United States Patent

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[54] MAGNETICALLY ACTUATED SAFETY ALARM CIRCUIT

6 Claims, 5 Drawing Figs.

[52] U.S. Cl. 340/63, 340/64, 340/258, 340/274
[51] Int. Cl. B60r 25/10
[50] Field of Search 340/32, 38, 63, 64

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ABSTRACT: A regulating or alarming circuit controlled by magnetic fields comprising one or more protective gas glass bulb contacts having poles set by a magnet and integrated by controlling magnets which complete the quoted pole setting by the first magnet, causing the contacts to close, thereby actuating the regulating or alarming circuits.

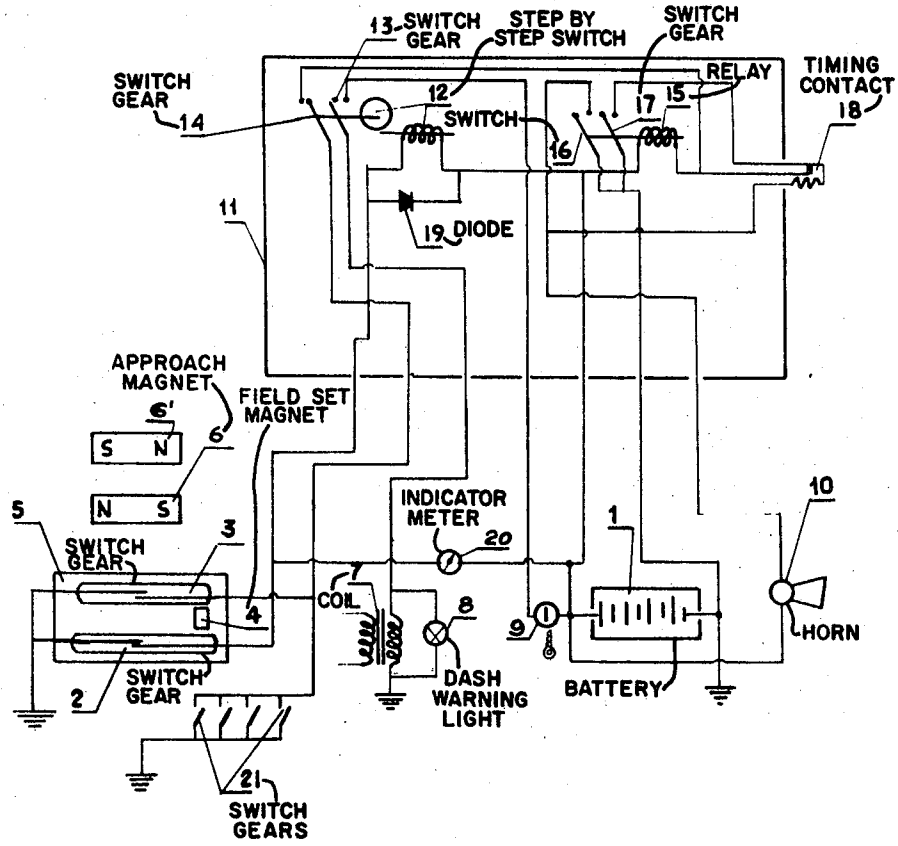
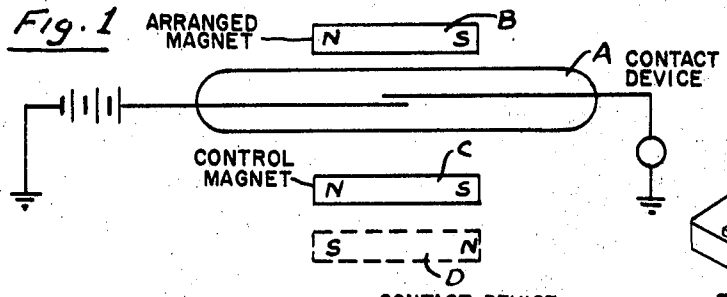


