Dec. 28, 1965 A. ANGRISANI 3,226,506

MAGNETIC DEVICE FOR CIRCUIT CONTROL

Filed June 20, 1963

FIG. 1

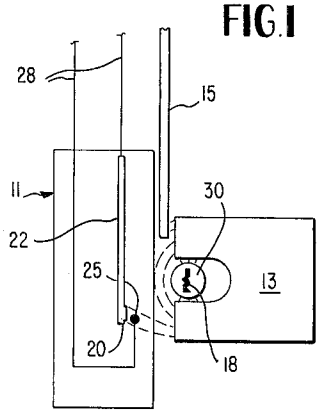
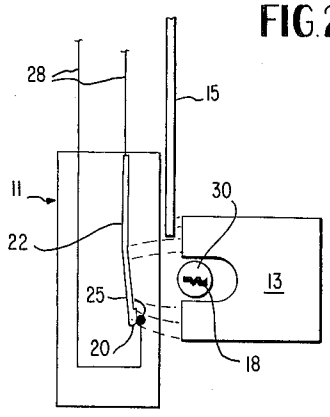


FIG. 2



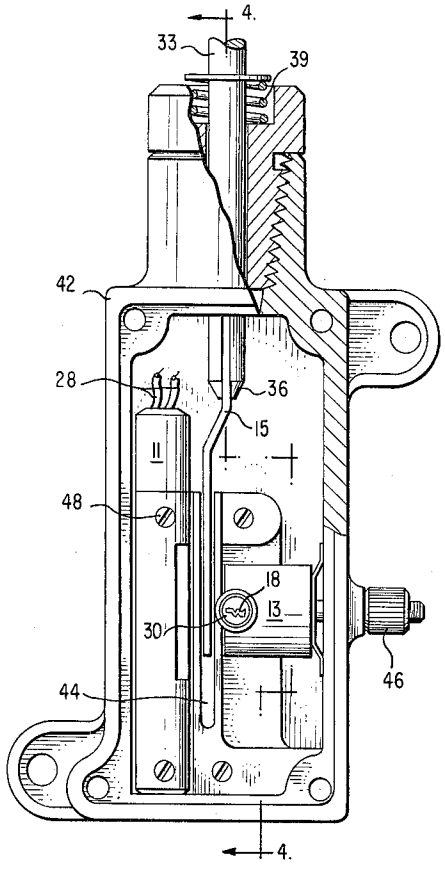


FIG. 3

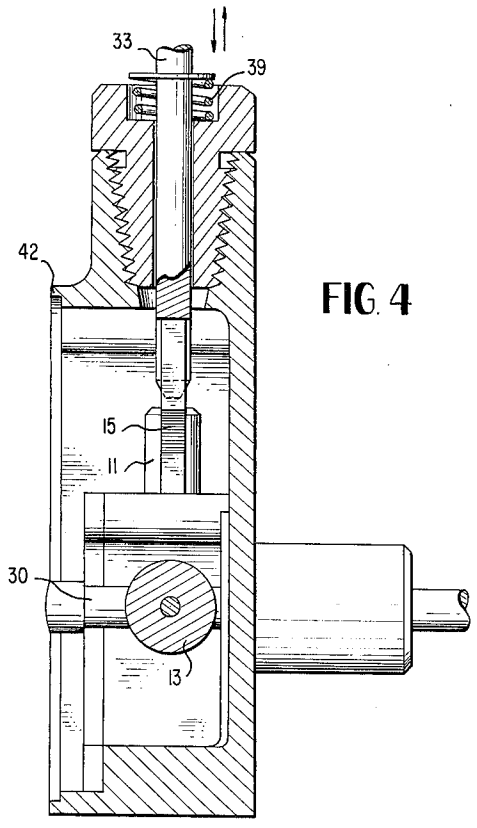


FIG. 4

INVENTOR.
ALDO ANGRISANI
BY Adams, Forward & McLean
ATTORNEY

United States Patent Office

3,226,506

Patented Dec. 28, 1965

3,226,506

MAGNETIC DEVICE FOR CIRCUIT CONTROL

Aldo Angrisani, Caripito, Estado Monagas, Venezuela (Calle el Mirador-Quinta Victoria, Prados del Este-Caracas, Venezuela)

Filed June 20, 1963, Ser. No. 289,372
5 Claims. (Cl. 200—87)

This invention is a novel magnetic device for control of an electric circuit. The device is appropriate for use with any one of a number of systems. For example, the device is of use in controlling a burglar alarm, and may be attached to the hood of an automobile to signal unauthorized opening of the hood.

