

[54] **ELECTRICAL LOCKING ALARM SYSTEM**
[76] Inventor: **Dale M. Perkins**, 8137 E. Phlox St.,
Downey, Calif. 90241
[22] Filed: **Nov. 10, 1972**
[21] Appl. No.: **305,421**

2,882,455	4/1959	Ferguson, Jr.	317/135
2,931,953	4/1960	Barney	317/134
2,967,916	1/1961	Williams	200/5 A
3,569,928	3/1971	Avalcone	340/64 X
3,705,277	12/1972	Sedley	70/276 X

[52] **U.S. Cl.**..... **340/274**, 340/164 R, 200/44,
317/134, 70/DIG. 49
[51] **Int. Cl.**..... **G08b 13/08**
[58] **Field of Search** 340/274, 147 MD, 149 R,
340/149 A, 164 A; 200/61.66, 44, 45;
70/276, 277, 278, DIG. 49; 317/134

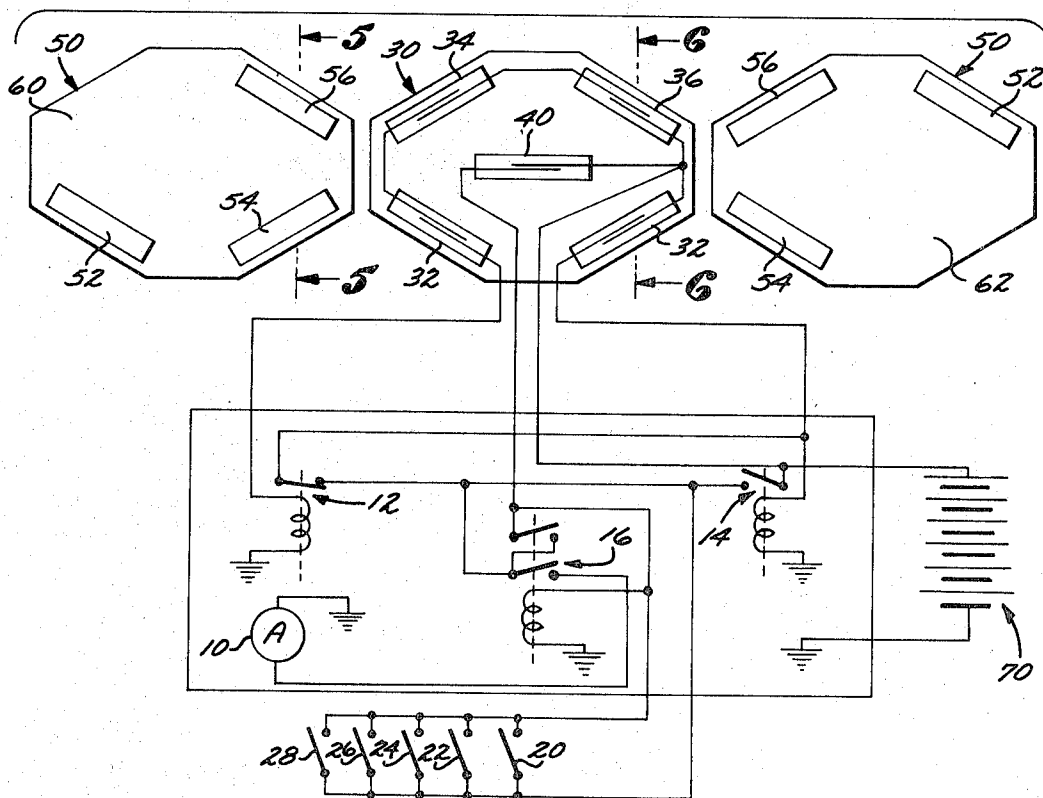
Primary Examiner—John W. Caldwell
Assistant Examiner—William M. Wannisky
Attorney, Agent, or Firm—Ronald L. Juniper

[57] **ABSTRACT**

A lock including magnetically actuated reed switches positioned in a predetermined position and operatively connected into an electrical circuit having an alarm actuated by trip switches, wherein the lock is set for alarm actuation by a key having magnets arranged in a pattern to coincide with said lock.

