

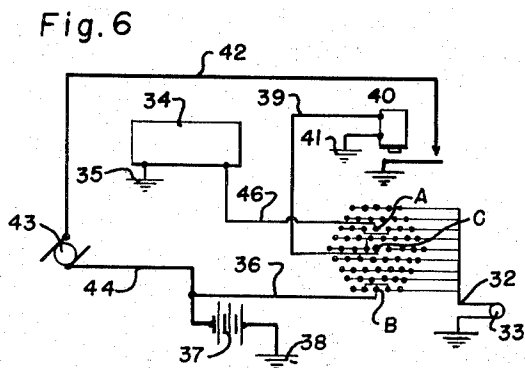
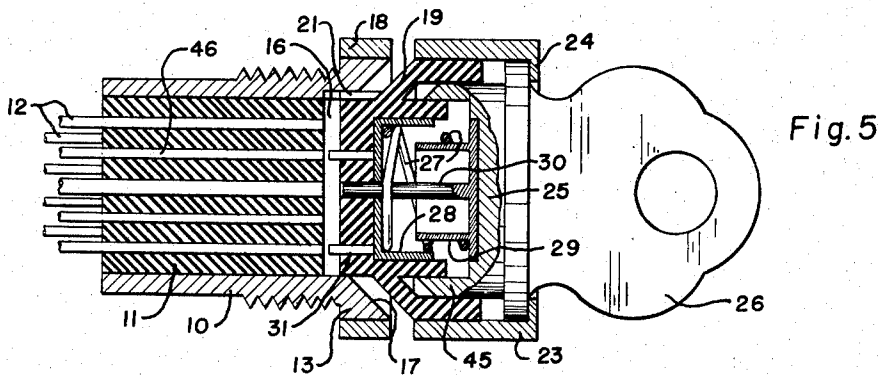
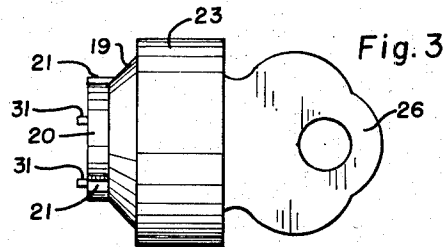
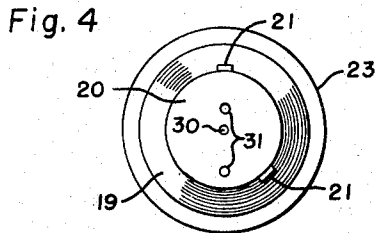
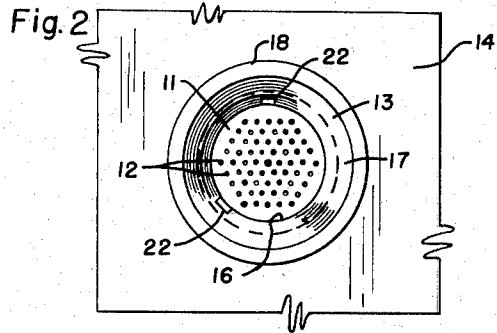
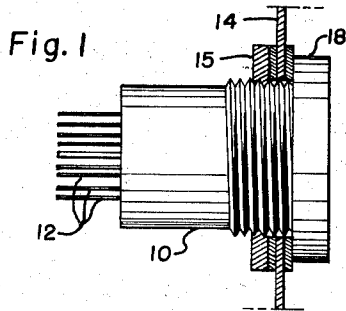
Jan. 13, 1959

L. C. MEYER

2,868,905

ELECTRIC LOCKS

Filed March 15, 1957



INVENTOR.
Louis C. Meyer
BY
[Signature]
ATTORNEY

1

2,868,905

ELECTRIC LOCKS

Louis C. Meyer, Morrison, Colo.

Application March 15, 1957, Serial No. 646,433

6 Claims. (Cl. 200—42)

This invention relates to what might be termed an electric lock, that is, a circuit-closing switch which will close an electric circuit only when the proper circuit-closing key is inserted in the lock. It is more particularly intended for use as an ignition lock for automotive vehicles, but will be found useful wherever it is desired to prevent unauthorized circuit closing.

The principal object of the invention is to provide a relatively simple, economical, and highly efficient key-operated circuit-closing switch which can be preset or preconnected so that it will close a circuit only when a proper circuit-closing key is inserted, and to so construct the locks that each lock of a plurality of similar locks can be preset or preconnected so that each lock will require its own individual key for actuation, and so that the key of one lock will not actuate another lock.

