Oct. 3, 1944. R. C. KULLING 2,359,565

FUSE PLUG

Filed April 23, 1943

Fig. 1.

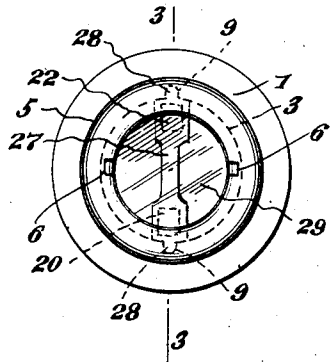


Fig. 2.

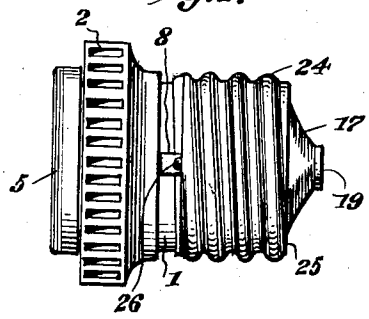


Fig. 4.

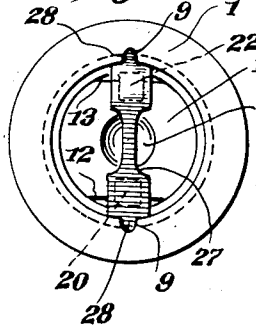


Fig. 3.

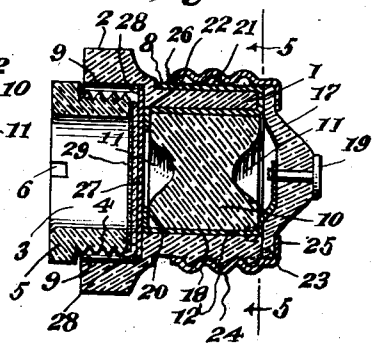


Fig. 5.

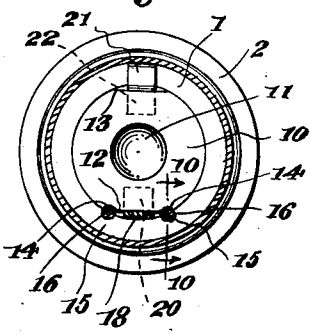


Fig. 6.

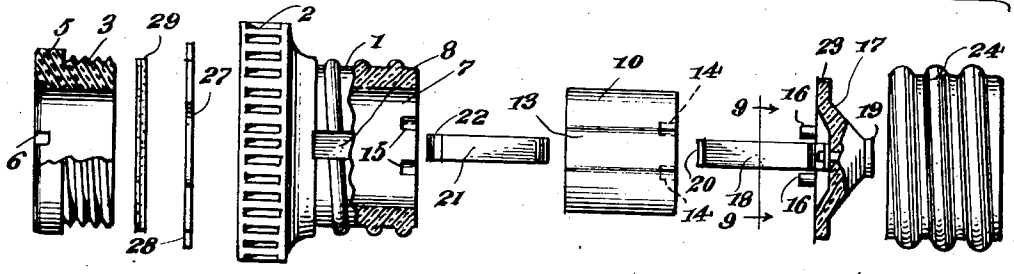


Fig. 7.

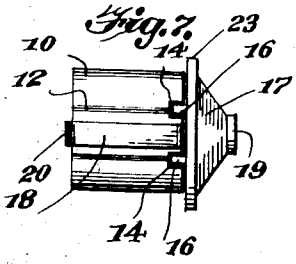


Fig. 8.

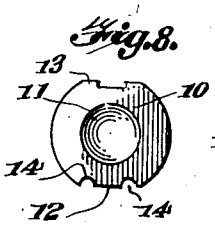


Fig. 9.

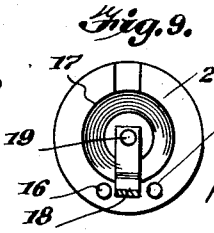
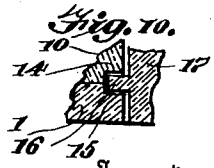


Fig. 10.



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UNITED STATES PATENT OFFICE

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FUSEPLUG

Rudolph C. Kulling, Chicago, Ill.

Application April 23, 1943, Serial No. 484,263

3 Claims. (Cl. 200—130)

This invention relates to fuse plugs and it is one object of the invention to provide a device of this character of such construction that when the fuse is blown by an overload, a bridge strip which is burned through may be removed and another substituted. It will thus be seen that the only portion of the plug which is discarded is the burnt fuse strip and that the remainder of the fuse plug is saved and its use continued.