Essentially the device comprises a magnetically actuatable switch and a stationary magnet, the flux of which may be affected by either of two mechanical inputs. At least one of these mechanical inputs is sufficient to divert a major portion or all of the magnetic flux of the magnet from its "normal" direction to a path through this first input. The second input may also be effective to divert magnetic flux to the same extent as the first input or may be sufficient only to weaken and nullify the effect of the flux.

In its simplest embodiment the device of this invention can be an operator for a magnetically actuated electric switch, the two inputs serving to prevent actuation of the switch; this embodiment effectively may function as a burglar alarm. In this embodiment the device comprises a stationary magnet placed adjacent to an electric switch designed to complete a circuit under the influence of magnetic flux. The device provides, between the magnet and switch a removable ferromagnetic shield which is the first mechanical input described above. When the shield is in place between the magnet and the switch it is sufficient to divert all the magnetic flux through itself, thus preventing actuation of the switch. The shield may be fastened, for example, to the hood of an automobile so that when the hood is closed the shield is in place and the switch circuit is open. When the hood is opened, the shield is removed from position and, unless provisions are otherwise made, the switch can close the circuit which may be attached to an alarm or signalling device, such as the automobile horn. Thus the unauthorized opening of the automobile hood will sound an alarm.

The second input in this embodiment of the device is a ferromagnetic strip between the poles of the U-shaped magnet. When this strip is perpendicular to the lines of magnetic flux between the north and south poles of the magnet it is of little or no effect on the flux. When, however, the strip is twisted to a position parallel to the flux, it absorbs an amount of the flux sufficient to prevent the magnet from actuating the switch. Thus, when opening the automobile hood, the twisting of the strip, which may be, for example, a steel key, serves to "disarm" the magnet allowing lifting of the hood and removal of the shield without setting off the alarm.

The invention will be better understood by reference to the accompanying drawing in which:

FIGURE 1 is a sketch illustrative of the operation of the device with the switch open due to the positioning of the secondary strip;

FIGURE 2 is a sketch illustrative of the operation of the device with the switch closed;

FIGURE 3 is a side view of the device partly cut away and with the cover plate removed; and

FIGURE 4 is a cross-sectional view along the lines 4—4 of FIGURE 3.

The device consists of the magnetically actuatable switch indicated generally as **11**, the permanent, stationary magnet **13**, the primary shield **15** and the secondary strip **18**.

The switch **11** may be more or less conventional in design. In the drawings this switch comprises the contact point **20** attached to the ferromagnetic member **22** which ideally is made of spring steel so that it may be spring biased toward the position shown in FIGURE 1 but is susceptible, under the influence of the magnet **13**, to being drawn to the closed position of FIGURE 2 where contact point **20** meets the other contact point **25**. The contact points are suitably joined to electrical leads **28** which are connected to a power source and a load, for example, an audible and/or visible signalling device.

The strip **18** is of flattened configuration and is made of a ferromagnetic material. It may be a key, as shown, or be actuatable by a key. The strip suitably may operate within the cylindrical core **30**. The strip is of a sufficient width that when twisted to the position shown in FIGURE 1 it will be sufficient to absorb a fair proportion of the flux emanating from the magnet **13**, but of a thickness insufficient to absorb a significant amount of the flux in the position of FIGURE 2 or 3. When the strip **18** is twisted, the core **30** is usually twisted simultaneously.

The shield **15** is made of ferromagnetic material and may be operated by the rod **33** which rod may be suitably forked at its lower end **36** to receive the shield **15**. The rod **33** may be biased by the spring **39** to put the shield **15** in the upward or non-interfering position shown in FIGURES 1 and 2. As is apparent from the drawing, the essential parts of the device may be enclosed within the housing **42** into which may be machined the slot **44** to serve as a guide for the shield **15** and to prevent its lateral motion under the influence of flux from the magnet **13**. The device also may suitably be provided with the screw mechanism **46** adjacent the magnet **13** and the screw mechanism **48** adjacent the switch **11** for adjustment of the magnet and switch in relation to the shield **15**.

