Oct. 23, 1956 C. J. BARECKI ET AL 2,768,256

INERTIA-OPERATED ELECTRIC SWITCH

Filed Jan. 6, 1955

Fig. 1

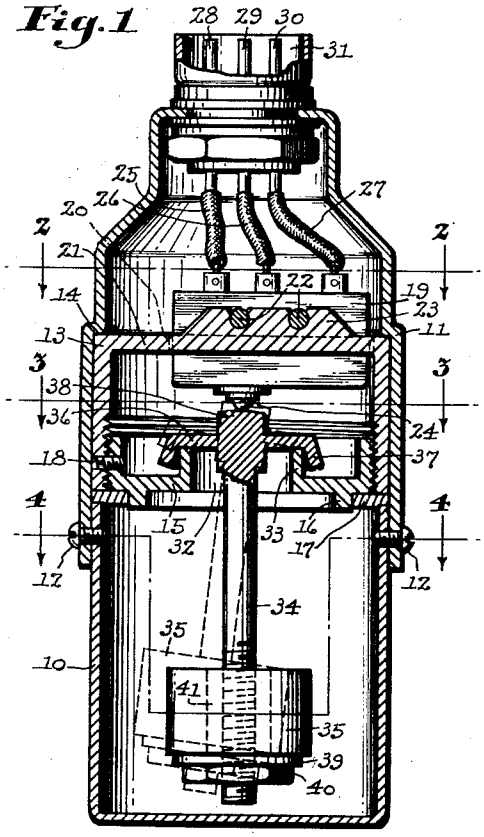
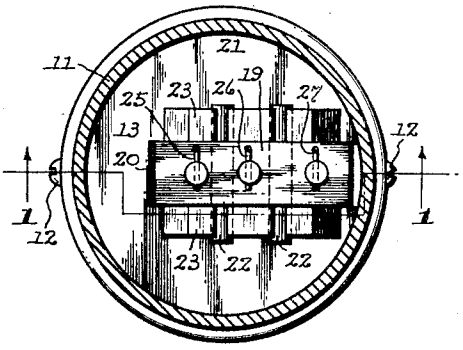


Fig. 2



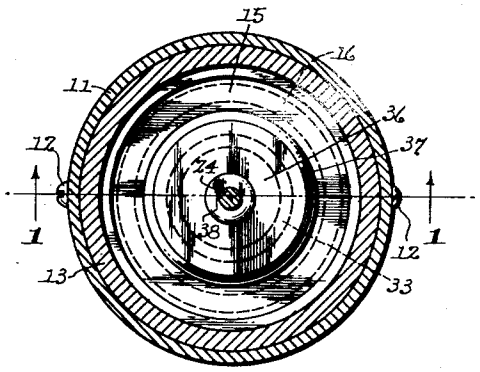


Fig. 3

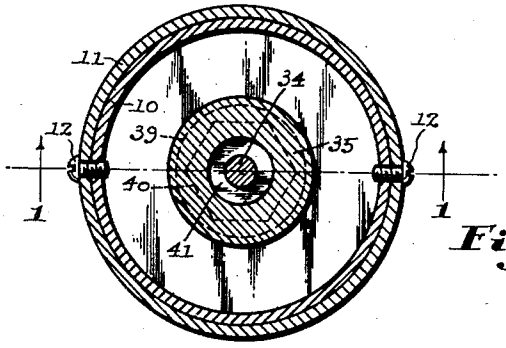


Fig. 4

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United States Patent Office 2,768,256 Patented Oct. 23, 1956

2,768,256

INERTIA-OPERATED ELECTRIC SWITCH

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Application January 6, 1955, Serial No. 480,142

5 Claims. (Cl. 200—61.48)

The present invention relates to an inertia-operated electric switch which is multidirectionally responsive to inertia forces to open or to close an electric circuit in which the switch is included. This invention is in the nature of an improvement on the inertia-operated switch disclosed in U. S. Patent No. 2,596,427 issued May 13, 1952, to Walter E. Nordmark, Joseph A. Miller and Norman C. Poel, and by them assigned to my assignee.

An illustrative embodiment of the invention is shown in the accompanying drawing, wherein:

Figure 1 is a vertical sectional view of the new inertia-operated switch, shown partly in section taken on line 1—1 of Figure 2 and partly in section taken on lines 1—1 of Figures 3 and 4;

Figure 2 is a horizontal sectional view of the same taken on line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view of the same taken on line 3—3 of Figure 1; and

Figure 4 is a horizontal sectional view thereof taken on line 4—4 of Figure 1.

Referring now in detail to this drawing, the several parts of the inertia switch there shown are housed within a casing comprising a lower cup-shaped casing member 10 and an upper inverted cup-shaped casing member 11 which casing members 10 and 11 are secured in assembly by means of screws 12.

An annular internally screw-threaded member 13 is seated within the upper casing member 10 against a shoulder 14 in the latter. An annular externally screw-threaded fulcrum member 15 is threaded into the annular member 13 and has a depending ring 16 thereon which is circumscribed by a washer 17 interposed between the annular member 13 and the lower casing member 10 to insure a snug fit of these parts. A set screw 18 extends through the side wall of the annular member 13 and into the annular fulcrum member 15 to prevent relative rotation of these parts after assembly.

