

- [54] **ELECTRONIC LOCK SYSTEM**
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317/134; 307/10, 110; 320/1**

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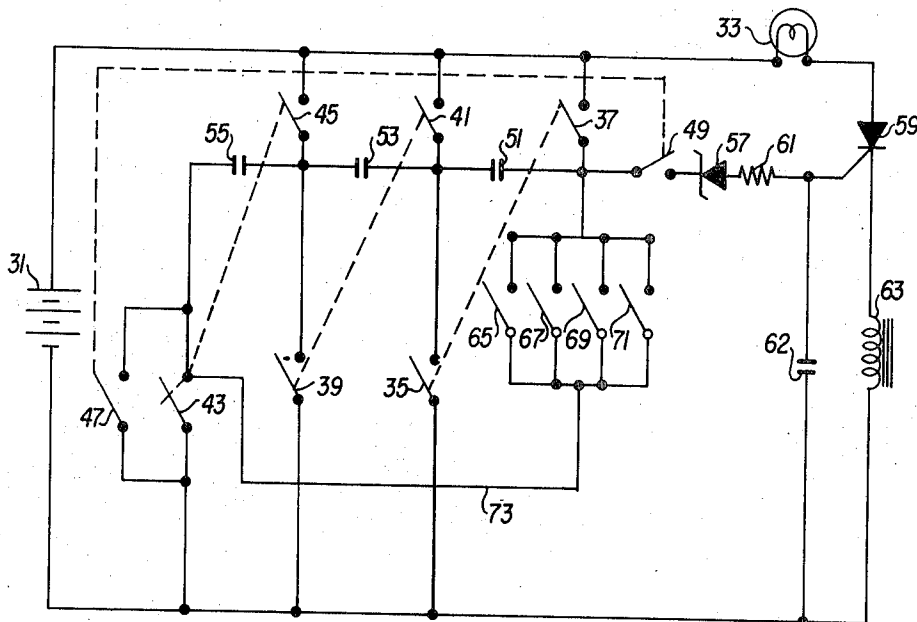
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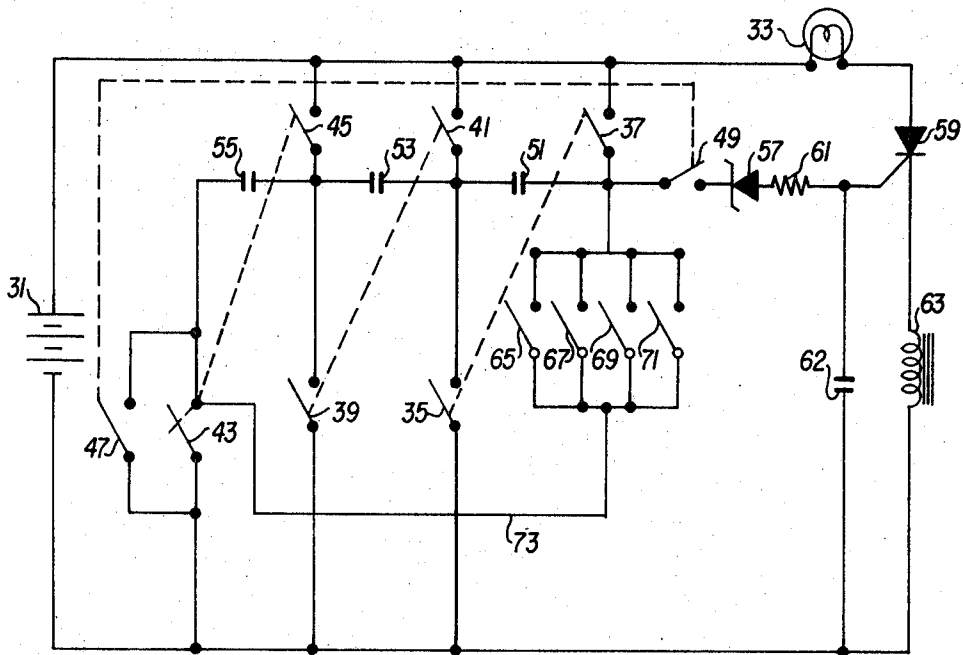
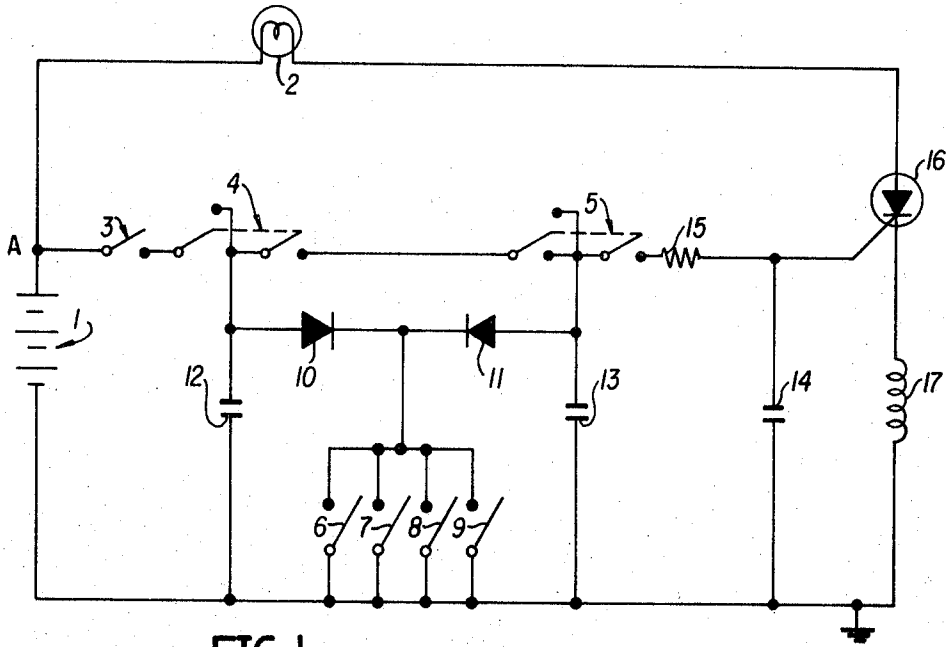
[57] **ABSTRACT**

