Aug. 1, 1939. G. R. BROWN 2,168,153

RENEWABLE FUSE

Filed March 23, 1938

Fig. 1.

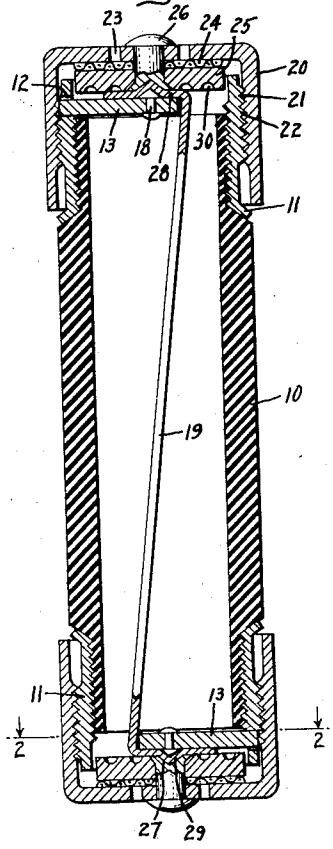


Fig. 3.

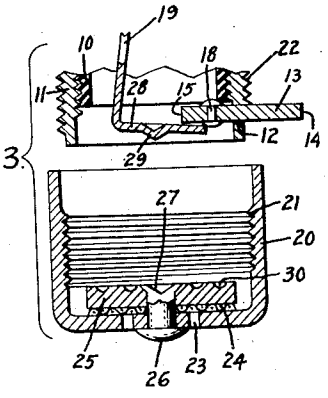
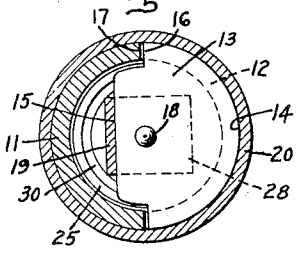


Fig. 2.



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RENEWABLE FUSE

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Application March 23, 1938, Serial No. 197,652

7 Claims. (Cl. 200—131)

This invention relates to a fuse for protecting electrical circuits, and more particularly to a cartridge type of fuse employing a renewable fuse link.

It is an object of my invention to provide an improved construction and arrangement in devices of this type in which the link may be easily and quickly replaced upon blowing of the fuse.

In the accompanying drawing Fig. 1 is a cross-sectional view through the fuse; Fig. 2 is a sectional view on the line 2—2 of Fig. 1, and Fig. 3 is an exploded view showing one end of the fuse with the cap removed illustrating the manner of renewing the fuse link.

Referring to the drawing the fuse casing comprises a housing 10 of insulating material, which may be formed of fibre or the like, and which may take the form of a tubular member, although housings of other shapes may be employed. A metallic ferrule 11 forming part of the casing is provided at each end of the housing for the purpose of reinforcing the casing and for providing a contacting means for cooperation with a fuse holder. The ferrules are shaped to the contour of the body of the housing and in the form illustrated are tubular. Inasmuch as both end structures of the fuse are identical, one end only will be described, it being understood that the other end of the fuse is similarly constructed.

The ferrule 11 is provided with a slot 12 which extends half way around the periphery of the ferrule to provide a loose mounting for a supporting plate 13. In order to conform to the contour of the ferrule, the plate 13 is provided with a semi-circular edge 14 which coincides with the periphery of the ferrule when the plate is in fuse-holding position. The other edge 15 of the plate extends substantially across the end of the opening formed by the casing 10 and is provided with indented abutments 16 which coact with the walls 17 of the slot 12 to prevent the plate from falling out of the slot interiorly of the ferrule 11. In order to prevent the plate from being withdrawn from the slot exteriorly of the ferrule, a pin 18 is provided through the plate which engages the wall of the casing as the plate is drawn outwardly, as best shown in Fig. 3. Inasmuch as the plate may be moved transversely to the axis of the casing to uncover the end thereof a relatively large opening is provided by the unobstructed end of the casing through which the fuse link 19 may be inserted in the fuse structure.

In order to maintain the supporting plate 13 in normal fuse holding position and in order to clamp the fuse to the plate, a cap 20 is provided having internal screw threads 21 cooperating with external threads 22 formed on the ferrule 11. The cap is provided with vent openings 23 which are separated from the interior of the fuse housing by a screen 24. A bearing plate 25 is provided in the base of the cap to cooperate with the supporting plate 13 in clamping the fuse link. The screen serves to separate the bearing plate 25 from the vented end wall of the cap in order that gases may be vented through the openings 23. The bearing plate 25 and screen 24 are secured to the end of the cap by a rivet 26 which is provided at its interior end with an indentation 27 adapted to cooperate with the pin 18 in holding a fuse link in position.

The fuse link 19 is provided with an end portion 28 which may be bent at an angle to the main body of the fuse and which is provided with a boss 29 which fits over the pin 18 and rests within the indentation 27 so that as the cap is screwed upon the ferrule the end of the link is locked securely between the bearing plate 25 and the supporting plate 13. It is desirable that an excellent electrical contact be maintained between the end of the fuse and the cap structure. To this end the bearing plate 25 is provided with a plurality of annular grooves 30 which score the surface of the end of the fuse link as the cap is rotated and threaded down upon the ferrule thereby making clean line contact with the end of the fuse link.

