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D. S. RIVERS

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ELECTRIC CIRCUIT INTERRUPTER

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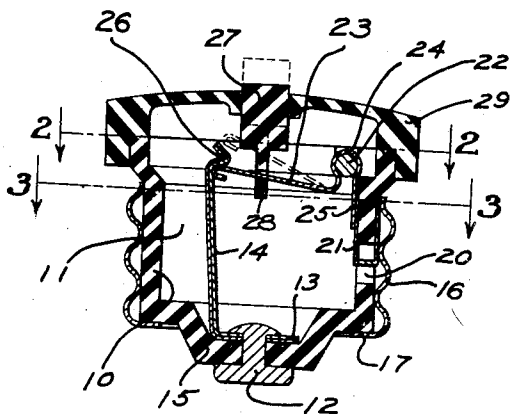


Fig. 1

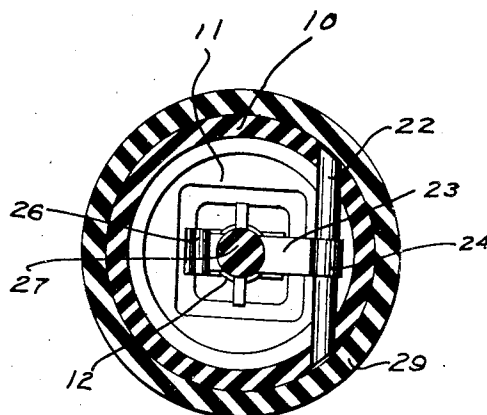


Fig. 2

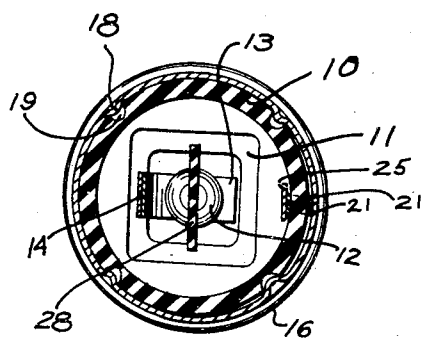


Fig. 3

Inventor
Durward S. Rivers,
By Minturn Tulinturn,
Attorneys

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ELECTRIC CIRCUIT INTERRUPTER

Durward S. Rivers, Indianapolis, Ind.

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4 Claims. (Cl. 200—116)

This invention relates to a plug type electrical circuit protector designed to replace the ordinary fuse embodying fusible metal.

The primary object of the invention is to provide a simplified structure which may be reset following circuit interruptions on overloads.

A further important object of the invention is to provide not only an extremely reliable operation in that part of the structure pertaining to the re-set, but also to provide an additional safety device in the form of a fuse link in series with the re-set mechanism.

Further important objects, advantages and features of the invention will be found in the unique combination of the elements as indicated in the appended claims, and as will become more apparent in the following description of one particular form of the invention as illustrated in the accompanying drawing, in which:

Fig. 1 is a diametrical vertical section through the structure embodying the invention;

Fig. 2, a horizontal transverse section on the line 2—2 in Fig. 1; and

Fig. 3, a horizontal transverse section on the line 3—3 in Fig. 1.

Like characters of reference indicate like parts in the various views of the drawing.

A body 10 is formed of a suitable insulating material to have an outer cylindrical surface and an internal cavity. This cavity 11, in the form herein shown, is circular in cross section. An axial terminal 12 extends through the floor or inner end of the body 10 and through the foot 13 of the bi-metal strip 14 to secure the foot 13 firmly against the inner side of the floor by turning the head of the terminal 12 in the form of a rivet. The floor of the body 10 is preferably recessed in order to provide for a seat for the foot of the bi-metal 14 and also an externally extending boss 15 on the end of the body 10 so as to present the outer end of the terminal 12 at a distance from the body 10. While the member 14 has been referred to as being made of the bi-metal, it is sufficient that this member be of any thermo-responsive material which will permit sufficient distortion of the metal to interrupt the circuit as will hereinafter more fully be described.

A sleeve or ferrule 16 surrounds the body 10 and has an intumed flange 17 to abut the end of the body 10 surrounding the protruding boss 15. The other end of the ferrule 16 is engaged with the body 10 by forming detents 18 fitting into indentations 19 around the body, four of such indentations being herein shown, Fig. 3.

It is understood that this engagement of the body with the ferrule is made at the upper end of the ferrule as indicated by sections shown in Fig. 3.

The body 10 is provided with a side window 20. A length of metal 21 of suitable cross sectional area and composition, to melt at a predetermined overload is formed to have a U-shape, whereby the metal 21 may be entered through the window 20 and pushed upwardly to engage the body 10 between the legs of the metal, as indicated in Fig. 1. In this position of the outer leg of the metal 21 is in electrical contact with the ferrule 16 and the inner leg of the metal extends along the inside of the cavity against the body 10.

Across the upper end of the body 10 is positioned a suitable support 22, herein shown as an inserted pin. The spring 23 is formed to have a looped portion 24, yieldingly engaged around the major portion of the circumference of this pin 22. From the portion 24 is carried a foot 25 downwardly into the cavity 11 a sufficient length as will permit the foot 25 to bear against and over an appreciable area of the inner leg of the metal 21. From the other side of the portion 24, the spring 23 extends across the cavity 11 normally in a position inclined upwardly, as indicated by dash lines in Fig. 1. The outer terminal end of the spring 23 is preferably provided with a round end, herein shown as formed by simply turning over the end of the spring.