An electronic lock control circuit having a voltage source and means for charging a plurality of storage elements from said source. The storage elements are connected in series to a gating device. The combined voltage of all the storage elements is required to activate the gating means which, in turn, passes the activating energy for the lock.

- [56] **References Cited**
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3 Claims, 2 Drawing Figures





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ELECTRONIC LOCK SYSTEM

This invention relates to lock systems and more particularly to such lock systems having electronic controls.

Locks of all types are known and in use today. The basic function of locks is to permit access through some act performed by authorized persons and prevent such access by unauthorized persons.

Mechanical locks have been in use for a long period of time including both key and combination locks. In more recent times, electrical and electronic locks have come into use particularly for protection of highly sensitive areas. The electronic lock seeks to perform electronically the function of pin tumblers, levers, etc. used with mechanical locks.

Most electronic locks in use today are complicated and expensive. Additionally, in many such locks, an excessive amount of energy is required for operation thereof.

The lock of the present invention uses a discrete, easily storable and exhaustible quantity of electrical energy which is stored in a plurality of energy stored devices and is ultimately used to perform the required unlocking function.

FIG. 1 discloses a prior art circuit which has been reduced to practice. 1 is a battery of 6 volt DC potential. Said battery's negative terminal is connected to ground and its positive terminal to one terminal of 2, a flashing incandescent lamp such as a GE No. 455, and to 3, one pole of a single pole, single throw switch. The other terminal of said lamp is connected to the anode of an SCR 16. The cathode of said SCR is connected to ground. 3 is a momentary contact, normally open, single pole, single throw switch which, when pushed, will energize 12, a capacitor, through a closed pole off switch 4, a push button momentary contact, normally closed pole of a double pole, double throw momentary contact pushbutton switch.