By the construction of this invention it is possible to easily and quickly replace the fuse link 19 whenever it is blown. By unscrewing the cap at each end of the casing 20 it is possible to slide the supporting plates 13 transversely to the axis of the fuse casing to a position where they uncover the ends of the casing, such a position being shown by Fig. 3. In this position ample room is provided for removing the fragments of the blown fuse and for replacing the fuse link through the opening made by the transverse removal of the supporting plate 13. The supporting plate 13 is locked within the slot in the ferrule by means of the pin 18 which prevents its removal from the outside or exterior of the ferrule and by the shoulders 16 and the edge 15 which prevent removal of the supporting plate from the inside or interior of the ferrule. Accordingly, there is no danger of the supporting plate becoming disassembled or lost. The semi-circular wall 14 of the supporting plate cooperates with the wall of the cap 20 in maintaining the bearing plate in fuse-holding position, as shown by Fig. 1. Ample opportunity for venting the gas pressures incident

to blowing of the fuse is provided by the vents 23 and screen 24, the latter maintaining any fragments of the fuse link within the fuse casing.

While the slot 12 and the supporting plate 13 have been shown as semi-circular in shape for the purposes of illustration, it will be apparent that these elements may take other forms in which the supporting plate is movable transversely of the fuse casing without departing from the spirit of the invention. A fuse constructed according to this invention is one in which the fuse link may be easily and quickly replaced without the use of special tools or equipment, it being merely necessary to unscrew the closure cap at each end of the fuse and move the supporting plate to expose the interior of the casing.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a fuse structure, a tubular casing, a threaded ferrule mounted at one end of said casing, said ferrule being provided with a semi-circular slot, a supporting element slidable in said slot transversely of said casing and partially closing the end of said casing, a cap threaded on said ferrule and a fuse link disposed in said casing and having a bent-over end clamped between said supporting element and said cap as said cap is threaded on said ferrule.

2. In a renewable fuse, a casing, said casing having a peripheral slot at one end, a supporting element mounted in said slot for movement transversely of said casing, a cap closing the end of said casing and maintaining said element in operative position, and a fuse link having an end clamped between said cap and said element, said cap being removable from said casing whereby said supporting element may be slid transversely through said slot for removal of said fuse link from the casing.

3. A renewable fuse comprising a casing having a slot extending around a portion of the periphery at one end thereof, a supporting element disposed in said slot and substantially closing the end of said casing, said supporting element being movable transversely of the casing through said slot to uncover the end of said casing, means on said element maintaining said supporting element within said slot, a cap surrounding the end of the casing and a fuse link disposed within said casing and having an end clamped between said supporting element and said cap.

4. In a renewable fuse structure, a tubular casing of insulating material, a ferrule disposed on one end of said casing, said ferrule having a slot through the periphery thereof, a supporting element normally disposed within said slot and substantially closing the end of said casing, said supporting element being movable transversely of the casing through said slot to uncover the end of said casing, a cap secured to said ferrule, and a fuse link disposed in said casing and having an end clamped between said cap and said supporting element, said cap extending around the periphery of said ferrule and maintaining said supporting element in normal position.

5. In a device of class described, a tubular casing of insulating material, a ferrule on one end of said casing provided with a peripheral slot, a supporting element normally disposed within said slot for substantially closing the end of said casing, said element being movable transversely of said casing through said slot to expose the end of said casing for insertion of a fuse link therein, a fuse link disposed in said casing having an end overlying said supporting element when in normal position, and a cap provided with grooved means mounted on said ferrule to clamp the end of said link between said grooved means and said supporting element, said cap maintaining said supporting element in normal position.

6. In combination, a casing having a peripheral slot at one end, a supporting element located in said slot and partially closing the end of said casing, said element being slidable transversely of the casing through said slot to expose the end of said casing, means on said element coacting with the wall of said casing to prevent removal of said element from said slot, a cap secured to the end of said casing and adapted to maintain said element in closing position, said cap being provided with a vent opening, a screen closing said opening, a bearing plate secured to said cap and overlying said screen and opening, and a fuse link disposed in said casing having an end clamped between said supporting element and said bearing plate.

7. In combination, a tubular casing of insulating material, threaded ferrules secured to each end of said casing, each of said ferrules being provided with a peripheral slot, a supporting element at each end of the casing partially closing the ends of said casing and slidable in said slots transversely of said casing, projecting means mounted in each of said supporting elements, a cap threaded to each of said ferrules, said caps being provided with vent openings, screens covering said openings, bearing plates holding said screens in position, means fastening a plate and screen to a corresponding cap, said fastening means being indented for cooperation with said projecting means, grooves formed in said bearing plates, and a fuse link disposed in said housing and having bent-over ends clamped between said supporting elements and said bearing plates as said caps are threaded on said ferrules, with said projecting means and indented fastening means gripping the ends of said link.

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