

April 23, 1940.

S. MERKL

2,198,484

INDICATOR KEY

Filed April 1, 1939

Fig. 1

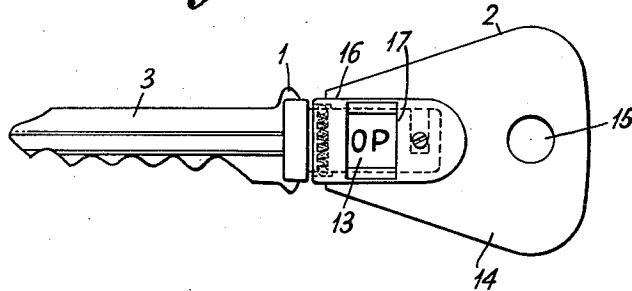


Fig. 2

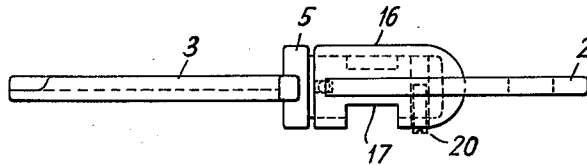


Fig. 3

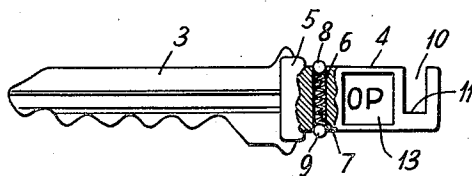


Fig. 4

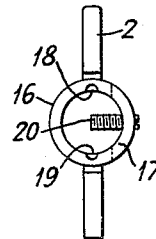


Fig. 5

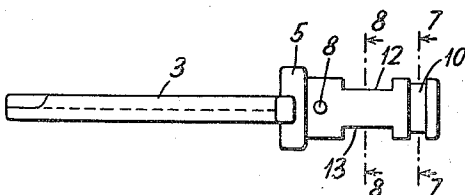


Fig. 8

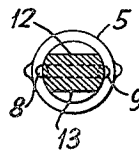


Fig. 7

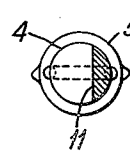
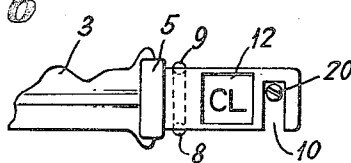


Fig. 6



INVENTOR
SEBASTIAN MERKL
BY
Abraham S. Greenberg
ATTORNEY

UNITED STATES PATENT OFFICE

2,198,484

INDICATOR KEY

Sebastian Merkl, Brooklyn, N. Y., assignor of
one-third to Jan Leyenaar, New York, N. Y.

Application April 1, 1939, Serial No. 265,464

9 Claims. (Cl. 70-395)

My present invention relates to an improved means for indicating on a key the operation of a lock; and more particularly to indicator keys of a highly simplified construction.

In my application Serial No. 241,733, filed November 22, 1933, there is shown, and claimed, a key of the type adapted to indicate whether a lock is in a closed or opened state. The main object of this present invention is to provide a device which indicates at a glance, and after removing the key from the lock, whether or not the lock has been properly operated in the desired manner.

Another object of my present invention is to provide a simplified indicator key construction, which is not only composed of a minimum of parts, but is economically manufactured and assembled.

The novel features which I believe to be characteristic of my invention are set forth in the particularity of the appended claims; the invention itself, however, as to both its construction and method of operation will best be understood by reference to the following description taken in connection with the drawing in which I have indicated diagrammatically a construction whereby my invention may be carried into effect.

In the drawing:

Fig. 1 is a side view showing the indicator face of the key,

Fig. 2 is a plan view of the key,

Fig. 3 is a front view, similar to Fig. 1, with the operating handle removed,

Fig. 4 is a front view of the handle looking into the interior thereof,

Fig. 5 is a plan view of the key shank shown in Fig. 3,

Fig. 6 is a rear view of the key shank, a part being broken away,

Fig. 7 is a view taken along section line 7-7 of Fig. 5, looking in the direction of the arrows,

Fig. 8 is a view taken along section line 8-8 of Fig. 5, looking in the direction of the arrows.