9 Claims, 6 Drawing Figures

[56] **References Cited**
UNITED STATES PATENTS
2,648,729 8/1953 Noregaard 200/45
2,769,873 11/1956 Noregaard 200/87



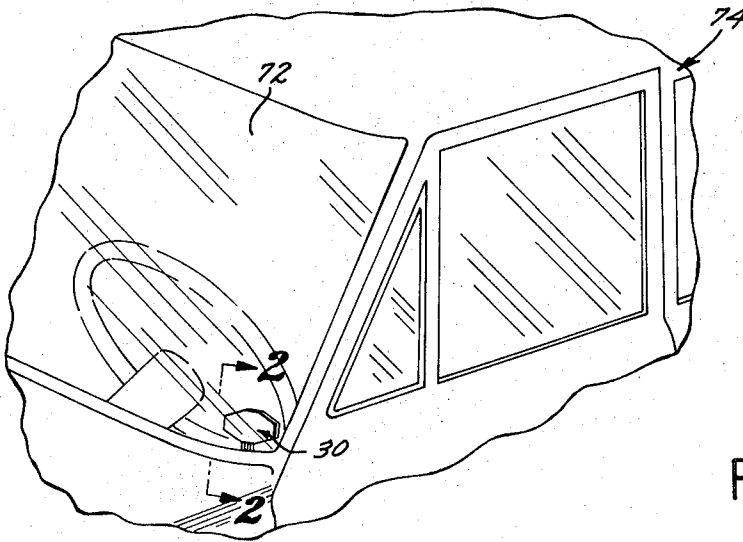


FIG. 1

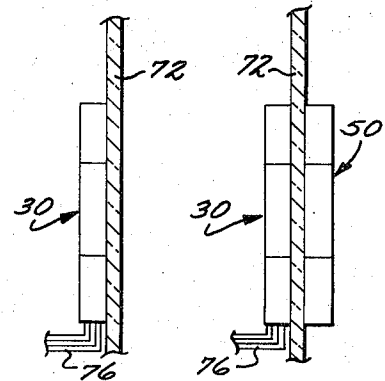


FIG. 2

FIG. 3

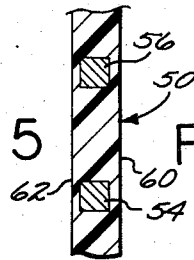


FIG. 5

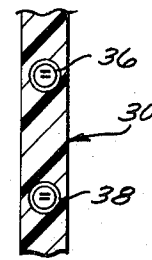
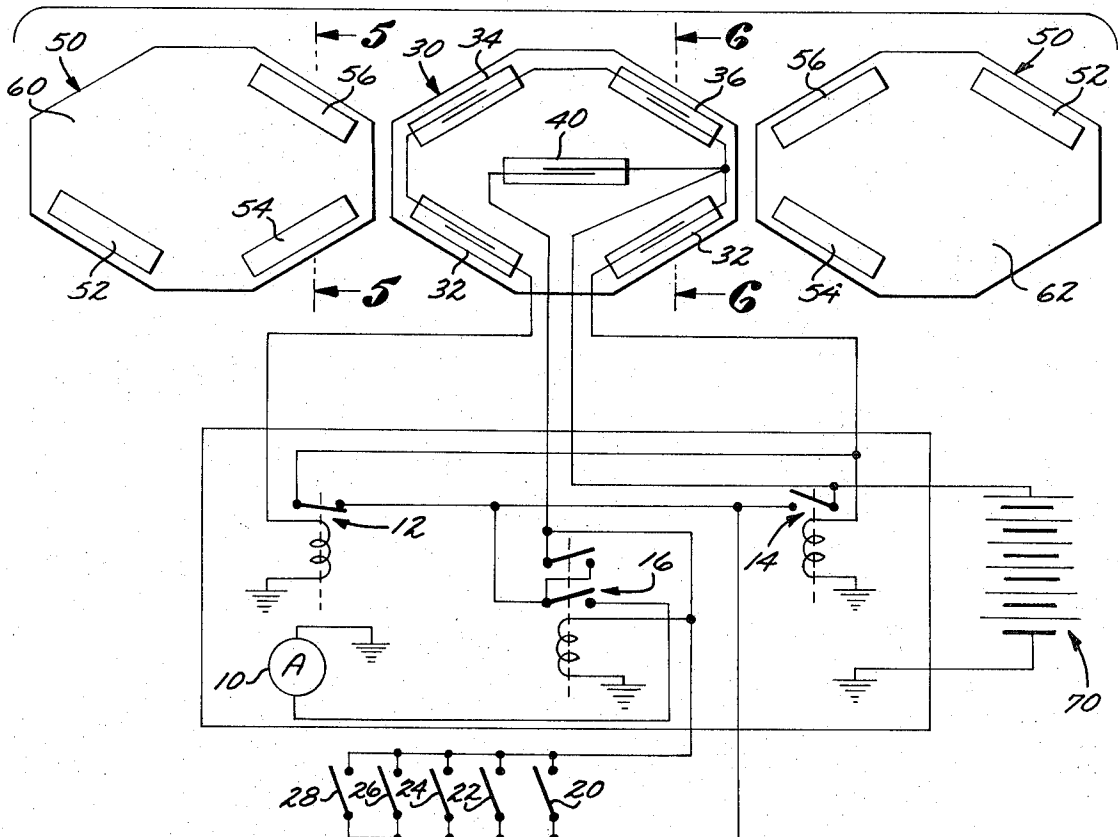


FIG. 6

FIG. 4



ELECTRICAL LOCKING ALARM SYSTEM

BACKGROUND OF THE INVENTION

The continuing and growing problem of theft from vehicles and homes has given rise to a demand for better locking and alarm systems than are generally currently available at a reasonable cost. Moreover, such locking systems frequently are required to be extremely complicated in order to discourage thieves. In addition, reliability is essential to their functioning and often necessitates expensive systems.

