front of the plug, and hold the parts in assembled relation.

In Fig. 7 we illustrate a modified form 32 of the shutter 21 of Fig. 3. This shutter has an angular extension 33 which is adapted to cooperate with the cut-away part 34 of the key 35 of Fig. 8 which is the key for which the shutter 32 is designed. The bit 22 of the shutter will cooperate with the milled groove 36 on the key. The key and shutter of Figs. 7 and 8 cooperate in the same manner as the key and shutter of my first modification except that the keyway is more accurately defined and a lesser degree of movement of a picking tool is possible.

While we have shown a preferred modification of our invention, it should be understood that we consider it to be broad in character and believe ourselves entitled to dominate the modifications of the same which are within the scope of the appended claims and which will readily occur to those skilled in the art.

We claim:

1. A key for a lock having a blade comprising forward and rearward offset parallel portions, the upper vertical edge of one of said portions being adapted for bitting whereby to cooperate with lock tumblers, and a side face on the other of said portions having a predetermined contour for cooperation with a keyway determining member of the lock.

2. A key for a lock having a blade comprising forward and rearward offset portions, the upper vertical edge of one of said portions being adapted for bitting whereby to cooperate with lock tumblers, and a side face on the other of said portions having a predetermined contour for cooperation with a keyway determining member of the lock.

3. A key for a lock having a blade comprising forward and rearward offset portions connected by an angular portion, the upper vertical edge of one of said portions being adapted for bitting whereby to cooperate with lock tumblers, and a side face on the other of said portions having a predetermined contour for cooperation with a keyway determining member of the lock.

4. A key for a lock having forward and rearward offset portions connected by an angular portion, the forward one of said offset portions having a series of bittings on its upper vertical edge, a side face of the rearward offset portion having a predetermined contour for cooperation with a keyway determining member, said side face lying in a plane intermediate the planes of the two outside parallel surfaces of said key.

5. A key for a lock having forward and rearward offset portions, the forward one of said offset portions having a series of bittings on its upper vertical edge, a side face of the rearward offset portion having a predetermined contour for cooperation with a keyway determining member, said side face lying in a plane intermediate the planes of the two outside parallel surfaces of said key.

6. A key for a lock having a lock mechanism operating blade comprising forward and rearward longitudinal connected por-

tions, each of said portions having a surface for operating lock controlling mechanism, said portions lying in different planes.

7. A key for a lock having a lock mechanism operating blade comprising forward and rearward longitudinal connected portions, the forward of said portions being adapted for bitting at its upper edge only for cooperating with vertically movable tumblers, the rearward of said portions constructed at its side for cooperation with a horizontally movable locking member, each of said portions lying in different planes.

8. A key for a lock having a blade formed of a metal strip bent intermediate its ends to form two portions lying in different planes, the forward of said portions being adapted for bitting along an upper edge for cooperation with tumblers movable parallel to the plane of that portion, the rearward of said portions constructed for cooperation with a locking member movable at substantially right angles to the plane of said rearward portion.

9. A key having forward and rearward longitudinally extending connected portions lying in different planes, the forward of said portions being adapted for bitting whereby to cooperate with tumblers moving parallel to the plane thereof, the rearward of said portions having a face of such contour as to properly cooperate with a lock controlling element which is positioned by said rearward element depending upon the displacement of the plane of said rearward portion from the forward portion as well as upon the contour of the face of said rearward portion.

10. A key for a lock having a blade formed of a metal strip bent intermediate its ends and forming forward and rearward longitudinal portions joined together by an angular bent portion, the key portion forward of said bent portion being constructed for bitting along an upper edge for cooperation with tumblers movable parallel to the plane of that portion, the key portion rearward of said bent portion being constructed for cooperation with a locking member movable at substantially right angles to said rearward portion.

11. A key for a lock having a blade formed of a metal strip bent and deformed intermediate its ends and forming forward and rearward longitudinal portions joined together by said bent deformed portion, the key portion forward of said deformed portion being constructed for bitting along an upper edge for cooperation with tumblers movable substantially parallel to the plane of that portion, the key portion rearward of said deformed portion being constructed for cooperation with a locking member movable at substantially right angles to the direction of movement of the aforesaid tumblers.

Signed at Stamford, in the county of Fairfield, and State of Connecticut, this 27th day of April, 1933.

MAXWELL C. MAXWELL.
FRANK E. THOMPSON.