The thermostatic metal 14 is carried upwardly through the cavity 11 to a position as indicated in Fig. 1, whereby the spring 23, when pushed downwardly, may engage by its free end under the hook 26, formed in the upper end of the metal 14, so that the normal position of the spring 23 is that when it is so engaged and as indicated by the solid lines in Fig. 1.

An indicating and reset button 27 is provided with a body herein shown as circular in cross section and is further provided with a tongue 28, having a slot therethrough, through which the spring 23 is carried. The cap 29 is provided to have a bore therethrough slidably receiving the body of the button 27 so that when the cap 29 is attached to the body 10, the button 27 will be pushed outwardly to some such position as indicated by the dash lines in Fig. 1, when the spring 23 is released from the engagement with the metal 14, and further, the cap 29 will guide the button 27 when the button is pushed inwardly to carry the spring 23 back into engagement with the metal 14. This cap 29, as is also the button 27, is preferably made of some suitable

insulating material. The cap 29 is formed to engage over on the outer end of the body 10 with a pressed fit sufficiently tight as will cause the cap 29 to engage the body and permit rotation of the body through the cap.

The structure above described is adapted to fit in the ordinary fuse block or receptacle (not shown) and will provide an electrical circuit from the terminal 12 through the metal 14, spring 23, fuse link 21, and the ferrule or sleeve 16. The metal 14 is so selected and sized that when a predetermined overload arises in the circuit, the metal 14 will bend outwardly from the axis of the body a sufficient distance to release the spring 23, whereupon the circuit is broken. When the overload condition is removed, and the bi-metal 14 has cooled sufficiently, this bi-metal will have returned to the normal position to again receive and engage with the spring 23 to re-establish the circuit. However, should for any reason the members 14 and 23 refuse to separate on an overload, the metal 14, being formed to carry a slightly greater overload, will then melt and break the circuit. This fuse link 21 is provided to break the circuit only on failure of the members 14 and 23 to separate. However, in the arrangement herein shown, it would be an extremely rare occasion when the fuse link 21 would be called upon to break the circuit.

While I have herein shown and described my invention in the one form as is best known to me, it is obvious that structural changes may be made without departing from the spirit of the invention and I therefore do not desire to be limited to this precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. In a plug type circuit interrupter, a body of insulation having a cavity, an axial terminal passing through the body into the cavity, a sleeve terminal surrounding the body, a thermostatically shiftable metal strip anchored by one end in said cavity, and electrically connected with said axial terminal, a spring, a supporting member carried by said body over which said spring wraps, one end of the spring being carried down into said cavity and yieldingly toward a wall thereof, the other end of the spring being yieldingly carried transversely over said cavity into releasable engagement with an outer portion of said metal strip, means electrically connecting said spring foot with said sleeve, a cap over said body, and a reset button slidingly guided through said cap to have an end in the path of said spring, said button having a slot therethrough through which said spring passes.

2. In a plug type circuit interrupter, a body of insulation having a cavity, an axial terminal passing through the body into the cavity, a sleeve terminal surrounding the body, a thermostatically shiftable metal strip anchored by one end

in said cavity and electrically connected with said axial terminal, a spring, a supporting member carried by said body over which said spring wraps, one end of the spring being carried down into said cavity and yieldingly toward a wall thereof, the other end of the spring being yieldingly carried transversely over said cavity into releasable engagement with an outer portion of said metal strip, means electrically connecting said spring foot with said sleeve, a cap over said body, and a reset button slidingly guided through said cap to have an end in the path of said spring, said sleeve and spring connecting means consisting of a U-shaped metal piece entered through a window in said body and straddling the body wall to have one leg abutted by said spring foot and its other leg connected with said sleeve.

3. In a plug type circuit interrupter, a body of insulation having a cavity, an axial terminal passing through the body into the cavity, a sleeve terminal surrounding the body, a thermostatically shiftable metal strip anchored by one end in said cavity and electrically connected with said axial terminal, a spring, a supporting member carried by said body over which said spring wraps, one end of the spring being carried down into said cavity and yieldingly toward a wall thereof, the other end of the spring being yieldingly carried transversely over said cavity into releasable engagement with an outer portion of said metal strip, means electrically connecting said spring foot with said sleeve, a cap over said body, and a reset button slidingly guided through said cap to have an end in the path of said spring, said supporting member comprising a pin carried by end sockets in said body, and said spring being wrapped about the pin more than 180 degrees.

4. In a plug type circuit interrupter, a body of insulation having a cavity, an axial terminal passing through the body into the cavity, a sleeve terminal surrounding the body, a thermostatically shiftable metal strip anchored by one end in said cavity and electrically connected with said axial terminal, a spring, a supporting member carried by said body over which said spring wraps, one end of the spring being carried down into said cavity and yieldingly toward a wall thereof, the other end of the spring being yieldingly carried transversely over said cavity into releasable engagement with an outer portion of said metal strip, means electrically connecting said spring foot with said sleeve, a cap over said body, and a reset button slidingly guided through said cap to have an end in the path of said spring, said button end having a slot therethrough through which said spring passes, said button end also having a shoulder thereon above said slot limiting outward travel of the button and said spring.

DURWARD S. RIVERS.