Another object is to provide an electric lock in which the actuating combination can be quickly and easily changed at any time should it be desired to render a formerly proper key useless, and to so construct the lock that a signal device or circuit breaker will be actuated should an attempt be made to actuate the lock without the proper key.

A further object is to incorporate in an automotive ignition lock means for actuating the engine-starting motor and magnetic means for retaining the key in place.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a side view of the improved electric lock illustrating it in place in a conventional instrument panel;

Fig. 2 is a front face view of the improved lock;

Fig. 3 is a side view of a key designed to actuate the lock;

Fig. 4 is an end view of the key of Fig. 3;

Fig. 5 is an enlarged longitudinal section through the improved lock with the key partially in position therein; and

Fig. 6 is a circuit diagram illustrating the improved lock in circuit with the circuits of an automotive vehicle.

Briefly, the improved lock provides a plurality of contacts, only predetermined ones of which close a desired circuit. The correct key will electrically connect the proper contacts, an incorrect key will not make the proper connection. The correct contacts are chosen and preconnected in advance to correspond to a certain key. The lock can be arranged so that if incorrect contacts are contacted, a circuit breaker or signal device will be actuated to give a warning.

2

The improved electric lock comprises a cylindrical lock barrel 10 having an internal insulating core 11 containing a plurality of spaced-apart, parallel, longitudinally extending electrical conductors 12 embedded therein.

The forward extremities of the conductors 12 are exposed flush with the front of the core 11 and extend rearwardly from the core to provide terminals to which circuit wires may be soldered or otherwise connected.

The forward extremity of the barrel 10 is provided with a stop flange 13 which can be clamped against the face of an instrument panel, such as indicated at 14, by means of a clamp nut 15 threaded on the exterior of the barrel. The insulating core 11 is inset from the forward extremity of the barrel to provide a key-receiving socket 16, and the inner surface of the barrel at the forward extremity is beveled, as shown at 17, to guide a key into the key-receiving socket 16. An annular permanent magnet 18 is fixedly attached to and surrounds the stop flange 13.

The key comprises a key block 19 of electrical-insulating material, such as plastic, having a projecting circular boss 20 adapted to slide into the key socket 16 of the lock. The boss is provided with projecting keys 21 extending longitudinally of its outer surface and adapted to enter registering key grooves 22 in the wall of the key socket 16 so that only the correct key can be inserted in the socket.

A steel sleeve 23, corresponding in diameter to the ring magnet 18, surrounds the key block 19. The sleeve 23 extends rearwardly from the key block and terminates in an inwardly extending terminal flange 24 which retains a circular key base 25 in place in spaced relation to the rear face of the block 19. A key tab 26 is formed on the key base 24 and extends rearwardly therefrom through the sleeve 23.

The key base 25 is provided with an annular guide flange 45 which slides in a circular guide groove in the key block to guide the inward and outward movement of the key base 25.

A compression spring 27 fits into and extends from a metallic spring cup 28 slidably mounted in the key block 19 and surrounds a tubular, cup-like, metallic spring guide 29 on the key base 25 so as to constantly urge the key base outwardly from the key block and simultaneously urge the spring cup inwardly into the key block.

A centrally positioned starter stud 30 is soldered or otherwise affixed in electrical contact with the bottom of the spring guide 29. The starter stud extends slidably through the key block 19 to the forward face thereof and normally terminates substantially flush with the latter.

Two contact pins 31 are soldered or otherwise electrically mounted on the bottom of the spring cup 28 and extend through the key block and project from the rear face thereof. The contact pins 31 are accurately positioned relative to the conductors 12 and to the projecting keys 21 so that when the key is in position they will align with a certain predetermined two of the conductors 12. The starter stud 30 is also accurately positioned to align with one of the conductors 12. As illustrated, the stud 30 aligns with the central conductor 12.

When installed in an automotive vehicle, all of the conductors 12 which do not align with the pins 31 and the stud 30 are grounded by means of a ground conductor 32. A signal device of an audible or visual nature may be connected in series with the ground conductor 32, as shown at 33 in Fig. 6.

One of the conductors which is in alignment with one of the pins 31, such as indicated at "A" in Fig. 6, is connected by means of an ignition conductor 46 with the live side of the ignition system, which is diagrammatically

indicated at 34. The other side of the ignition system is grounded, as indicated at 35.