Referring now to the accompanying drawing, wherein like reference characters in the different figures designate similar constructional elements, it will be noted that the improved key comprises but two main parts. These parts consist of the key 1 and the manually manipulatable handle 2. The key 1 comprises the customary key bit 3 and shank 4. The key bit 3 may be of the usual construction for operating the well known type of locks. The shank 4 acts as the indicator section of the key. Referring specifically to Figs.

3 and 4, it is pointed out that the indicator section consists of a generally cylindrical projection of the stop portion 5 of the key bit.

This cylindrical section is of somewhat less cross-sectional diameter than stop 5, as clearly shown in Figs. 7, 8. A bore 6 is provided in the shank 4; the axis of the bore being normal to the axis through the shank. Further, the bore 6 is in alignment with the key bit 3. A coil spring 7 is located within bore 6. Each end of the spring 7 is normally slightly to the rear of its associated bore opening. This arrangement permits a steel ball to be seated in each bore opening. Thus, Fig. 3 shows balls 8 and 9 seated in each bore opening. Each ball contacts the end of the coil spring 7 associated therewith; as shown in Figs. 3 and 6, the normal position of the balls is such that substantially a hemisphere projects beyond the shank periphery. Balls 8 and 9 may be the well known type of ball bearings. A slot 10 is provided adjacent the end of shank 4. In Fig. 7 there is shown the fact that the slot 10 has a configuration which is more than a semi-circle with a flat base. Hence, slot 10, in effect, is provided by a pair of spaced walls and a flat base 11.

The width of slot 10 is so chosen that a stop pin can readily move therethrough in an arcuate path. Between bore 6 and slot 10 are provided a pair of parallel spaced recesses, or slots, 12 and 13. The base of each recess 12 and 13 has provided thereon an indication. For example, the letters "OP" are provided on the exposed face of slot 13. The plane of the face 13 is parallel to the plane of face 12, but both of these planes are normal to the planes of the walls of 10. The groove 6 is, furthermore, arranged centrally of the faces of recesses 12 and 13. The face of recess 12 has the letters "CL" provided thereon. The slot 10, as shown in Fig. 6, opens downwardly in the position at which the observer views the letters "CL" in normal position.

The key handle 2 is provided with a substantially triangular gripping portion 14, and the latter may have an opening 15 provided therein from which the key can be supported by any supporting device. The handle is furthermore provided with a hollow shell 16. The interior of the shell 16 has a substantially cylindrical configuration, and the exterior of the base portion of shell 16 slopes towards the gripping portion 14, as shown in Fig. 2. One face of shell 16 is provided with an opening 17 therein which is adapted to register with either of the letters provided on recess faces 12 or 13. The recess 17

is sufficiently deep so that an indication face will act as the base of the recess when in indicating position, such as shown in Fig. 2. Opening 17 is provided approximately centrally of the ends of shell 16, and preferably it has an area which is equal to that of either of recess faces 12 or 13. The forward portion of shell 16 is furthermore provided with a pair of opposed parallel grooves 18 and 19. These grooves are diametrically opposed to each other and are provided in a line which is included in the plane of the gripping portion 14. As shown in Fig. 1, the grooves 18 and 19 are arranged to slide into contact with balls 8 and 9 respectively when the handle 2 is in normally indicating position with respect to the shank 4.

Each of grooves 18 and 19 is preferably of a length sufficient to permit the open end of the shell 16 to be positioned close to the element 5. More specifically, the grooves 18 and 19 are each of a length equal to approximately twice the diameter of a ball. As the handle 2 is slid into position on shank 4 such that each ball is seated in its associated groove 18 or 19, the contact between each ball and its groove will not cause compression as would be the case when the handle is rotated on the shank so as to have the interior face of shell 16 pressing down on balls 8 and 9. In other words, spring 7 urges each of balls 8 and 9 into grooves 18 and 19 when the handle is in such position, for example, as shown in Fig. 1. However, as soon as the handle 2 is rotated on the shank each ball rides out of its groove and is pushed inwardly, thereby compressing spring 7, by contact of each ball with that portion of the interior shell 16 between grooves 18 and 19.

