March 15, 1955 C. D. SPRACHER 2,704,314

MULTIPLE CONTACT ELECTRIC SWITCH

Filed Jan. 4, 1954

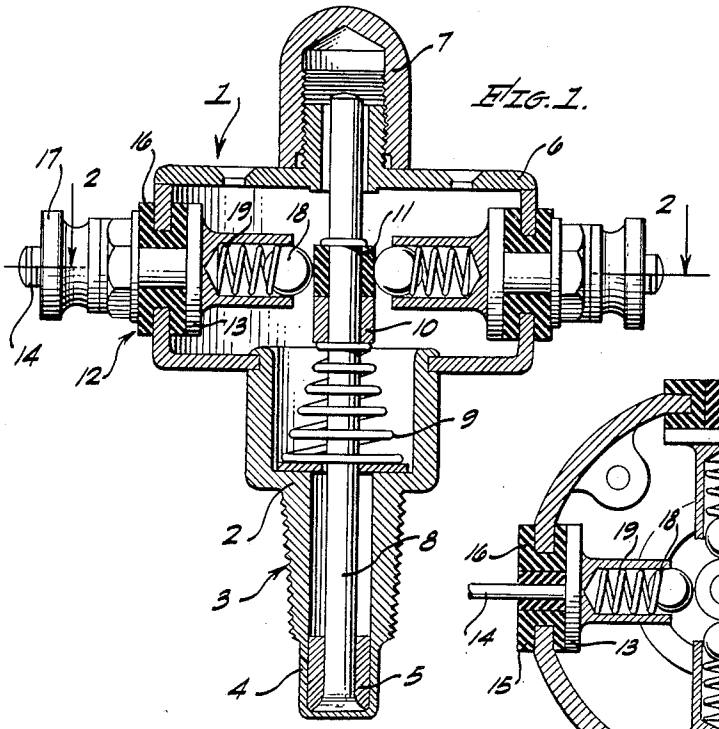


FIG. 1.

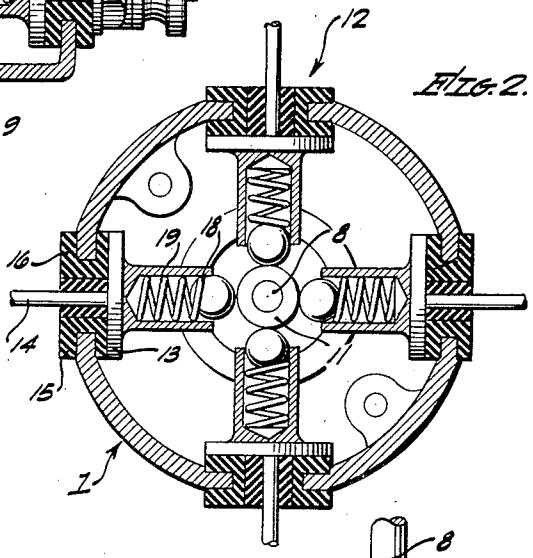


FIG. 2.

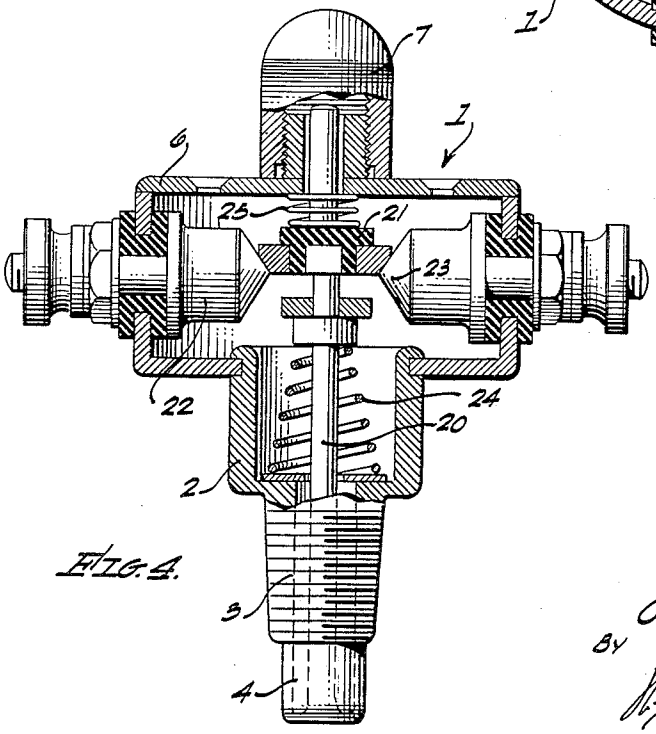


FIG. 4.

