Nov. 18, 1930. J. R. TATE 1,781,990

COMBINED ELECTRIC FUSE AND SWITCH

Filed Aug. 13, 1928

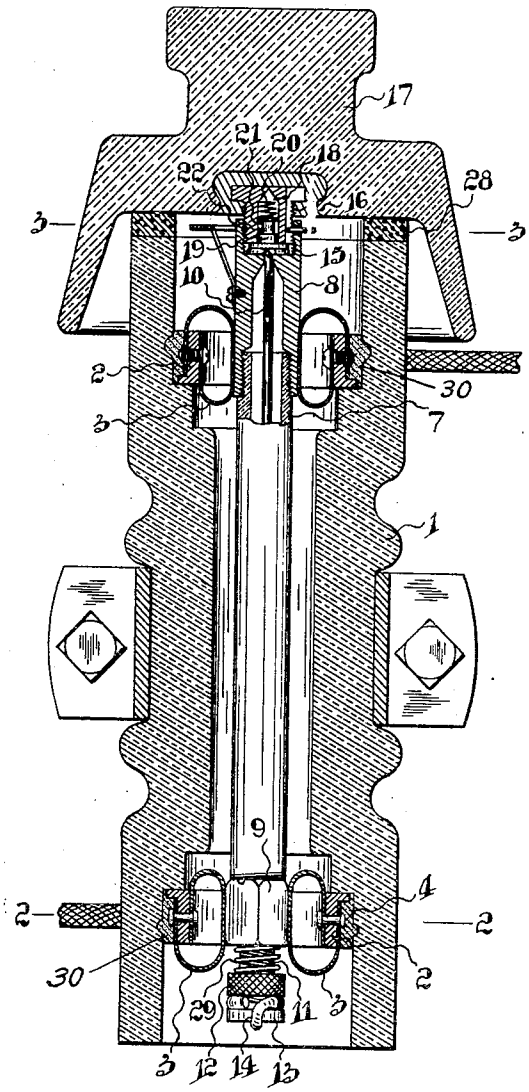


Fig. 1.

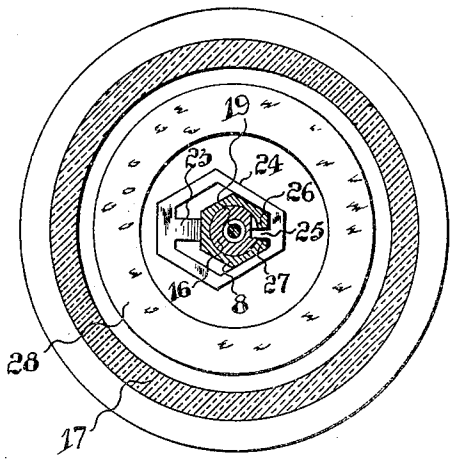


Fig. 3.

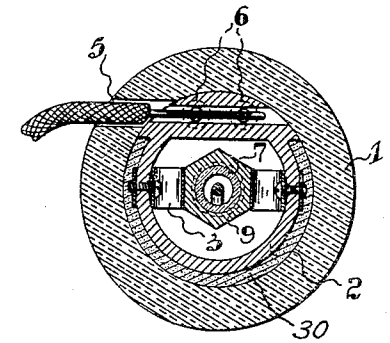


Fig. 2.

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UNITED STATES PATENT OFFICE

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COMBINED ELECTRIC FUSE AND SWITCH

Application filed August 13, 1928. Serial No. 299,347.

This invention relates to heavy duty fused switches for outdoor and indoor use, which switches comprise a hollow body of insulating material having a contact adjacent each end thereof to which the lead wires are connected. A hollow plug member of insulating material is slidably fitted in the body, which plug member is provided with spaced contacts adapted to engage the contacts in the body and which are connected by a fusible element positioned within the plug. The plug is provided with a head of insulating material which serves both as a handle for withdrawing the plug and as a cap to cover the open end of the body and thus exclude dirt and moisture.

My object is to devise certain improvements in the details of construction to overcome certain defects in the devices now on the market. One of these improvements is in the provision of means for preventing the separation of the cap from the plug while the latter is in position in the body.

Another improvement is in the method of mounting the fusible element, and particularly the method of ensuring a good contact at the cap end of the plug. Another improvement is in the construction of the contacts in the body.

I attain my object by means of the constructions hereinafter described and illustrated in the accompanying drawings in which

Fig. 1 is a vertical section of the device;

Fig. 2 a cross section through the body on the line 2—2 in Fig. 1; and

Fig. 3 a cross section through the upper end of the plug.

