May 21, 1957 S. J. CIOSEK 2,793,260

SWITCH

Filed Nov. 23, 1954

FIG. 1

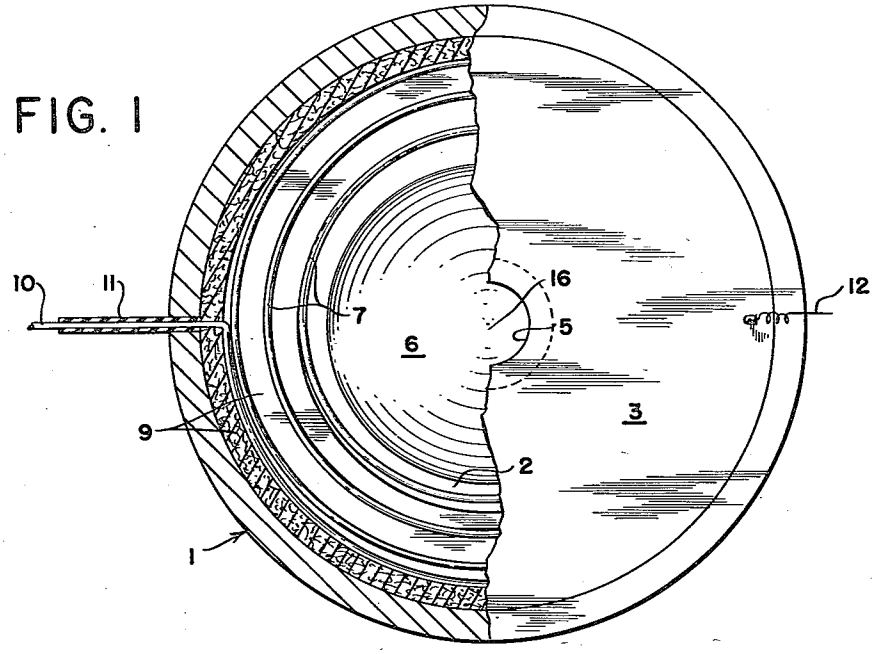
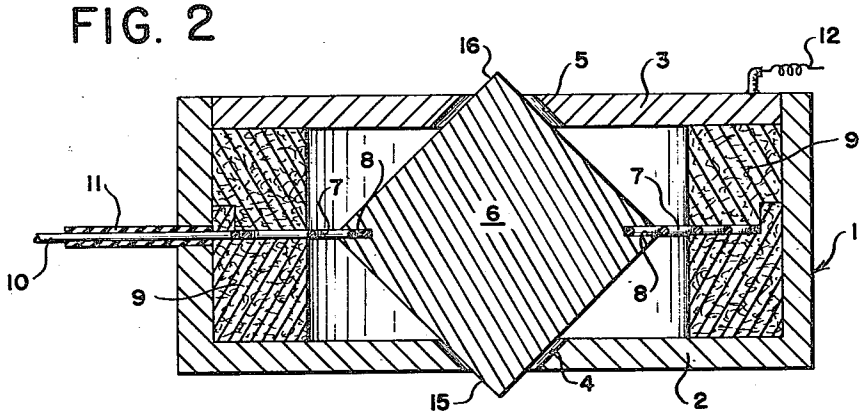


FIG. 2



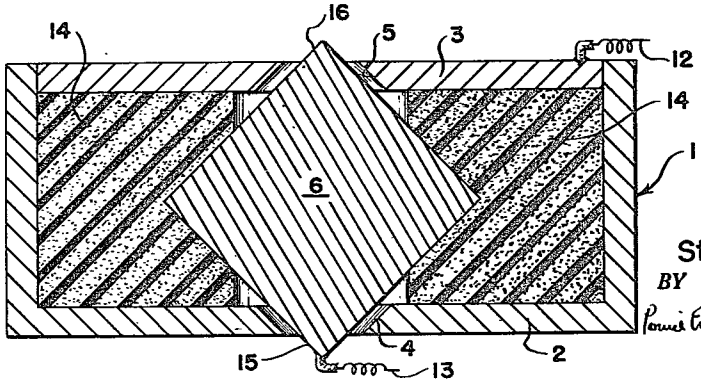


FIG. 3

INVENTOR.

Stanley J. Ciosek

BY

Pennie Edmonds Morton Barrows & Taylor

ATTORNEYS

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SWITCH

Stanley J. Ciosek, East Haven, Conn., assignor to Olin Mathieson Chemical Corporation, New Haven, Conn., a corporation of Virginia

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11 Claims. (Cl. 200—61.45)

This invention relates to electrical switches and more particularly to an omnidirectional trembler switch of simple and unique construction.

The switch forming the subject matter of my invention consists of two normally spaced members connected in an electric circuit, one of the members being so mounted that upon impact, acceleration or deceleration it will be moved momentarily into contact with the other to complete the circuit. The device is capable of many uses in which the momentary closing of a circuit is desired for various purposes, such as setting off explosive projectiles, firing detonators, starting a timing mechanism, and numerous other uses in which the circuit in which the switch is arranged is closed for a brief period to start the operation of another circuit or other mechanism.

While the detailed construction of the switch may be altered without departing from the spirit of the invention, it preferably consists of a case made of conductive material, and an inertia member within the case and normally spaced therefrom. Electric leads are connected to these members and an electric circuit is completed when they are brought in contact with each other. The inertia member is yieldingly mounted, as by a spring or a mounting of a non-conductive material, such as rubber.

As a preferred construction, I employ a case formed of a conducting metal to which one lead is connected, and a double cone mounted in the case, also made of metal, to which the other lead is connected. The double cone or inertia member is of such dimensions that it projects from the top and bottom, or two opposite sides of the case, and these two opposite sides are provided with openings of such size that when the inertia member is idle, it is spaced from the walls of the openings at all points. The inertia member is yieldingly supported and is thus caused to move by impact, acceleration or deceleration. Any movement of the cone with respect to the case causes contact to be made between the two and thus closes the circuit.