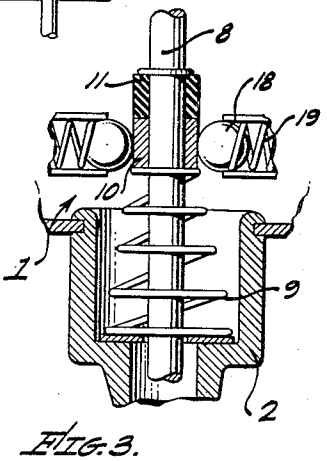


FIG. 3.

INVENTOR.
CLIFFORD D. SPRACHER,
BY
W. A. Fleckman
ATTORNEY.

United States Patent Office 2,704,314 Patented Mar. 15, 1955

2,704,314

MULTIPLE CONTACT ELECTRIC SWITCH

Clifford D. Spracher, Downey, Calif.

Application January 4, 1954, Serial No. 401,863

6 Claims. (Cl. 200—142)

This invention relates to a multiple contact electric switch which includes a fusible element and which causes the switch to either close or open when the fusible element is melted, due to excessive heat on that portion of the switch.

An object of my invention is to provide an electrical switch with a plurality of fixed contacts therein, and with means to open or close these contacts, including a slideable post engaged by all of the contacts, the post being held in one position by a fusible element and moved to another position by a spring when the fusible element is melted.

Another object of my invention is to provide a simple and effective means of returning the control post to its normal set position from an external point on the switch.

A feature of my invention resides in arranging multiple contacts radially so that all of the contacts simultaneously engage a central post.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a longitudinal sectional view of my multiple contact electrical switch.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary vertical sectional view showing the contacts in the open position.

Figure 4 is a vertical sectional view of a slightly modified form of my multiple contact switch.

Referring more particularly to the drawing, the numeral 1 indicates the switch housing, including a hollow thimble 2 externally threaded as at 3 so that it may be screwed into a sump or similar part of an engine or the like, and so that the lower part of the thimble is immersed in oil or in the cooling water, or other fluid of the engine. The lower part 4 of the thimble is filled with a fusible metal 5 which melts at a relatively low temperature, especially when the water or oil reaches a temperature which would indicate possible injury to the engine, or the like. The upper part of the housing 1 is closed by a cover 6 which is secured in position by appropriate screws extending into the lower part of the housing. A cap 7 screws onto the cover 6 and the purpose of this cap will be further described. A post 8 extends vertically through the thimble 2 and through the housing 1 and extends into the cap 7, substantially as shown. The lower end of the post 8 is immersed in the fusible metal 5 and is thus normally held in the position shown in Figure 1. A spring 9 is mounted within the thimble 2 and encircles the post 8. This spring engages a contact ring 10 fixedly mounted on the post 8 and thus urges the post upwardly whenever the fusible metal 5 melts.

A ring 11, formed of an insulating material, is fixedly mounted on the post 8 immediately above the contact ring 10. Thus in the lower position of the post 8 the contacts will engage the insulation 11, whereas when the post 8 is moved upwardly the contacts will engage the metallic ring 10. A plurality of contacts 12 extend radially into the housing 1 and these contacts are identical in construction and only one will be described in detail. A hollow sleeve 13 includes a stem 14, which stem extends through an insulating collar 15. The insulating collar is mounted within a ring 16, also formed of an insulating material. Suitable contact screws 17 are threaded onto the stem 14 to hold the contacts stationary and in proper alignment within the housing 1. The hollow sleeve 13 receives a

ball 18 and the ball is pressed outwardly by a spring 19, thus pressing the ball 18 against either the insulation 11 or the contact 10, depending upon the position of the post 8. When the post 8 is in the position shown in Figure 1 all of the contact balls 18 are engaging the insulation 11 and, consequently, no current can flow from one terminal to another. When the fusible metal 5 is melted, due to excessive temperature of the engine or certain liquids within the engine, then the post 8 is moved upwardly by the spring 9, and at that time all of the contact balls 18 will engage the contact ring 10, thus permitting current to flow from one contact to another to effect a shorting of the electrical system of the engine. If it is desired to reset the switch, the cap 7 can be unthreaded by the cover 6, thus exposing the upper protruding end of the post 8. This post can now be pushed downward manually until the lower end of the post is again immersed in the fusible metal 5, and when this metal solidifies, the post 8 is again held in the position shown in Figure 1.