As can be readily understood, while the spring **22**, the shield **15**, and the strip **18** are made of ferromagnetic materials and the magnet **13** is, of course, magnetized, the other materials making up the device will be of diamagnetic material such as aluminum or synthetic resins, so as not to interfere with operation of the device. Of course, the spring **39** is generally so far away from the magnet **13** that its construction from steel will not interfere.

The operation of the device is apparent from the drawings and descriptions. The device may be attached to an automobile in such a position that the closing of the hood pushes the rod **33** and shield **15** down. The electrical leads **28** are connected to make a circuit between the battery and horn of the automobile, but, with the shield **15** in the groove **44**, magnetic flux from magnet **13** is prevented from reaching and actuating the switch. If, by opening the hood, the pressure of spring **39** causes movement of the shield **15** upward to the position of FIGURE 2, magnetic flux will reach spring **22** and pull contact point **20**, against the biasing of the spring, to the point **25**. This completes an electric circuit thereby causing the horn to sound. If, however, the strip **18** is twisted to the vertical position of FIGURE 1 before the shield **15** is raised, a good portion of the magnetic flux will pass through the strip **18** leaving the remaining flux too weak to overcome the bias of the spring **22** to close the circuit. Thus, the insertion and twisting of a key before opening the hood averts sounding of the "burglar" alarm. It is often desirable to have the magnetic flux diverting ability of the strip **18** strictly limited. In this way strip or secondary input **18** may be effective to hold the flux pattern established by the primary input or shield

15 while not being sufficient, in itself, to reestablish the pattern once it has been broken. Thus, twisting of the strip 18 from the horizontal, FIGURE 2 position when the shield 15 is raised, will not serve to turn off the alarm once it has sounded.

It will be understood that the operative elements of the device of this invention may be provided with a sufficient number of mechanical accessories of sufficient size to provide any degree of remoteness desired in the operation. For example, the strip 18 may, as illustrated, be the very key which twists the core 30. Alternatively, the core 30 may be provided with a permanent strip and be turned by operation of a servo motor from a remote switch, for example, at the dashboard of the car. Likewise, the shield 15 may be replaced by a blade which is rotatable, for example, by a spring motor. The closed hood or other closed door can be the damper for the spring motor and keep the blade in shielding position. Then, opening of the hood without previous twisting of the strip leads to continuous rotation of the blade, giving an intermittent or pulsing signal. Such a signal may often be preferable to indicate that the signal is not merely "stuck" due to a mechanical or electrical defect in the mechanism. Other variations of the accoutrements of the novel circuit-controlling device of this invention will be obvious to ordinary skill in the art. Likewise, other types of switch actuatable by magnetic flux may be employed.

It is claimed:

1. A circuit-controlling device comprising a switch actuatable to a first position by establishment of a first magnetic flux pattern and biased to a second position in the absence of magnetic flux, a permanent magnet adjacent to the switch in a relationship to establish said first magnetic flux pattern, a primary ferromagnetic input means comprising an element movable from a position of non-interference with said first flux pattern to a position wherein said flux pattern is broken and a second flux pattern is established, said second flux pattern being ineffective to move said switch, and a secondary ferromagnetic input means between the poles of the magnet movable from a position aligned with said second flux pattern to a position non-aligned with said pattern, said secondary input means having a size sufficient to hold said second flux pattern when in the aligned position but insufficient to interfere with said first flux pattern.

2. The device of claim 1 in which the first switch position is the closed position and the second switch position is the open position.

3. The device of claim 1 in which the secondary input is a strip which changes position by being twisted.

4. The device of claim 3 in which the strip is a key.

5. The device of claim 1 in which the primary input is a shield which changes position by linear displacement.

References Cited by the Examiner

UNITED STATES PATENTS

1,891,568	12/1932	Morris et al.	200—87
2,767,278	10/1956	Collins	200—87
2,924,682	2/1960	Winterburn	200—87
3,005,885	10/1961	Bowditch et al.	200—50
3,022,398	2/1962	Abel	200—87

BERNARD A. GILHEANY, *Primary Examiner.*

ROBERT K. SCHAEFER, *Examiner.*