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MAGNETICALLY ACTIVATED DOOR SWITCH
Elmo W. Voland, Indianapolis, Ind., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind., a corporation of Delaware

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4 Claims

ABSTRACT OF THE DISCLOSURE

A leaf spring fixedly connected at one end to a housing disposed within a casing for a compartment carries a magnet at one end of the spring and an electrical contact near its center. A second magnet of opposite polarity from the first is disposed within the casing of a door adapted to close the opening of the compartment so that when the door is closed the repelling force of the magnets actuates the switch.

This is a continuation of application Ser. No. 590,732, filed Oct. 31, 1966.

This invention relates to a door switch; more particularly it relates to such a switch which is magnetically operated.

Various types of electrical switches are commonly used in conjunction with doors to actuate other devices when such doors are opened and closed. Automobile and refrigerator doors, for example, actuate a switch which turns lights on and off as the door opens and closes. In such applications, the switch is usually actuated by a plunger protruding through the door casing, the plunger being depressed upon the door's closing. While such an arrangement is for the most part satisfactory, it would be better for the sake of reliability and for ease in cleaning that the switch be actuated without the use of the protruding plunger.

It is, therefore, an object of the invention to provide a door switch which operates without the use of a plunger protruding from the door's casing.

Another object of the invention is to provide a door switch which is magnetically operated.

Another object of the invention is to provide a magnetically operated door switch which has a magnet disposed in the door casing and in the compartment casing in spaced relation.

Still another object of the invention is to provide a magnetically operated door switch in which the switch magnet is situated at one end of a leaf spring, the other end of the spring being biased at one of the contacts of a unitarily constructed electrical spade terminal with an electrical contact centrally located in the leaf spring and in spaced relationship with the other contact of the spade terminal.

Yet another object of the invention is to provide a magnetically operated door switch which is simple in construction, reliable, and economic to produce.

In the drawings:

FIG. 1 is an exploded view in partial cross section of the switch and its actuating means;

FIG. 2 is a cross section taken along line 2—2 of FIG. 1; and

FIG. 3 is a partial cross section of the switch and its actuating means when the door is in the closed position.

Generally speaking, the objects of the invention are accomplished by providing a magnetically operated door switch that is located in the casing of the compartment utilizing the door, the actuating means for the switch being located in the door casing. More specifically, the magnetic switch comprises a housing disposed within the casing of an opening for a compartment, a leaf spring dis-

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posed within the housing, the spring being at one end fixedly connected to the housing and further at the same end being in electrical contact with an electrical contact of an electrical spade terminal, a magnet disposed at the other end of the spring and being in spaced alignment with a magnet of opposite polarity disposed within the casing of a door adapted to close the opening of the compartment, and an electrical contact centrally disposed on the leaf spring and being in spaced alignment with the other electrical contact of the spade terminal.

Referring now to FIGS. 1 and 2 the novel magnetic switch 10 is held within the casing 11 defining the opening of a compartment. The term compartment is here meant to mean any enclosed space, whether it be a refrigerator storage area, the passenger space of an automobile, or a simple storage box. The switch 10 has a housing 12, the housing as well as the casing being made from an insulating material such as a thermosetting plastic. Disposed within the housing is a leaf spring 13 that is fixedly connected to the housing at one end through a rivet or other pin type connection 14. The pin also serves as an electrical connection between the leaf spring and one of the electrical terminals 15 of a unitarily constructed spade terminal 16, the pin 14 also serving to attach the terminal to housing 12.

Attached to the leaf spring at its opposite end is a magnet 17 that is constructed of a suitable magnetic material such as iron, a ceramic-iron mixture, or the like. Centrally disposed on the spring is an electrical contact 18 which is in spaced alignment with an electrical contact 19. Electrical contact 19 is in electrical contact with terminal 20 of spade terminal 16 through rivet or pin 21, the pin also serving to attach contact 19 and terminal 20 to the housing 12.

The means to actuate the switch is disposed within the door 22. The means to actuate the switch comprises a magnet 23 disposed within the casing 24 of the door. Casing 24 is preferably constructed of an electrically insulating material such as a plastic or rubber moulding. Magnet 23 can be fabricated from a material similar to magnet 17; however its pole should be opposite that of magnet 17. With this actuating structure, there need be no plunger protruding from the door casing as is common in prior art door switches. As an alternative, the casing 24 could be constructed of a plastic or rubber material impregnated with a magnetic material, thus eliminating the need for magnet 23.

Referring to FIGS. 1 and 3, the operation of the switch can be shown as the door is opened or closed. As shown in FIG. 1, when the door is opened, contact 18 is closed with contact 19, thus completing the electrical circuit through the spade terminal 16, the spring being biased such that the circuit is closed when the door is open. Thus a light or other device within the compartment will be "ON" when the door is open. When the door is closed, as is shown in FIG. 3, magnet 23 attracts magnet 17, thus causing the circuit through the spade terminal 16, and leaf spring 13 to be opened when contact 18 disengages contact 19. The light is then turned "OFF." It should be understood that it is within the scope of the invention that the spring may be oppositely biased with the polarity of the magnets being reversed.

FIG. 3 also shows an alternate form of the invention wherein the leaf spring is constructed to give a snap action. In this embodiment leaf spring 13 has a circular depression or dimple 25 located near the end where it is fixedly connected to the housing 12 such that a snapping action is imparted to the spring when the spring is released through separation of the magnets.

From the foregoing discription it will be apparent to those skilled in the art that this invention provides a new and useful door switch. Accordingly, it is contemplated

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that the scope of the invention is to be determined from the claims appended hereto.

What is claimed is:

1. A combination comprising: a door switch comprising a housing of electrically insulating material disposed within a casing of electrically insulating material forming the opening of a compartment, a leaf spring disposed within said housing fixedly connected to said housing at one end thereof, a magnet disposed at the other end of said leaf spring, a first electrical contact centrally disposed on said leaf spring, a second contact carried by said housing in line with said first contact; a second magnet of opposite polarity from said first magnet carried by a door connected to said compartment closing said opening; said leaf spring biased to close said contacts when said door is open; and means to complete an electrical circuit through said leaf spring and electrical terminals connected to said switch.

2. A door switch according to claim 1 in which said leaf spring has a circular depression near its end where it is fixedly connected to said housing so as to impart a snapping action to said spring.

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3. A door switch according to claim 1 wherein said electrically insulating material is a thermosetting plastic.

4. The combination according to claim 1 wherein said second magnet comprises a casing of said door, said casing including an electrically insulative material impregnated with a magnetic material.

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ROBERT K. SCHAEFER, Primary Examiner

M. GINSBURG, Assistant Examiner

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