June 11, 1935. F. W. SONN 2,004,773

ELECTRIC SWITCH

Filed Sept. 10, 1934

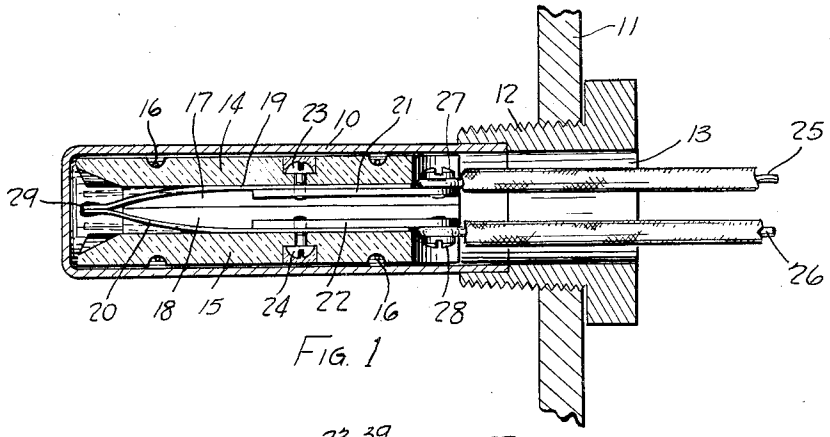



FIG. 1

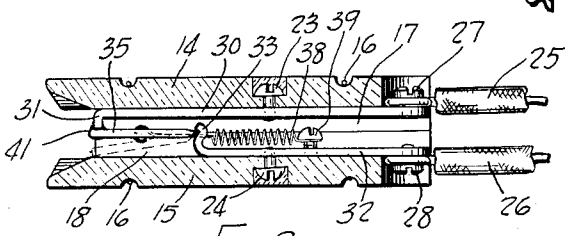



FIG. 2

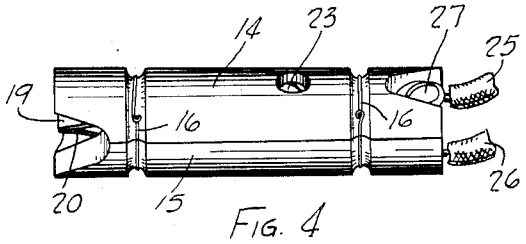



FIG. 4

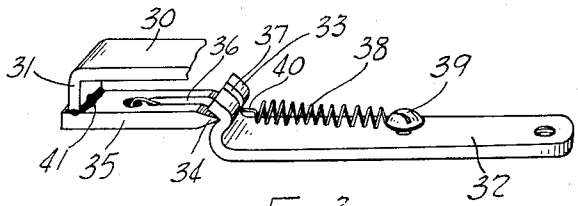



FIG. 3

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## ELECTRIC SWITCH

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10 Claims. (Cl. 200—142)

This invention relates to electric switches and has for an object to provide a switch thermally controlled for breaking a circuit when the temperature has reached a predetermined maximum.

A further object of the invention is to provide a switch of such proportion and construction as to be inserted within a tube or casing, which in turn may be inserted into or clamped to a heated chamber, so that the switch proper will not come in contact with the contents of the chamber, but will be acted upon by the temperature surrounding the switch.

A further object of the invention is to provide a switch having contacts yieldingly mounted, so arranged that the tendency of the yielding members is to separate the switch contacts and break the circuits, said switch contacts to be held normally in closed and contacting position by a solder or like material at such temperature as will represent the predetermined maximum.

The invention, therefore, comprises in combination with a tube and means for associating the tube with a chamber, of a switch comprising halves or sections, each of which carries a switch element, and which may be combined by placing the two halves or segments together, with any approved type of binding means, after which the contacts are soldered and the whole inserted into the tube in position to be acted upon by the surrounding heat.

The drawing illustrates several embodiments of the invention and the views therein are as follows:

Figure 1 is a diametrical sectional view through one type of the switch enclosed in a tube or sleeve and inserted into a chamber,

Figure 2 is a diametrical sectional view of a different type of the switch,

Figure 3 is a perspective view of a fragment of the switch elements in the type shown at Figure 2, and

Figure 4 is a view in elevation of the switch specifically showing the type shown at Figure 1, but substantially showing both types.

Like characters of reference indicate corresponding parts throughout the several views.

The improved switch which forms the subject-matter of this application is of quite general utility, but is especially designed for use in association with a hot water boiler electrically heated or the heating apparatus electrically controlled whereby when the temperature of the water has been raised to the danger point, or any predetermined maximum, a solder which forms a part of the switch apparatus is fused, and the switch points open to break the supply to the heater or to the control. For this purpose a tube or sleeve 10 is provided, of such proportion as to receive the switch therein in its entirety, and for association with a water heater represented by the wall 11, or any other heated chamber, a threaded plug or bushing 12 is employed, secured to the sleeve 10 in water-tight or air-tight condition. The bushing 12 has an opening 13 corresponding in size and registering with the hollow chamber formed by the sleeve 10.

The switch comprises two halves or segments 14 and 15 which, when placed together, form approximately a cylindrical body of such size as to be freely inserted through the opening 13 of the bushing 12 into the sleeve 10.

These segments may be secured together in any approved manner, and the showing of binding wires 16 is not to be understood as any limitation upon the use of any other type of bond.

Each of these segments 14 and 15 is provided with a groove, shown respectively at 17 and 18 which, in the combined body, form an opening entirely through the switch body.