Fig. 1



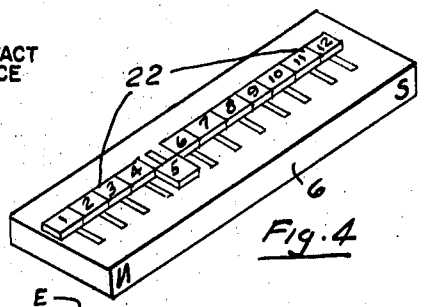


Fig. 4

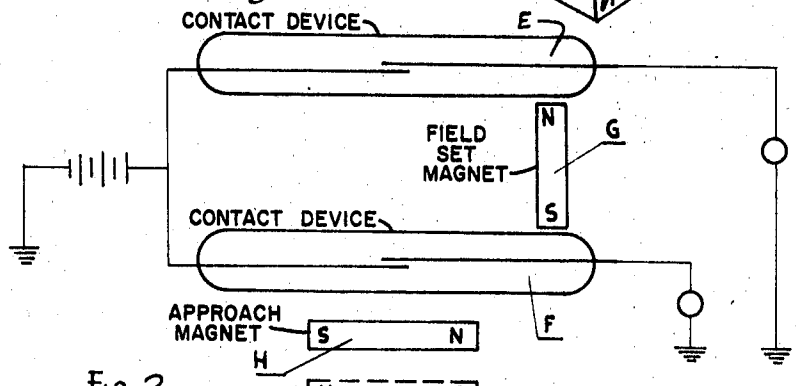


Fig. 2

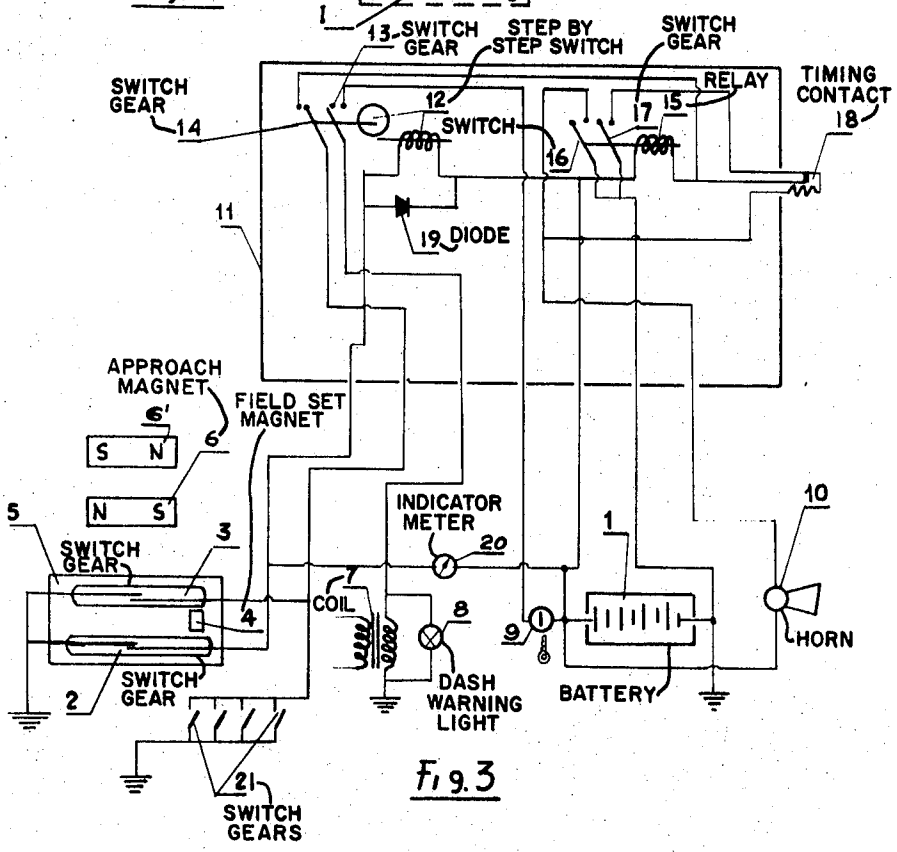


Fig. 3

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MAGNETICALLY ACTUATED SAFETY ALARM CIRCUIT

The enormous increase in the number of motor vehicles has raised many problems concerning auto thefts, frequently troubling car owners. The safety-locks presently used on the cars are mechanical and electrical; the former differ from one vehicle to the other only as to their lock and their relative key suitable to lock and to free the antitheft device, while the latter, usually acting on the horns and switching off the current feed have no substantial differences but assume a suitable switch concealment in a position known to the owner. Both systems are insufficient, since unauthorized persons are able to open the locks and they readily recognize the position of the electric alarm switch.

It is an object of the present invention to provide a device which avoids all the above-mentioned inconveniences, comprising an electrical alarm device including a code of magnetic impulses that are given on a glass bulb or tube contact, and may be modified at any time and are known only to the owner. The great advantage of such a device consists in the fact that although the codification is subjective, it may be mass-produced, as it does not require constructional differences. The above-mentioned magnetic code substantially consists in the principle that through magnetic impulses given by a magnet (or magnetic key) on the bulb contact a relay is gradually rotated. This relay has different positions and only one of them corresponds to the idle position of the device. The above-mentioned device is complete because the alarm system sounding is performed by a simple opening of the bonnet or of a door or by the incorrect approach of a magnet. The alarm may cause a current break in the engine and start the horn sounding, which sounding time may be regulated by a timing device.