In the modified form of my invention shown in Figure 4, the construction of the housing 1 and thimble 2 is identical to that previously described. The difference in construction lies in the post 20, which is also immersed in a fusible metal in the bottom of the thimble 2. Adjacent the upper end of the post 20 there is provided a contact head 21 which simultaneously engages all of the contacts 22 which extend radially into the housing 1. The inner ends of the contacts 22 are conical, as shown at 23, thus enabling the head 21 to accurately engage the contacts 22 and either make or break a contact, depending whether the head 21 is formed of a conducting or non-conducting material. A spring 24 in the thimble 2 bears against the post 20 urging the post upwardly so that when the fusible metal in the bottom of the thimble 2 melts, the post 20 will be pressed upwardly to disengage the head 21 from the contacts 22. A coil spring 25, which is lighter than the spring 24, presses the head 21 against the contacts 22, thus providing a yieldable contact which will properly engage, even though there might be some irregularity in the contacts 22.

In the form of my invention, shown in Figures 1 to 3, inclusive, there is also a rolling contact with both the metallic ring 10 and the insulation 11, and also there is a spring pressed contact, due to the springs 19 which press the balls 18 inwardly towards the post 8. It will also be evident that my switch can be reset without disassembling the switch, since the post 8 or 20 can both be reset by simply removing the cap 7 and pressing the post downwardly so that it re-enters the fusible metal mass 5.

Having described my invention, I claim:

1. A multiple contact electric switch comprising a housing, a thimble depending from the housing, a fusible metal in the thimble, a post extending through the housing and into the thimble, one end of the post being immersed in the fusible metal, a plurality of contacts extending into the housing, the inner ends of the contacts engaging the post, and spring means bearing against the post to urge the end of the post out of the fusible metal, a contact ring and an insulating ring on the post, each of said rings being separately engageable by the contacts, in either of two positions of the post.

2. A multiple contact electric switch comprising a housing, a thimble depending from the housing, a fusible metal in the thimble, a post extending through the housing and into the thimble, one end of the post being immersed in the fusible metal, a plurality of contacts extending into the housing, the inner ends of the contacts engaging the post, and spring means bearing against the post to urge the end of the post out of the fusible metal, a cap, means removably mounting the cap on the housing, said cap inclosing the upper end of the post protruding from the housing.

3. A multiple contact electric switch comprising a housing, a thimble depending from the housing, a fusible metal in the thimble, a post extending through the housing and into the thimble, one end of the post being immersed in the fusible metal, a plurality of contacts extending into the housing, the inner ends of the contacts engaging the post, and spring means bearing against the

post to urge the end of the post out of the fusible metal, a constant ring and an insulating ring on the post, each of said rings being separately engageable by the contacts, in either of two positions of the post, a cap, means removably mounting the cap on the housing, said cap inclosing the upper end of the post protruding from the housing.

4. A multiple contact electric switch comprising a housing, a thimble depending from the housing, a fusible metal in the thimble, a post extending through the housing and into the thimble, one end of the post being immersed in the fusible metal, a plurality of contacts extending radially into the housing, a contact ring mounted on the post, each of the contacts engaging the ring in one position of the post, and spring means bearing against the post to urge the end of the post out of the fusible metal, and a spring separate from said spring means engaging the contact ring and pressing the ring against said contacts.

5. A multiple contact electric switch comprising a housing, a thimble depending from the housing, a fusible metal in the thimble, a post extending through the housing and into the thimble, one end of the post being immersed in the fusible metal, a plurality of contacts extending radially into the housing, each of said contacts including a hollow sleeve, a ball mounted in the sleeve, a spring in the sleeve bearing against the ball and pressing each of the balls against the post, a contact ring and an insulating ring on the post, each of said rings being

separately engageable by the balls, in either of two positions of the post, and spring means bearing against the post to urge the end of the post out of the fusible metal.

6. A multiple contact electric switch comprising a housing, a thimble depending from the housing, a fusible metal in the thimble, a post extending through the housing and into the thimble, one end of the post being immersed in the fusible metal, a plurality of contacts extending radially into the housing, each of said contacts including a hollow sleeve, a ball mounted in the sleeve, a spring in the sleeve bearing against the ball and pressing each of the balls against the post, a contact ring and an insulating ring on the post, each of said rings being separately engageable by the balls, in either of two positions of the post, and spring means bearing against the post to urge the end of the post out of the fusible metal, a cap, means removably mounting the cap on the housing, said cap inclosing the upper end of the post protruding from the housing.

References Cited in the file of this patent

UNITED STATES PATENTS

185,841	Striedinger et al.	Jan. 2, 1877
1,001,152	Lawrence	Aug. 22, 1911
1,484,816	Derby	Feb. 26, 1924
2,029,097	Garner	Jan. 28, 1936
2,442,830	Spracher	June 8, 1948