In the type shown at Figure 1, two contact springs 19 and 20 are secured, one to each of the segments as shown. These spring contacts may be secured in any approved manner, but as shown, bars 21 and 22 are positioned upon the proximate sides of these spring contacts, and screws 23 and 24 are inserted through the respective sides 14 and 15 and engage in threaded connection the bars 21 and 22, whereby the spring contacts 19 and 20 are rigidly secured within the opening formed by the grooves 17 and 18.

These bars 21 and 22 form means for connection with the lead-in wires 25 and 26, which are connected, respectively, with the bars 21 and 22 by the binding screws 27 and 28.

After the several contact and conductor parts have been associated with the segments as shown, and the segments united by the bonds 16, or otherwise, the extremities of the spring contacts 19 and 20 are drawn together and through the opening in the end of the body, a low fusing solder 29 is applied to hold such ends in contact, whereby circuit is completed between the lead-in wires 25 and 26.

As an alternative structure, as shown at Figure 2, the bar 30 is provided with a right angle bend or L 31, and the bar 32 with a reversely curved bend 33. The reverse bent curves 33 provides a bearing for the knife edge 34 of the switch 35. The switch 35 is bifurcated at 36 and

the reverse bend 33 is similarly bifurcated at 37, such bifurcations aligning, and a spring 38 is secured at 39 to the bar 32 and is provided with a section 40 which draws across the fulcrum formed by the knife edge 34 in the reverse bend 33, as shown at Figure 2. This spring has a tendency to move and hold the switch 35 at the position shown in dotted lines at Figure 2. To overcome this tendency the switch 35 is brought into engagement with the L-bend 31 and a low fusing solder 41 applied through the end of the body, as described in regard to the assembly of the type shown at Figure 1.

When the solder is fused by heat, the spring 38 tends to move the switch 35 to dotted line position and break the circuit.

In either type the switch as an entirety is merely slipped into the sleeve 10. Of course, any approved means may be employed for maintaining it in that position, but it is not ordinarily deemed necessary as it will therein maintain itself. When and if the heat of the surrounding chamber shall fuse the solder and open the switch, the switch body as an entirely may be quickly withdrawn and resoldered or conveniently and quickly disconnected and a substitute switch properly soldered used as a replacement, which may be returned to the tube with the loss of but a few moments of time.

It is always possible to resolder either of the types shown, which may be done, and the switch returned or another switch substituted and the soldering done at leisure.

Of course, the electric switch herein illustrated may be modified and changed in various ways without departing from the invention herein set forth and hereinafter claimed.

I claim:—

1. An electric switch comprising a hollow substantially cylindrical body of insulating material formed in opposed segments, a switch contact part carried by each of the opposed segments, means tending to separate the switch parts, and an easily fused material holding the contact parts in connection.

2. An electric switch comprising a substantially cylindrical body formed in segments having an opening through its center, means holding the segments united, switch contact parts carried by opposed segments and located within the opening, said switch parts embodying means tending to maintain the parts yieldingly out of contact, and a low fusing material holding the switch parts in electrical contact.

3. An electric switch comprising a substantially cylindrical body composed of segments of insulating material, said segments being provided with furrows extending longitudinally thereof forming in the unit an opening extending axially through the body and open at opposite ends, switch members connected to opposed segments, means tending to hold the switch members normally out of contact, and low fusing material holding the switch members in contact.

4. An electric switch comprising a substantially cylindrical body composed of segments of insulating material, said segments being provided with furrows extending longitudinally thereof and unitedly forming an axial passage open at both ends and extending throughout the unit, spring contact members located within the passage and each connected to the wall of the passage so proportioned as to remain initially out of contact, and low fusing material holding the switch members in contact.

5. The combination with a sleeve and bushing, of an electric switch comprising a body properly proportioned to pass through the bushing into the sleeve and composed of united parts, said parts being provided with furrows unitedly forming a passage longitudinally through the body, switch members within the passage and each individually connected with one of the parts of the body, inhering means tending to hold the switch parts out of contact, and a low fusing material holding the switch parts in contact.

6. An electric switch comprising a substantially cylindrical body composed of segments each having a furrow formed therein unitedly forming a longitudinal and axial passage entirely through the body, spring contact members secured upon opposite sides of the passage and initially out of contact each with the other, and low fusing material connecting the resilient ends of said spring contact members.

7. An electric switch comprising a substantially cylindrical body composed of segments of insulating material each provided with a furrow unitedly forming a passage extending longitudinally throughout the body and open at both ends, a switch element secured to the inner wall of one of said segments and provided adjacent to one open end with an L-bend, a second switch element secured to the opposing wall and provided with a swinging contact member, a spring tending to move and hold the contact member out of engagement with the L-bend, and a low fusing material connecting the swinging contact member to the L-bend.

8. An electric switch comprising an insulating block made up of sections provided with longitudinal furrows registering to form a passage entirely throughout the block, a switch contact carried by each of the parts, means tending to separate the switch parts, and an easily fused material holding the contact parts in connection.

9. An electric switch comprising an insulating block made up of sections provided with longitudinal furrows registering to form a passage entirely throughout the block, spring contact members located within the passage and each connected to a wall of the passage so proportioned as to remain initially out of contact, and low fusing material holding the switch members in contact.

10. An electric switch comprising an insulating block made up of sections provided with longitudinal furrows registering to form a passage entirely throughout the block, a switch element secured to the inner wall of one of said sections and provided adjacent to one open end with an L-bend, a second switch element secured to the opposing wall and provided with a swinging contact member, a spring tending to move and hold the contact member out of engagement with the L-bend, and a low fusing material connecting the swinging contact member to the L-bend.

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