Of course, the spring 7 is given sufficient biasing force to maintain each ball securely seated in its associated groove 18 or 19 so that the handle 2 requires considerable turning force to move a groove out of contact with its ball. As long as the key bit 3 meets no restraining force in the lock, then the handle 2 will be fixed to the shank by the ball-groove locking device. In other words, the spring-biased balls 8 and 9 act, in conjunction with grooves 18 and 19, as positioning means to positively position the operating handle at the "open" and "closed" indication positions. However, as soon as the bit has actuated the lock mechanism and cannot be adjusted any further, then additional rotational force applied to gripping portion 14 causes each groove 18 and 19 to ride out of contact with their respective balls 8 and 9.

The subsequent arc of rotation of handle 2 with respect to shank 4 is governed by the slot 10 which cooperates with a stop pin 20. The stop pin may consist of a threaded pin which is threadedly engaged with an aperture in shell 16 positioned between the rear edge of opening 17 and the base portion of shell 16. As shown in Fig. 4, the pin 20 projects towards the interior of shell 16, and the pin is positioned centrally of the upper and lower edges of opening 17.

As shown in Fig. 4 the pin 20 has a length such that it terminates at a line joining grooves 18 and 19. The diameter of pin 20 is somewhat smaller than the width of slot 10 so that upon rotation of the handle 2 with respect to shank 4 the pin 20 can be adjusted from one position in slot 10 to a diametrically opposed position. Of course, in order to assemble the key the pin 20 is first removed from shell 16. The handle 2 is mounted on shank 4 by positioning the shank within

the interior of the shell. In such position each of balls 8 and 9 is seated in their respective grooves 18 and 19. Assuming, as shown in Fig. 1, that the recess face 13 is positioned to be viewed through opening 17, then pin 20 is inserted through its aperture in the shell 16 and securely positioned in the position shown in Fig. 4. In such position the pin 20 projects towards the center of slot 10 and is located close to the base 11 of the slot.

Assuming, further, that the user of the key wishes to close the lock of his door, the key, as shown in Fig. 1, is inserted into the door lock so that bit 3 makes contact with the actuating mechanism in the door lock. The handle 2 is then rotated in that direction, as for example in a clockwise direction, such that the bit 3 will adjust the lock mechanism to "closed" position. As soon as the bit 3 has actuated the lock mechanism to its final position, the lock mechanism will prevent the bit 3 from further motion. However, continued rotational force applied to gripping portion 14 will now cause the grooves 18 and 19 to ride out of contact with balls 8 and 9 and it will, therefore, be seen that the handle 2 is thereby being rotated with respect to shank 4. In the meanwhile, pin 20 is moved in an arcuate path within slot 10.

The rotation of handle 2 is maintained until the recess face 12 registers with the opening 17. This means that the handle has described an angle of 180°, and that groove 19 now rides into contact position with ball 8, while groove 18 rides into contact with ball 9. Of course, the previously compressed spring 7, upon each ball riding into its associated groove, forces each ball securely into groove-locking position. In this new position of the handle, as shown in Fig. 6, the slot 10 points downwardly and the pin 20 is positioned again adjacent the base 11. Any further attempt to move the handle 2 in a clockwise direction is prevented in a positive manner by pin 20 abutting the base of slot 10. It will also be observed that pin 20 prevents lateral motion of the handle at all times thereby serving as a means for preventing removal of the handle should the bit 3 get stuck in the door lock and the user attempted to pull the key out of the lock by pulling back on the handle. It will now be seen that pin 20 and slot 10 cooperate to perform a dual function; that is, further arcuate motion beyond the limits determined by positioning balls 8, 9 is prevented, and removal of the handle from the shank is prevented.

Of course, the positioning of the letters on faces 12 and 13 will depend upon the method of adjustment of the door lock. It is also to be understood that any other indicia may be employed in place of the letters shown to indicate the condition of the door lock. Furthermore, the specific type of stop pin 20 is merely illustrative. It will also be understood that operation of the key mechanism will be in a manner reverse to that described above, when it is desired to open a closed door lock, and have the indicator device indicate the letters "OP" in opening 17.