In the accompanying drawing I have shown several embodiments of the invention. In this showing:

Fig. 1 is a plan view of one form of the invention, parts being shown in section;

Fig. 2 is a vertical, sectional view of the form shown in Fig. 1; and

Fig. 3 is a similar view of another form of the invention.

Referring to Figs. 1 and 2 of the drawing, case 1 is formed of a metal that is a good conductor of electricity. The case is shown as cylindrical, but it can be of other shapes as will be apparent from the following description. The bottom 2 and top 3 of the case are provided with openings 4 and 5, respectively. Within the case, the inertia member 6 is mounted. It is illustrated as a double cone but it will also be apparent that it may be of other shapes. The inertia member is yieldingly mounted in the case. This may be accomplished in any one of a variety of ways. In this form, a spiral spring 7 is received in a groove 8 at the base of the

double cone. This spring extends into, and is supported by a filling 9 of non-conductive material. The end 10 may extend through an opening in the side wall of the case and form the lead wire connected to the inertia member. It is suitably insulated, as by sleeve 11, from the wall of the case. A lead wire 12 is connected to the case.

In the form of the invention shown in Fig. 3 of the drawing, the construction is essentially the same, and those parts which are indentical in the two forms are identified by the same numerals. In this form of the invention a lead wire 13 is connected to the inertia member. In place of the spring 7, a filling 14 of soft rubber, or similar material, is used to support the inertia member 6. Whether the material be natural rubber, synthetic rubber or other composition of like properties is immaterial. It is merely necessary that it be electrically nonconducting and that it support the inertia member in such manner that impact, acceleration or deceleration cause relative movement between the inertia member and the case.

The operation of the device will be apparent from the foregoing description. The spaces between the cone surfaces of inertia member 6 and the walls of openings 4 and 5 are small and are uniform or substantially so at all points. Any disturbance of the normal rest position, such as by impact or displacement in any direction, will cause one of the cone tips to engage the wall of opening 4 or opening 5 to momentarily complete an electric circuit. As stated, the case may be of other shapes than cylindrical, as long as it has two substantially parallel wall portions in which the openings 4 and 5 are located. Also the double cone-shaped inertia member could be of other shapes as long as it embodies portions corresponding to cone tips 15 and 16 to cooperate with openings 4 and 5 regardless of the direction of displacement of the inertia member with respect to the case. Also, while I have referred to the top and bottom of the case and have illustrated the inertia member with its axis extending vertically, the axis can be at any angle without interfering with the proper functioning of the device.

I claim:

1. An inertia switch comprising a case member formed of conductive material, and an inertia member of conductive material resiliently mounted in the case, the inertia member having portions substantially equally spaced from two parallel walls of the case throughout 360° whereby relative movement of the two members in any direction will cause the inertia member to contact the case.

2. An inertia switch comprising a case formed of conductive material, the case having alined openings in the top and bottom thereof, and an inertia member resiliently mounted in the case and having portions projecting into and equally spaced from said openings at all points of the circumference of said openings.

3. A device in accordance with claim 2 in which the inertia member consists of a double cone.

4. A device in accordance with claim 2 in which the inertia member is resiliently supported by means of a spiral spring.

5. A device in accordance with claim 2 in which the inertia member is resiliently supported by a body of rubber-like material in the case.

6. An inertia switch comprising a substantially cylindrical case formed of conducting material and having alined openings in its top and bottom, an inertia member comprising a double cone of conducting material mounted in the case with the tips of the cones extending into and equally spaced at all points from the walls of

the openings, and a spiral spring resiliently supporting the inertia member in the case, the spring being secured to the case, and the inertia member having a groove to receive the inner coils of the spring.

7. An inertia switch comprising a substantially cylindrical case formed of conducting material and having alined openings in its top and bottom, an inertia member comprising a double cone of conducting material mounted in the case with the tips of the cones extending into and equally spaced at all points from the walls of the openings, and a body of rubber-like material in the case, said body being shaped to receive and resiliently support the inertia member in the case.

8. An inertia switch comprising a case member, and an inertia member of conductive material resiliently mounted in the case, the inertia member having portions substantially equally spaced from two parallel walls of conductive material on the case throughout 360° whereby relative movement of the two members in any direction will cause the inertia member to contact the case.

9. An inertia switch comprising a case member formed of conductive material, an inertia member of conductive material resiliently mounted in the case, the inertia member having portions substantially equally spaced from two parallel walls of the case throughout 360° whereby relative movement of the two members in any direction will cause the inertia member to contact the case, and electrical leads connected to the case member and to

the inertia member, the lead connected to the inertia member forming the resilient mounting which permits relative movement of the two members.

10. An inertia switch comprising a case formed of conducting material, an inertia member of conducting material resiliently supported in the case, the case and the inertia member being normally spaced from each other and having surfaces equally spaced from each other throughout 360° whereby relative movement of the two members in any direction will cause the inertia member to contact the case, and leads connected to the case and to the inertia member.

11. An inertia switch comprising a case formed of conducting material, and an inertia member of conducting material resiliently mounted in the case, the inertia member comprising a double cone, the cones being disposed adjacent, but normally spaced from, opposite wall portions of the case shaped to provide surfaces equally spaced from the cones throughout 360° whereby relative movement of the case and the inertia member in any direction will cause the inertia member to contact the case.

References Cited in the file of this patent

UNITED STATES PATENTS

1,845,848	Richards	Feb. 16, 1932
2,076,251	Rockola	Apr. 6, 1937
2,311,855	Nelson	Feb. 23, 1943