Dec. 7, 1948. J. H. SREB 2,455,620

CENTRIFUGAL SWITCH

Filed Sept. 12, 1944

Fig. 1.

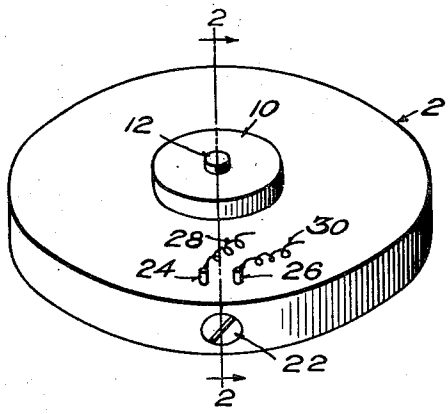


Fig. 2.

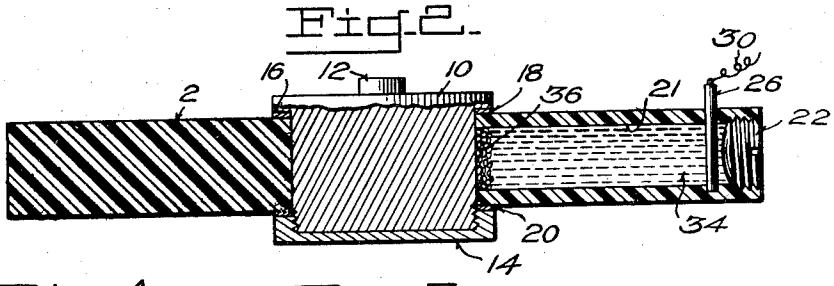


Fig. 4.

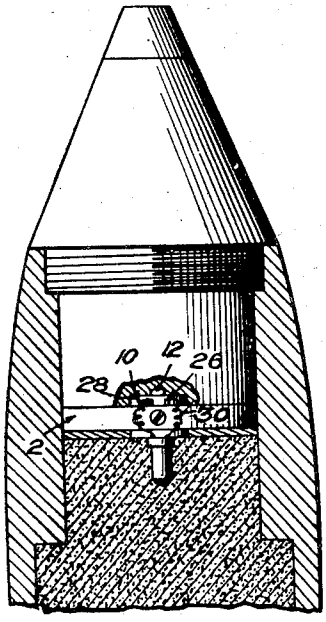
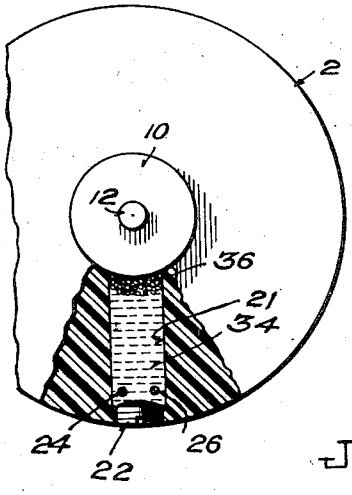


Fig. 3.



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Patented Dec. 7, 1948

2,455,620

UNITED STATES PATENT OFFICE

2,455,620

CENTRIFUGAL SWITCH

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Application September 12, 1944, Serial No. 553,733

9 Claims. (Cl. 102—70.2)

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My invention relates to an improved centrifugal switch, and its general object is to provide a device of this character wherein means is employed for closing an electric circuit at the end of a predetermined period of time.

A further object of my invention is to provide a device of this character, wherein granules of electrical conducting material, suspended in a fluid, are moved by centrifugal force into engagement with a pair of electrical contacts for closing an electric circuit.

A still further object of my invention is to provide a device of this character, which is particularly adapted for use in connection with the electrical detonating of artillery and like projectiles.

A still further object of my invention is to provide a device of this character which is of simple construction, and which is capable of manufacture at low cost.

With these and other objects in view, as will hereinafter more fully appear and which will be more particularly pointed out in the appended claims, reference is now made to the accompanying drawings forming a part of this application, in which:

Figure 1 is a perspective view of my improved centrifugal switch;

Figure 2 is a vertical section view, taken on the line 2—2 of Figure 1;

Figure 3 is a top plan view, partly in section of my invention; and

Figure 4 is a vertical sectional view, partly in elevation showing my improved switch in operative position in a projectile.

Referring now to the drawings in which similar reference characters represent similar parts, in Figs. 1 and 2 my invention comprises a body, shown generally at 2, cylindrical in form preferably cast or moulded of Lucite or other suitable insulating material, and provided with a central circular opening adapted to receive a magnet 10. Magnet 10 is provided with a stud 12 at one end thereof, the other end being threaded to receive cap 14, as shown in Fig. 2. Magnet 10 is also provided with an annular shoulder portion 16 and suitable conventional washers 18 and 20 may be employed to prevent leakage.

The body 2 is provided with a radially extending cylindrical bore or chamber 21 which is threaded at its outer end to receive a conventional plug 22, preferably of the same material as is the body 2. Carried in the body 2 and projecting into the bore 21 are contacts 24 and 26 of copper or other suitable electric current conducting material. Lead wires 28 and 30 are attached to the contacts and are connected in a detonator circuit, as shown in Figure 4. Carried in the bore 21 is a fluid 34, which may consist of glycerine, oil, or some other liquid having the desired viscosity. Suspended in the fluid 34 is a plurality of granules 36, such as iron filings or other suitable electric current conducting particles.