For the above and other reasons the subject apparatus has been invented. It is an effective inexpensive system that is very reliable and virtually tamper-proof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric, partly fragmented, view of the reed switch capsule container portion of the lock mounted on the window of a vehicle.

FIG. 2 is an enlarged elevational end view of the reed switch capsule container and connected wires taken through the window section shown in FIG. 1.

FIG. 3 is an elevational end view of the reed switch capsule container as shown in FIG. 2 with the mating key placed on the opposite side of the window from the capsule container.

FIG. 4 is a plan view of a typical circuit arrangement for operation of the subject lock, an internal view of the connected reed switches in the capsule container, and also a plan view of the internal position of each of the magnets in the mating key when turned over from set to re-set position.

FIG. 5 is a sectional view of the internal magnets in the key taken through 5—5 in FIG. 4.

FIG. 6 is a sectional view of the internal reed switches taken through 6—6 of the capsule container in FIG. 4.

SUMMARY OF THE INVENTION

Basically, this locking system includes an alarm which is actuated by trip switches placed wherever entry is intended to be denied. Electrical circuitry connecting the alarm and switches is set for actuation or reset for neutralization by means of opening or closing specifically arranged reed switches in the circuitry system which are generally contained in an opaque capsule attached to the interior of a relatively thin non-magnetic wall surface, such as a window.

A separated key in the form of a capsule containing magnets arranged to match selected reed switches in the circuitry system is provided so that in one position reed switches are activated to set the connected circuitry and, in another position, to reset it. Also, a reed switch is mounted in the reed switch capsule which is connected to the alarm but is not activated by the magnets in the key when properly positioned. However, if a magnet comes adjacent to it by mispositioning the key or otherwise, it is actuated so as to serve as an anti-tampering device.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings as an illustrative example of an embodiment of this invention, FIG. 4 discloses operative circuitry which include an alarm 10 activated as described hereinafter. In the electrical circuitry shown, a reset relay 12 is normally closed and a set relay 14 is normally open. Interconnected in the cir-

cuitry between reset relay 12, set relay 14 and alarm 10 is a normally open trip relay 16 and a number of external, normally open, trip switches 20, 22, 24, 26 and 28, which are wired parallel.

Incorporated in a normally opaque (but shown transparent in FIG. 4) piece of non-magnetic material locking capsule 30 are concealed reset reed switches 32, 34 and 36, a set reed switch 38 and an anti-tampering reed switch 40. These switches are interconnected into the circuitry hereinbefore described. The reed switches are of the type which consists of a small glass cylinder within which are contained a pair of magnetically deflectable overlapping wires (spaced normally slightly apart) which extend outside opposite ends of the glass cylinder.

When in the presence of a magnetic field of flux these small wires in the reed switches are deflected toward each other until they contact. Thus, when the end of each wire extending outside of the glass cylinder is connected into a circuit, as shown in FIG. 4, that portion of the circuit within the reed switch is closed when in the presence of a magnetic force. Some reed switches are the reverse of those shown here. That is, they are normally closed and are opened by magnetic force. Such switches could be used in this system if the comparable parts of the operative circuitry were also reversed.

The magnetic actuation characteristic of the reed switch operation is utilized in this invention by providing a key 50 which is a flat, opaque, eight-sided object, matching the locking capsule 30 and made of non-magnetic material. Key 50 contains magnets 52, 54 and 56 which are of sufficient magnetic force to selectively actuate the reed switches when placed immediately adjacent thereto. Accordingly, the magnets are positioned within the key 50 so that at a predetermined position some of them are close enough to selected reed switches to actuate them when key 50 is placed adjacent to locking capsule 30.

The particular pattern of the magnets and reed switches to be actuated depends upon the circuitry arrangement of which FIG. 4 is an illustrative example. Thus, in order to set the alarm circuit in operation so that closing any one of the trip switches will actuate it, key 50 is turned to the side 60, as shown in the top left of FIG. 4, and carefully placed in alignment over locking capsule 30. In this position magnet 54 is adjacent to reed switch 38 and near enough so that it is closed in order to, in turn, close normally open set relay 14. (Notice, that even though magnets 52 and 56 are also adjacent to reed switches 32 and 36, respectively, and do actuate them, the circuit through the reset relay 12 is not actuated because reed switch 34 in that circuit is still open.)