While I have indicated and described a system for carrying my invention into effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular construction shown and described, but that many modifications may be made without departing from the scope of my invention, as set forth in the appended claims.

What I claim is:

1. In a key, the combination of a bit provided with an indicator end, said end being provided with a slot, an operating handle movably mounted on said bit end, said handle being provided with a stop pin projecting in said slot to limit the motion of the handle over a predetermined arc, and means, operatively associated with said indicator end and said handle and independent of said pin and slot, for positioning said handle on said end at the limits of said arc.

2. In a key, the combination of a bit provided with an indicator end, said end being provided with a slot, an operating handle movably mounted on said bit end, said handle being provided with a stop pin projecting in said slot to limit the motion of the handle over a predetermined arc, and spring-actuated means independent of said pin and slot for positively positioning said handle on said end at the limits of said arc.

3. In a key, the combination of a bit provided with an indicator end, said end being provided with a slot, an operating handle movably mounted on said bit end, said handle being provided with a stop pin projecting in said slot to limit the motion of the handle over a predetermined arc, and opposed spring-actuated balls for positioning said handle on said end at the limits of said arc.

4. In an indicator key, a bit having an indication end section provided with opposed "open" and "closed" markings denoting the operation of a lock, an operating handle having a sleeve provided with an opening adapted to register with said markings, said end section being rotatably mounted within said sleeve, said end section being provided with a slot, and a pin projecting from the sleeve interior and located in the slot to limit rotation of the handle between positions at which the markings appear in said opening and said pin additionally preventing removal of said handle from said end section.

5. In an indicator key, a bit having an indication end section provided with opposed "open" and "closed" markings denoting the operation of a lock, an operating handle having a sleeve provided with an opening adapted to register with said markings, said end section being rotatably mounted within said sleeve, said end section being provided with a slot, and a pin projecting from the sleeve interior and located in the slot to limit rotation of the handle between positions at which the markings appear in said opening, and means for positively positioning said sleeve on said end section at said limit positions.

6. An indicator key comprising, in combination, a key bit provided with an end section, an operating handle provided with a sleeve, said end

section being positioned within said sleeve to permit rotary motion of the handle, said end section being provided with a pair of spaced indication marks which are representative of the state of a lock after operation thereof by said key bit, said sleeve being provided with an opening through which said marks can be observed, means associated with said end section and cooperating with the sleeve to positively position said handle on said end section at said marks, and additional means independent of said positioning means for limiting rotation of the handle between predetermined limits.

7. An indicator key comprising, in combination, a key bit provided with an end section, an operating handle provided with a sleeve, said end section being positioned within said sleeve to permit rotary motion of the handle, said end section being provided with a pair of spaced indication marks which are representative of the state of a lock after operation thereof by said key bit, said sleeve being provided with an opening through which said marks can be observed, opposed spring-pressed ball means associated with said end section and cooperating with the sleeve to positively position said handle on said end section at said marks, and additional means for limiting rotation of the handle between predetermined limits.

8. In a key of the type described, a key bit provided with an end section, said end section having a pair of opposed spring-biased balls projecting therefrom, a slot provided in said end section, a pair of lock-operation indications arranged in spaced relation on said end section, an operating handle having a sleeve provided with an opening, depressions in said sleeve surface to receive said balls thereby to position the handle on the bit, said indications being adapted to be observed through said opening, and a stop pin projecting from said sleeve into said slot.

9. In a key of the indicator type, a key bit having an indicator end section, a pair of spaced indications provided on said end section, an operating handle provided with a sleeve in which is located said end section, said sleeve being provided with an observation opening adapted to register with said indications upon rotation of the handle with respect to said bit, spring-biased means for normally positioning the sleeve on said end section at positions of the handle corresponding to said indications, and means independent of said spring-biased means for preventing rotation of said handle beyond said positions, said independent means further preventing lateral displacement of the handle.

SEBASTIAN MERKL.