In the drawings like numerals of reference indicate corresponding parts in the different figures.

1 is the hollow body of the device, which will usually be made of porcelain. Within the body a fuse cartridge is adapted to slide so that it may be positioned to make or break the electric circuit in which the device is included.

The body is counterbored at each end to receive metallic members 2 to each of which are secured two opposed spring contacts 3. These spring contacts are each formed from a piece of spring metal bent up to substantially elliptical form with the ends overlapping, one end being secured to the outside and the other to the inside of the member 2 by means of a rivet 4. The spring contacts 3 are secured to the rings 2 before the latter are inserted in the body. The rings are held in the body by cement 30.

Holes 5 are formed through the side of the body, one for each member 2, for the passage of conductors, the ends of which are secured in place by set screws 6.

The fuse cartridge is formed as a tube 7 of insulating material having at its upper end a contact 8 and at its lower end a contact 9, which are adapted to be engaged respectively with the upper and lower spring contacts 3. A fusible element 10 inside the tube 7 has its ends connected with the contacts 8 and 9.

The lower contact 9 has a threaded extension 11 having a jam nut 12 thereon. On the outer end of the threaded extension is a shoulder 13 having a slot 14 formed therein. The end of the fusible element is passed through this slot 14 and bent around the extension 11, the nut 12 being turned down to hold the element against the shoulder 13. A coil spring 29 tends to prevent unscrewing of the nut.

The upper end of the upper contact 8 has a recess 15 formed therein in which the upper end of the fusible element is bent. This recess is threaded to receive a plug 16, the end of which is secured, by means of a lead seal, within a recess in the insulating cap 17.

This plug has a recess 18 therein in which is slidable a plunger 19. A coil spring 20 is positioned in the recess below the plunger and tends to hold the latter in projected position. In the stem of the plunger is formed a notch 21 into which projects a shoulder 22 on the inside of the plug. This shoulder is preferably formed by driving a portion of the side of the plug inwardly by means of a suitable punch. The plug will be formed of a metal sufficiently soft to enable this to be done.

This plunger, when the cap is in position on the end, the upper contact 8 resiliently holds the fusible element against the bottom of the recess 15.

As stated in the preamble of the specification, it is desirable to prevent the removal of the cap from the fuse cartridge while the latter is in position in the body. I therefore mount on the upper contact 8 a thumb spring 23, which has connected therewith a locking member 24 having a tongue 25 extending through a hole 26 in the side of the contact 8. The plug 16 has a ratchet notch or groove formed in its side into which the tongue 25 may project, one side of the groove forming a cam to move the tongue outwardly when the cap is being placed in position, the other side of the notch forming a shoulder 27 with which the tongue 25 engages to prevent the removal of the cap. After the fuse cartridge is withdrawn from the body, by pushing against the spring 23 with the thumb, the tongue may be withdrawn to allow the cap to be removed.

In order to prevent moisture getting inside the body, an annular ring 28 of cork or other suitable material is secured within the cap to form a seal between the cap and body.

From the above description it will be seen that I have devised a construction which will satisfactorily attain the objects of my invention as set out in the preamble of this specification.

What I claim is:

1. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contact members within said body adapted to be contacted by the contact members of the fuse cartridge, one of said body contact members comprising a metal member positioned within the bore of the body; and a pair of opposed springs, each of said springs being of substantially elliptical form extending longitudinally of the body and secured to the metal member.

2. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contact members within said body adapted to be contacted by the contact members of the fuse cartridge, one of said body contact members comprising a metal member positioned within the bore of the body; and a pair of opposed springs, each of said springs comprising a strip of metal of substantially elliptical form, the opposite ends of said strip being secured to the metal member.

3. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which the fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contact members within the body with which the contacts on the fuse cartridge are adapted to engage, one of the contact members on the fuse cartridge having a threaded tubular extension; an annular rib adjacent the outer end of said extension; and a jam nut threaded on said extension adapted to hold the end of the fusible element against the rib.

4. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which the fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contact members within the body with which the contacts on the fuse cartridge are adapted to engage, one of the contact members on the fuse cartridge having a threaded tubular extension; an annular rib adjacent the outer end of said extension, said shoulder having a slot formed therethrough for the passage of the fusible element; and a jam nut threaded on said extension adapted to hold the end of the fusible element against the rib.

5. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which the fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contact members within the body with which the contacts on the fuse cartridge are adapted to engage, one of the contact members on the fuse cartridge having a threaded tubular extension; an annular shoulder on said extension; a jam nut threaded on said extension adapted to hold the end of the fusible element against the shoulder; and a spring on said extension tending to hold the nut against the shoulder.

6. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage, one of the contacts on the fuse cartridge having a threaded recess formed therein to receive the end of the fusible element; a cap of insulating material; a plug fitted in said cap and adapted to be threaded in said recess; and a resiliently pressed plunger carried by the plug extending into said recess to engage the fusible element.

7. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage, one of the contacts on the fuse cartridge having a threaded recess formed therein to receive the end of the fusible element; a cap of insulating

material; a plug fitted in said cap and adapted to be threaded in said recess, said plug having a pocket formed therein; a plunger slidable in said pocket; and a spring in said pocket tending to move the plunger into projected position.

8. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage, one of the contacts on the fuse cartridge having a threaded recess formed therein to receive the end of the fusible element; a cap of insulating material; a plug fitted in said cap and adapted to be threaded in said recess, said plug having a pocket formed therein; a plunger slidable in said pocket; and a spring in said pocket tending to move the plunger into projected position, said plunger having a slot formed in its side and the said plug having a shoulder on the wall of the pocket extending into said slot.

9. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage; a cap of insulating material detachably mounted on the upper contact member of the fuse cartridge; and means for locking said cap in position on the contact member inaccessible for release while the cartridge fuse is in position in the body.

10. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage; a cap of insulating material threaded on the upper contact member of the fuse cartridge; and means for preventing the disengagement of the cap from the contact member while the fuse cartridge is in the body.

11. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage, the upper contact member on the fuse cartridge having a threaded recess formed thereon to receive the end of the fusible element; a cap of insulating material; a plug carried by the cap and adapted to be screwed into said recess; a spring on said upper contact member, said upper contact member having a hole formed in its side; and a tongue on said spring extending through said hole, said plug having a shoulder formed thereon with which said tongue is adapted to engage to prevent the removal of the plug.

12. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage, the upper contact member on the fuse cartridge having a threaded recess formed thereon to receive the end of the fusible element; a cap of insulating material; a plug carried by the cap and adapted to be screwed into said recess; a spring on said upper contact member, said upper contact member having a hole formed in its side; a tongue on said spring extending through said hole, said plug having a shoulder formed thereon with which said tongue is adapted to engage to prevent the removal of the plug; and a resiliently supported plunger carried by the plug extending into said recess.

13. In a combined fuse and switch, the combination of a fuse cartridge having spaced contact members thereon to which a fusible element is connected; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage, the upper contact member on the fuse cartridge having a threaded recess formed thereon to receive the end of the fusible element; a cap of insulating material; a plug carried by the cap and adapted to be screwed into said recess; a spring on said upper contact member, said upper contact member having a hole formed in its side; a tongue on said spring extending through said hole, said plug having a shoulder formed thereon with which said tongue is adapted to engage to prevent the removal of the plug, said plug having a pocket formed therein; a plunger slidable in said pocket; and a spring in said pocket tending to move the plunger into projected position.

14. In a combined fuse and switch, the combination of a fuse cartridge having spaced contacts thereon to which a fusible element is engaged; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage; a cap of insulating material mounted on one of the contact members of the fuse cartridge; and means carried by the cap to retain the fusible element in en-

gagement with the contact on which said cap is mounted.

15. In a combined fuse and switch, the combination of a fuse cartridge having spaced contacts thereon to which a fusible element is engaged; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage; a cap of insulating material mounted on one of the contact members of the fuse cartridge, said last mentioned contact member having a recess therein into which the end of the fusible element extends; and a projection carried by the cap adapted to extend into said recess to retain the fusible element in engagement with the bottom thereof.

16. In a combined fuse and switch, the combination of a fuse cartridge having spaced contacts thereon to which a fusible element is engaged; a hollow body of insulating material in which the fuse cartridge is slidably received; spaced contacts within the body with which the contacts on the fuse cartridge are adapted to engage; a cap of insulating material mounted on one of the contact members of the fuse cartridge, said last mentioned contact member having a recess therein into which the end of the fusible element extends; and a resiliently pressed projection carried by the cap adapted to extend into said recess to retain the fusible element in engagement with the bottom thereof.

Signed at Toronto, Canada, this 24th day of July 1928.

JAMES RICHARD TATE.