An electric switch assembly 19 of the subminiature type known as a microswitch is disposed in an opening 20 through the top wall 21 of the annular member 13 and is rigidly secured thereto by means of pins 22 which extend through aligned openings in upstanding lugs 23 on the top wall 21 of member 13 and through the microswitch. The lugs 23 are desirably swedged over the pins 22 as shown to insure a tight connection between these parts. A downwardly spring-pressed switch button 24 in the microswitch is movable upwardly against the pressure of the spring to close a circuit which includes lead wires 25 and 26 or to open a circuit which includes lead wires 25 and 27, which ever is desired. These lead wires 25, 26, 27 are connected to prongs 28, 29, 30 respectively which extend into a suitable socket 31 at the top of the casing.

The annular fulcrum member 15 has a central circular opening 32 therethrough, and the inner perimeter of the fulcrum member 15 surrounding said opening 32 has an upstanding circular rim 33 the upper edge of which lies in a substantially horizontal plane. A pendulum is

here shown as comprising a stem 34 extending through the opening 32 in the fulcrum member 15 in a generally vertical direction, a weight 35 on the lower end of the stem 34 and a head 36 on the upper end of the stem 34, the head 36 being here shown as integrally formed with the stem 34. The pendulum's head 36 is circular in form and has a depending peripheral ring 37 closely surrounding the upstanding rim 33 on the fulcrum member 15, and said head 36 also has an upwardly extending central portion 38 which has a slightly convex upper surface bearing against the switch button 24 of the microswitch.

The weight 35 on the lower end of the pendulum rests on a circular plate 39 which is screw-threaded on the pendulum's stem 34 so that it can be vertically adjusted on the stem to increase or decrease the effective length of the pendulum to suit the conditions under which the switch is used. A lock nut 40 is provided for securing the circular plate 39 in adjusted position on the stem 34. The weight 35 has a central opening 41 through which the stem 34 extends, said opening 41 being of appreciably greater diameter than the stem 34 so that the weight is laterally shiftable on the stem. Thus accidental tripping of the switch is prevented when it is used under vibratory conditions.

With the new switch installed on a moving vehicle or other object and included in any desired electrical circuit therein, it will be seen that sudden deceleration of the vehicle as in a crash will swing the pendulum as indicated in dotted lines in Figure 1. Thus when the pendulum's stem 34 deviates from the vertical it effects upward rotation of the pendulum's head 36 about a point on the inner perimeter or rim 33 of the fulcrum member 15, and the upwardly extending central portion 38 of the pendulum's head presses against the switch button 24 on the microswitch thus to operate the switch.

While but one specific embodiment of the invention has been herein shown and described, it will be understood that numerous details may be altered or omitted without departing from the spirit of the invention as the same is defined by the following claims.

We claim:

1. In an inertia-operated electric switch: a casing; a switch assembly mounted in the casing and included in an electric circuit, said assembly having a spring-pressed button movable against the pressure of the spring to operate the switch; a fulcrum member mounted in the casing and having an opening therethrough, the inner perimeter of the fulcrum member surrounding said opening lying in a substantially horizontal plane; a pendulum comprising a stem extending through said opening in a generally vertical direction, a weight on one end of the stem and a head on the other end of the stem, said head being peripherally seated against said inner perimeter of the fulcrum member and being operatively associated with the switch button, whereby deviation of the pendulum's stem from the vertical will effect rotation of the pendulum's head about a point on said inner perimeter of the fulcrum member thus to operate said switch.

2. In an inertia-operated electric switch: a casing; a switch assembly mounted in the casing and included in an electric circuit, said assembly having a downwardly spring-pressed button movable upwardly against the pressure of the spring to operate the switch; a fulcrum member mounted in the casing and having an opening therethrough, the inner perimeter of the fulcrum member surrounding said opening lying in a substantially horizontal plane; a pendulum comprising a stem extending through said opening in a generally vertical direction; a weight on the lower end of the stem and a head on the upper end of the stem, said head being peripherally seated upon said inner perimeter of the fulcrum member and being adapted

to press upwardly at its center against said switch button, whereby deviation of the pendulum's stem from the vertical will effect upward rotation of the pendulum's head about a point on said inner perimeter of the fulcrum member thus to operate said switch.

3. An inertia-operated switch according to claim 2 characterized by having the weight loosely mounted on the lower end of the pendulum's stem so as to be laterally shiftable thereon.

4. An inertia-operated switch according to claim 2 characterized by having the opening in the fulcrum member and the pendulum's head of circular form.

5. An inertia-operated switch according to claim 4 characterized by having an upstanding rim around the inner perimeter of the fulcrum member and a depending peripheral ring on the pendulum's head closely surrounding said upstanding rim.

References Cited in the file of this patent

UNITED STATES PATENTS

2,043,530	Dezotell	June 9, 1936
2,262,917	Brooks	Nov. 18, 1941
2,596,427	Nordmark et al.	May 13, 1952
2,596,666	Edgar et al.	May 13, 1952