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As best seen in Figure 4, the body 2 is mounted in a projectile, preferably on the axis thereof, when the projectile is at rest, the magnet will attract and retain the granules of electric conducting material at the inner end of the chamber, as shown in Figs. 2 and 3, and out of engagement with the contact pins 24 and 26. When the projectile is fired, and after "set-back" has diminished, centrifugal force will drive the granules outwardly within the bore 31 and through the solution 34 into engagement with the contact pins, thereby closing an electric circuit. In this connection it is pointed out that the centrifugal force will be sufficient to drive the granules into engagement with and about the contact pins with such effect that a low resistance connection between said pins will be assured. When spin has ceased, the granules will fall away from the pins, causing a break in the circuit for providing an extremely high resistance therethrough).

It is desired to call attention to the fact that, by providing solutions of different viscosities, a time delay may be imposed. That is to say, if solutions of heavy viscosity are employed, it will take a longer time for centrifugal force to drive the granules into contact with the pins than would be the case if a solution of light viscosity were used.

It should also be understood that various modifications may be resorted to without departing from the spirit of the invention. For example, if it is desired to use the device for breaking a short circuit, rather than closing a circuit, the pins may be mounted near the inner end of the chamber. It should also be understood that the magnet may be eliminated if desired. However, it is believed that a greater factor of safety will be present if the magnet is employed when a magnetic material is used. In addition, a number of switches can be mounted in one body. Such switches may be employed for controlling a plurality of electric circuits in an electrically detonated projectile. For example, one of said switches could be used to break a short circuit,

another to close a filament circuit, and still another to close a plate circuit.

It should be understood that, if desired, a setback switch may be used in service with my improved centrifugal switch so that electric potentials will not be impressed on the switch contacts until after the projectile is fired.

It is also desired to point out that, if different metallic colloids are used, the times at which the contacts will be bridged may be varied. In addition, by the use of metallic granules supported in a more or less viscous solution, it will be possible to close a circuit gradually with the result that the effect of transients will be minimized.

While I have illustrated and described the invention in some detail, it is to be understood that the invention is not to be limited to such details, but only by the spirit of the invention and the scope of the appended claims.

I claim:

1. A switch of the character described comprising a body, a chamber within said body, contact pins mounted in the chamber, and a plurality of granules of electrical conducting material in the chamber and suspended in a fluid, said granules being adapted to be shifted by centrifugal force for connecting the contact pins electrically with each other.

2. A switch of the character described comprising a body, a radial chamber within said body, a fluid in said chamber, a pair of contact pins mounted in said chamber, a plurality of granules possessing electrical conducting qualities suspended in said fluid, and centrifugal means for moving said granules into contact with said pins, said contact forming an electrical connection between said pins.

3. A switch of the character described comprising a body, a chamber within said body, contact pins mounted in the chamber, a magnet positioned in said body, a plurality of granules of electrical conducting material in the chamber and suspended in a fluid, said granules being adapted to be shifted by centrifugal force for connecting the contact pins electrically with each other.

4. A switch of the character described comprising a body, a radial chamber within said body, a fluid in said chamber, a pair of contact pins mounted in said chamber, a magnet positioned in said body, a plurality of granules possessing electrical conducting qualities suspended in said fluid, and centrifugal means for moving said granules into contact with said pins, said contact forming an electrical connection between said pins.

5. A switch of the character described comprising an annular body, a magnetic core mounted axially in said body, a chamber within said body and extending radially from said magnetic core, a pair of contact pins mounted in said chamber near the outer end of the chamber and adjacent each other, a fluid in said chamber, a plurality of electrical conducting granules suspended in said fluid and centrifugal means for moving said granules into contact with said pins, said contact forming an electrical connection between said pins.

6. A switch of the character described comprising an annular body, a magnetic core mounted axially in said body, a chamber within said body and extending radially from said magnetic core, a pair of contact pins mounted in said chamber adjacent its outer end and adjacent each other, a fluid in said chamber, a plurality of electrical conducting granules suspended in said fluid and normally maintained in juxtaposition contiguous said magnetic core, and centrifugal means for moving said granules away from said position into contact with said pins, said contact forming an electrical connection between said pins.

7. A switch of the character described comprising an annular body, a radially extending chamber within said body, a magnetic core mounted axially in said body and constituting the inner end of said chamber, a pair of contact pins mounted in said chamber adjacent the outer end thereof and adjacent each other, a fluid in said chamber, a plurality of electrical conducting granules suspended in said fluid and centrifugal means for moving said granules into contact with said pins, said contact forming an electrical connection between said pins.

8. A switch of the character described comprising a body, a chamber within said body, contact pins mounted in the chamber, a plurality of granules of electrical conducting material in the chamber and suspended in a fluid, said granules being adapted to be shifted by centrifugal force for connecting the contact pins electrically with each other, and magnetic means for breaking said contact upon cessation of said centrifugal force.

9. A fuze comprising a detonator adapted to be ignited by electrical means, a switch of the character described adapted to be mounted in an explosive projectile, comprising a body, a chamber within said body, contact pins mounted in the chamber, a plurality of granules of electrical conducting material in the chamber and suspended in a fluid, said granules being adapted to be shifted by centrifugal force for connecting the contact pins electrically with other other, and means for conducting the current to the detonator of said fuze.

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The following references are of record in the file of this patent:

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