With the above and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 schematically illustrates a glass bulb contact in protective gas with a pole arrangement magnet and controlling magnet;

FIG. 2 is an example of two glass bulb contacts with pole arrangement magnet and controlling magnet;

FIG. 3 is an electrical circuit diagram of a car safety-lock device designed in accordance with the present invention;

FIG. 4 is a perspective view of a memory controlling magnet.

Referring now to the drawings, and more particularly to FIG. 1, a tube contact device or switch gear where the tube contains inert or protective gas is illustrated, and arranged magnets B having an adequate magnetic field intensity are provided in order to arrange or pole orient their polarity, but not suitable to close the contacts. The contact occurs in the tube contact device A when another control magnet C approaches the device A as shown in FIG. 1, with its magnetic field complementary to the pole-orienting field created by magnet B, completing the field created by magnet B, while if it is approached by a magnet positioned as shown in D, i.e., opposite to the field of D, it does not close the contact. The same result is obtained when the contact of device A approaches magnet C instead of the magnet C approaching contact device A.

Referring now to FIG. 2, two tube contact devices or switch gears E and F are arranged on the polarity of magnet C having an adequate intensity and unsuitable for the closing of the contacts. By approaching with magnet H, as shown in FIG. 2, contact device E closes, while contact device F opens. To the contrary by approaching with magnet I, opposite to magnet H, contact device F closes and contact device E opens. Magnets B (FIG. 1) and G suitable to set the field, are not sufficient to close the contacts, but they may have such a field intensity that approaching magnets C and H, close the contacts yet upon moving them away immediately, they may either keep the contacts closed (stable contact) or be unable to maintain its condition (unstable contact).

Referring now again to the drawings and more particularly to FIG. 3, a DC electrical source 1, i.e., a car battery, is illustrated. An unstable tube magnetic field switch gear 2 is provided for the impulse counting control, and an unstable tube magnetic field switch gear 3 for the alarm control by an incorrect magnetic position. Switch gears 2 and 3 are permanently influenced by a permanent magnet 4 having a suitable intensity and cooperatively arranged on a sheath 5 to be fitted in a suitable position on the car dashboard or cockpit, always adjacent to an external surface, in order to be able to use from the outside another control magnet shown in the two possible positions 6 and 6'. A coil is provided and a dashboard warning light 8. An engine starting key switch is connected to the battery 1. Horns 10 or another acoustic, optical, or radio-signalling alarm system are electrically connected into the system. A container houses devices for selecting the impulses and controlling the alarm comprising a catch relay or step-by-step switch 12 of a type having a predetermined number of releases and controlling two switch gears. A switch gear 13 which is arranged on a coil 7 feeds and a switch gear 14 controls a relay 15. The relay 15 controls two other switches, switch 16 connected to the horns 10 and a switch 17 suitable to keep the relay under tension even when it cuts switch 14 out. In the circuit of the switch gear 17 there is a bimetallic valve-timing contact 18 with a resistance suitable to cut current out in relay 15 and therefore disconnect alarm 10. A diode 19 connected across the catch relay 12 protects the tube switch gear 2, while a visual indicator meter 20 counts the magnetic impulses given by switch gear 2 and transmitted by the relay 12. Different trip switches or switch gears 21 are arranged on the bonnet, baggage compartment, doors, etc. The switches 21 may also constitute magnetic tube contact devices subject to magnetic fields which may cause the switch gear opening or closing under any change.

Referring now again to the drawings, and more particularly to FIG. 4, mobile and numbered notches 22 are provided on the back of magnet 6 to remind the car owner of the impulses given to the alarm device.

The alarm device of FIG. 3 operates in its idle position as follows. The catch relay 12, provided with, for example, twelve notches, is connected only to the notch-closing switch gear 13 and the opening switch gear 14. Under these conditions relay 15 cannot be operated by current during the closing of the various switch gears 21 arranged on the doors and on the other parts to be safeguarded and therefore the alarm is idle, while the engine-starting key switch 9 and the coil 7 of the engine starting circuit is closed.