The conductor 12 which aligns with the other pin 31, indicated at B in Fig. 6, is connected by means of a battery conductor 36 with one side of the automotive battery, indicated at 37. The other side of the battery is grounded, as indicated at 38.

The central conductor 12 which aligns with the starter stud 30, indicated at C in Fig. 6, is connected by means of a starter conductor 39 with the auto starter solenoid 40 of the vehicle. The other side of the solenoid 40 is grounded, as shown at 41. The solenoid, when energized, serves to close a ground circuit 42 to the engine starter motor 43. The other side of the starter motor circuit is connected to the battery 37, as shown at 44.

Let us assume that the operator has the correct key and that the circular boss 20 of the key is inserted in the beveled socket 17 of the lock. The key is rotated until the projecting keys 21 thereof enter the key grooves 22 in the wall of the key socket 16. The key is now forced forwardly until the sleeve 23 is magnetically attached to the ring magnet 18. As the key moves forwardly, the forward extremities of the contact pins 31 will close circuits with the preselected conductors 12, and as the key moves further forward, the key block 19 will slide forward on the pins 31 and about the spring cup 28, compressing the spring 27 so that the contacts are resiliently maintained while the sleeve 23 is in magnetic engagement with the magnet 18.

The circuit to the ignition system is now closed by the bridging effect of the pins 31 and the metal spring cup 28.

The operator now pushes the key tab 25 forwardly, causing the starter stud 30 to be projected forwardly into electrical contact with the conductor "C" to close a circuit to the starter solenoid 40 from the conductor "B," the spring cup 28, the spring 27, the spring guide 29, and the starter stud 30 so as to start the engine.

Should an unauthorized person attempt to bridge the contacts to close the ignition circuit, the attempts will result in bridging the conductor B to one of the many grounded contacts so as to ground the system and operate the warning signal 33. If preferred, the warning signal may be omitted and the ground wire 32 connected directly to the ground so that tampering will result in a blown fuse or circuit breaker.

There may be any number and arrangement of the conductors so that a multitude of differing combinations of the two active conductors may be made. As illustrated, there are 62 of the conductors, one of which is in the starter circuit, leaving 61 conductors. Since any two of the 61 conductors may be selected as the key circuit, 1730 different arrangements of the two contact pins 31 are possible, with the 1730 keys all having the same arrangement of projecting keys 21 and key grooves 22.

While a specific form of the improvement has been described and illustrated herein, it is to be understood

that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A key-operated circuit-closing switch comprising a lock barrel, a cylindrical insulating core disposed within said barrel and having one end thereof disposed inwardly of the corresponding end of said barrel providing a key block-receiving socket, said end of said core having a plurality of electrical contacts lying in a common plane, an electric circuit including two of said contacts, and a key including an insulated block movable in said socket axially of said core, cooperating guide means on said barrel and said block for confining the latter to axial movement in said socket, and conductor means carried by said block and adapted to bridge said two contacts upon the axial movement of the block within said socket.

2. The structure according to claim 1, together with a key base outwardly of said block and engaged therewith for axial movement, and spring means disposed between said block and said key base normally holding the latter in retracted position relative to the block.

3. The structure according to claim 2, wherein said barrel is provided with an annular permanent magnet, a magnet attractable metallic sleeve surrounding said block, said key base having a circular flange, and said sleeve having an inwardly directed flange engaged with said aforementioned flange for limiting the outward movement of said key base under the action of said spring means.

4. The structure according to claim 3, wherein a key tab projects outwardly from the circular flange.

5. The structure according to claim 2, wherein said key block and said key base have a dovetail slidable connection.

6. The structure according to claim 2, together with a metallic cup disposed within said block, a spring guide disposed within said base and being provided with a starter stud movable through an aperture in said block and being adapted to engage a starter circuit-controlling contact on said end of said core.

References Cited in the file of this patent

UNITED STATES PATENTS

1,021,550	Murray	Mar. 6, 1912
1,449,248	Rathbun	Mar. 20, 1923
2,057,532	Macdonald	Oct. 13, 1936
2,354,035	Maier	July 18, 1944
2,469,018	Swanson	May 3, 1949
2,473,664	Taylor	June 21, 1949
2,771,521	Cressman	Nov. 20, 1956
2,780,088	Nabeit	Feb. 5, 1957

FOREIGN PATENTS

363,949	Italy	Oct. 18, 1938
706,529	Great Britain	Mar. 31, 1954