Once 12 is energized, when 4 is pushed, the normally closed pole opens the circuit to 3 and the normally open pole closes the circuit to capacitor 13 through 5 a double pole, double throw momentary contact pushbutton switch, thus charging or transferring a portion of the charge which resides in 12 to capacitor 13. When 5, a double pole, double throw, momentary contact pushbutton switch is pushed, the charge residing in 13 is connected to the gate of the SCR, 16, with switch 4 being in the open circuit position so as to break any connection between capacitor 12 and capacitor 13. Resistor 15 and 14, a capacitor form a timing circuit which prevents spurious energization of SCR 16. SCR 16 is gated if sufficient charge resides in 13. If switches 6, 7, 8, 9 and 10 are pushed, then any charge in capacitor 13 or 12 is grounded through diodes 10 and 11, thus exhausting said quantity of energy.

If the proper order and speed is observed in pushing switches 3, 4, 5, then the SCR 16 will be gated into conduction through 2 and load 17 will perform some act such as solenoid actuation. If bulb 2 breaks continuity and commences to flash, it breaks the circuit to the SCR thus resetting said SCR automatically. Additionally, the lighting of the bulb indicates a successful sequence of the lock.

It is obvious that capacitors 12 and 13 can be chosen to limit the charge and also if lossy can limit the time they will hold a charge.

One implementation of the present invention is disclosed in FIG. 2.

The circuit as shown consists of a power supply 31 coupled to the anode of SCR 59 through light 33.

A plurality of ganged switches 35 and 37, 39 and 41, 43 and 45 are connected respectively in circuit relationship with capacitors 51, 53 and 55. Since each pair of switches are individually ganged as shown in FIG. 2, each pair are individually operated.

Ganged switch 47 and 49, when closed, connects capacitors 51, 53 and 55 in series with a Zener diode 57 connected to the gate of SCR 59 through a resistor 61. Capacitor 62 is coupled between ground and a resistor 61 so as to provide a timing circuit.

A series of switches 65, 67, 69 and 71 are coupled between one terminal of capacitor 31 and one terminal of capacitor 55.

The circuit of FIG. 2 operates as follows. The ganged switches are operated separately so as to charge the individual capacitors. For instance, when switch 35, 37 is momentarily closed, capacitor 51 is charged. When switch 39, 41 is closed, capacitor 53 is charged, and when switch 43, 45 is closed, capacitor 55 is charged.

Zener diode 59 is designed such that the combined voltage of the three capacitors are required to cause a breakdown thereof and a resultant gating of SCR 59. As an example, if a 6 volt battery is used, the breakdown voltage of the Zener diode 57 would be something slightly less than 18 volts, the combined voltage of the three capacitors.

When the three capacitors have been charged, switch 47, 49 is closed, thus discharging the capacitors through the Zener diode and gating SCR 59. Power is then supplied to the load such as a solenoid 63 for operation of the locking mechanism.

Switches 65, 67, 69 and 71 represent error switches which, if closed during the sequential operation of switches 35, 39 and 43 will discharge any one or all of capacitors 51, 53 and 55 to prevent a sufficient voltage buildup to cause a breakdown of the Zener diode.

Physically, all of the switches are similar with different number designations in the actual apparatus. Therefore, the proper numbers of necessary switches must be known.

The above description and accompanying drawing are illustrative only. The number of switches and combinations may be varied to provide the desired results. Accordingly, the invention is to be limited only by the scope of the following claims.

1. I claim:

1. In an electronic lock, a control circuit comprising; a voltage source, a plurality of storage elements connected in series; switching means for each storage element for connecting said elements to said voltage source for charging each of said elements independently of the others of said elements; gating means for actuating said lock, and means for connecting said storage elements in series with said gating means so as to combine the voltages of said storage elements to provide a voltage to said gating means substantially greater than that of said voltage source.
2. The control circuit of claim 1 further comprising; switching means connected between said storage devices and ground for resetting said lock.
3. The control circuit of claim 1 wherein said gating means comprises a silicon controlled rectifier.

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