The device is in its alarm phase with the following operation. The driver, after checking the bonnet and the closing of the doors, approaches with magnet 6, as shown in the drawings, adjacent to switch gear 2 as many times as he believes necessary (for instance 5 times). Therefore, the switch gear 2 is closed five times and the catch relay 12 rotates by five releases. In this way relay 12 leaves its idle position and opens switch gear 13 and closes switch gear 14. Under these conditions the engine coil 7 feeding circuit is cut out and the alarm circuit feeding is arranged, i.e., placed in the operative, or ready to be activated condition. If a thief opens the bonnet or a door, i.e., he closes one of contacts 21, the coil of the relay 15 is under voltage and it closes switch gears 16 and 17. Switch gear 16 closes the horn circuit which will then sound, while switch gear 17 keeps the coil of the relay 15 under voltage, even if the thief immediately open the switch gear 21. The horns sound for a long or short period of time according to the bimetallic thermoregulator 18 adjustment, such that, after the elapsing of the time allowed, it cuts out the coil of the relay 15 from feeding, and consequently open switch gears 16 and 17. The driver, in order to open the door without actuating the alarm and in order to start the engine, must take the catch relay 12 back to its initial idle position and must approach with magnet 6 seven times in order to operate relay 12 by seven releases. The relay 12 then opens switch gear 14 and closes the switch gear 13.

The tube switch gear 3 arranged in sheath 5 is a further device safety measure. In fact, if a thief approaches with a magnet, of course, not set as magnet 6, but set as magnet 6', switch gear 3 closes the circuit and operates the alarm device similarly corresponding to switch gear 21. Another feature of the safety device against unauthorized entry consists in the following. The magnet 4 arranged in the sheath 5 has a magnetic field intensity inferior to the magnet 6 and therefore the latter influences the switch gear 2, even if it is spaced few centimeters distant, and it cannot be further approached, because if the field of the magnet 6 is superior, as to its intensity, to that of magnet 4 it closes switch gear 2 and also switch gear 3, activating the alarm. The above-mentioned incidence occurs also when, instead of a usual magnet, a magnet with a much stronger magnetic field intensity is used. The meter 20 is arranged with numbers different from the notches of relay 12, and may help the car owner to remember the impulses given when setting the alarm device. Another suitable memory system may be the system of providing the back of magnet 6 with several movable notches 22, as many as the number of notches on relay 12, as shown in FIG. 4. The great advantages of the above-mentioned device should now be obvious. This device may be achieved and mass-produced and enables the alarm with a number of impulses subjectively established. A complementary number of impulses for its idle position cannot be guessed by a thief. If the above-mentioned device instead of providing one complete sheath 5 and a relay 12 provides two or more sheaths and two or more relays, it is possible to obtain real secret combinations of compound numbers which may be changed every time.

The above-described device may have particular shapes and may be applied to cars and to any other object as well where there is an order to be respected. For instance, the pictures in a gallery may be provided with switch gears 21 closing complementary alarm circuit if they are taken away or only moved. Consequently, switch gears 21 may be arranged on statues, windows and door frames, tents, floors, bunches of banknotes etc., sounding the alarm if they are removed from their usual position.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense.

I claim:

1. A vehicle antitheft device, comprising:

an alarm;

a contact making step-by-step switch including at least one contact and operatively connected to said alarm and having a plurality of positions, only one of which cuts off said alarm;

contact means for impulsing said switch when actuated;

said alarm and said step-by-step switch being mounted on a vehicle;

portable magnetic means for closing and opening said impulsing contact means, respectively; and

at least one alarm-initiating contact in series with said at least one contact of said switch, the alarm condition being set by stepping said switch from an alarm cutoff position by a variable first number of steps, and reset by stepping said switch by a second number of steps, the sum of the two numbers being equal to the number of positions of said step-by-step switch.

2. The vehicle antitheft device, as set forth in claim 1, further comprising a thermally actuated contact means in series with said at least one contact and said alarm for actuating said alarm for a predetermined period when said at least one alarm-initiating contact is actuated when said switch is set in a noncutoff alarm position.

3. The vehicle antitheft device, as set forth in claim 2, further comprising:

a motor vehicle to which said antitheft device is set;

said at least one alarm-initiating contact being operatively mounted on doors, windows and bonnet of said motor vehicle; and

said alarm constitutes the horn of said motor vehicle.

4. The vehicle antitheft device, as set forth in claim 1, wherein:

said contact means comprises a first reed switch and adapted to be positioned for ready access by a person to be opened and closed by said magnetic means; and

container means for mounting the remainder of said device.

5. The vehicle antitheft device, as set forth in claim 4, wherein said magnetic means includes thereon a mnemonic device corresponding to the impulse steps required to set said step-by-step switch.

6. The vehicle antitheft device, as set forth in claim 4, further comprising a second reed switch means mounted adjacent said first reed switch and connected in series with said at least one contact and adapted to be actuated by a magnet stronger than said magnetic means for actuating said alarm when said step-by-step switch is set in a noncutoff alarm position.