In order to neutralize the alarm system so that authorized persons may gain entry without setting it off, key 50 is turned over to its side 62 as shown to the right of the locking capsule in FIG. 4. Then when the key 50 is aligned with locking capsule 30 and carefully placed over it, magnets 54, 56 and 52 coincide with reed switches 32, 34 and 36, respectively, and are close enough to them so that they are actuated to close thereby opening the normally closed reset relay 12.

In order to ensure that the alarm 10 cannot be neutralized by guessing at the location of the reed switches hidden in the opaque material of the locking capsule 30 the reed switch 40 will be actuated by a nearby magnet

thereby closing the normally open anti-tampering relay 16 and circuit to alarm 10.

In operation, the locking system is energized by an electrical power source 70, which can be the regular direct current battery of a vehicle in the system shown. The locking capsule 30 is attached to the inside of a non-magnetic surface such as the glass window 72 of the vehicle 74. In turn, the capsule 30 is interconnected by wires 76 to circuitry such as shown in FIG. 4. The trip switches 20, 22, 24, 26 and 28 are located for actuation at all places where unauthorized breaking and entry is likely to occur, such as the doors and windows.

Thus, for example, when the system is installed as shown in the drawings, after the owner of a vehicle has locked his vehicle in the normal manner, he will then carefully place the set side 60 of the key 50 in alignment with the locking capsule 30 close enough on the outside of the glass window 30 that the set relay 14 is actuated. Then, the key 50 is removed and anyone attempting to open any entry covered by a trip switch or tampering with the locking capsule 30 will set off the alarm 10. When the owner of the vehicle returns, he neutralizes the alarm system by carefully aligning the reset side 62 of the key 50 with the locking capsule 30 by placing it close enough on the outside of the glass window 72 to actuate the reset relay 12. Then the vehicle can be unlocked in the normal manner without setting off the alarm.

The embodiment of this invention illustrated here is intended as an example only since variations within the spirit of the inventive concept defined herein are intended to be comprehended. Thus, the pattern for the reed switches and matching magnets can be modified extensively so long as sufficient security is maintained to prevent easily breaking the locking system. Also, though it is preferable to include the anti-tampering reed switch and relay, an operative set and reset circuit can function without it but with some loss in anti-tampering effectiveness. A single reed switch in the reset circuit could operate it, but without nearly the mathematical security from accidental or unauthorized actuation as is provided with the preferred pattern arrangement, such as reed switches 32, 34 and 36 shown.

I claim:

1. A locking alarm system including:

a lock comprising a plurality of concealed magnetically activated reed switches arranged in a predetermined pattern; an alarm circuit electrically connected with said reed switches; a source of electrical power interconnected with said alarm circuit; an alarm device electrically connected within said alarm circuit; at least one trip switch electrically connected with said alarm circuit; a separate key

having magnets disposed so as to coincide with selected set reed switches to actuate said alarm device for triggering, said magnets capable of activating said reed switches when said key is moved close to them; a reset circuit which neutralizes said alarm and wherein at least one of said reed switches in said lock is a reset reed switch interconnected within said reset circuit and capable of actuating it when said reset switch is activated, and said key magnets are positioned so as to be capable of activating said reset switch without activating the other reed switches in said circuit; wherein, when both said selected set reed switches and said trip switch are activated, said alarm circuit is closed and said alarm device is thereby triggered.

2. A locking alarm system as defined in claim 1 which includes a normally open set relay and a normally closed reset relay interconnected in electrical circuitry with said alarm device, wherein said set relay is responsive to activation of said set reed switches and said reset relay is responsive to activation of said reset reed switches.

3. A locking alarm system as defined in claim 2 wherein said reed switches are encapsulated within opaque nonmagnetic material within said lock.

4. A locking alarm system as defined in claim 3 wherein there are a plurality of parallel wired trip switches electrically connected to said alarm circuit.

5. A locking alarm system as defined in claim 4 which includes an anti-tampering reed switch in said lock, an anti-tampering relay electrically connected with said alarm device and said set relay wherein, when said set relay is activated, magnetic attraction adjacent to said anti-tampering switch will trigger said alarm device.

6. A locking alarm system as defined in claim 5 wherein said magnets are encapsulated within opaque nonmagnetic material in said key.

7. A locking alarm system as defined in claim 6 wherein said lock is positioned on one side of a non-magnetic structure and said key is placed on the opposite side of said structure to actuate said lock.

8. A locking alarm system as defined in claim 9 wherein the exterior shape of said key matches the exterior shape of said lock and wherein aligning one side of said key adjacent to said lock causes selected magnets in said key to activate said set switches and wherein aligning the opposite side of said key adjacent to said lock causes selected magnets in said key to activate said reset switches.

9. A locking alarm system as defined in claim 8 in combination with a motor vehicle wherein said lock is placed inside a fixed window and said trip switches are positioned at points of possible unauthorized entry so as to be actuated by unauthorized entry.

* * * * *