Another object of the invention is to provide a fuse plug of such construction that elements thereof may be very easily assembled and conductor strips firmly held in opposed relation to each other with their outer ends so disposed that a bridging strip of fusible material may be easily applied and retained in proper position for engaging the conductor strips.

Another object of the invention is to provide the plug with a core fitting within a cylindrical body of the plug, the core being so formed that when it is fitted into the body, a conductor strip carried by a cap for the inner end of the body will be held in diametrically oposed relation to a conductor strip carried by the body.

Another object of the invention is to provide the plug with a retainer sleeve or ring adapted to hold the bridge strip and a transparent shielding disc in place, the sleeve being easy to remove when it is necessary to substitute a new bridging strip in place of one which has been burned through by an over-load.

Another object of the invention is to provide a fuse plug which is simple in construction, easy to assemble, and adapted for use over a long period of time.

In the accompanying drawing:

Fig. 1 is a view looking at the front end of the improved fuse plug.

Fig. 2 is a side elevation of the improved fuse plug.

Fig. 3 is a sectional view taken longitudinally through the fuse plug on the line 3—3 of Fig. 1.

Fig. 4 is a view looking at the front end of the fuse plug with the retainer ring or sleeve removed.

Fig. 5 is a sectional view taken transversely through the plug on the line 5—5 of Fig. 3.

Fig. 6 is a group view showing the elements of the plug disassembled, certain of the elements being partially in section.

Fig. 7 is a view of the core and cap looking at the opposite side thereof from that shown in Fig. 6.

Fig. 8 is an end view of the core.

Fig. 9 is a view taken on the line 9—9 of Fig. 6, rotated through an angle of 180°.

Fig. 10 is a fragmentary view taken on the line 10—10 of Fig. 5.

This improved fuse plug has a cylindrical body 1 formed of hard rubber or other suitable insulating material. The body has an outstanding annular flange 2 about its front end which is knurled so that it may be firmly gripped when screwing the plug into a socket of a fuse box or when screwing a ring or sleeve 3 into or out of place in the body. The sleeve is externally threaded for engagement with internal threads 4 formed in the front end portion of body. The outer end portion of the sleeve is formed with an outstanding flange 5 to limit inward movement of the sleeve when screwed into place. Notches 6 formed in the outer end of the sleeve permit it to be easily unscrewed from the body. From the inner end of the internal threaded portion of the body, the bore 7 of the body has smooth walls which are unobstructed for its length to the inner end of the body. It should be noted, however, that the threaded outer surface of the body is formed with a longitudinally extending recess 8 and that the internally threaded forward portion of the body is formed internally with diametrically opposed grooves or seats 9, one of which is located substantially in alinement with the recess 8.

A core 10 of insulating material fits snugly in the bore 7 of the body and is thrust into place from the rear end of the body. This core has recesses 11 at its ends and along opposite sides is formed with flat surfaces 12 and 13 which extend the full length of the core. Notches 14 are formed in one end of the core at opposite sides of the flat surface 12 to register with companion notches 15 formed at the rear end of the body and form seats to receive pins or lugs 16 which are carried by a cap 17 and are spaced from each other circumferentially of the cap a sufficient distance to accommodate a conductor strip 18 between them. This strip has its inner end portion bent to extend radially of the cap and is fixed to the inner end of a center terminal pin 19 which passes through the center of the cap, as shown in Fig. 3. The length of the conductor strip is such that it extends the full length of the core with its front end bent to form an ear 20 overlapping the front end of the core. Since the lugs 16 engage in the notches 14 and 15, when the core is thrust into place, the core cannot turn in the body and the cap will also be prevented from turning out of its proper position.

A second conductor strip 21 is carried by the body at a point diametrically opposite the strip 18. This conductor is formed from a strip of metal bent to U-shape and is disposed in straddling engagement with the wall of the body with its outer arm seated in the groove or recess 8 and its inner arm in close contacting engagement with the inner surface of the wall of the body. The inner arm has its free end bent to form an ear 22 which overlaps the front end of the core 10 when the core and the cap are thrust into place and, since the core is formed with the flat surface 13, space will be provided to accommodate the inner arm of the conductor 21. Therefore, the core may be easily slid longitudinally into the bore 7 of the body until the flange 23 of the cap has abutting engagement with the rear end of the body. After the core and cap have been thrust into place, a shell 24 of conductive metal is screwed onto the body until it is tightly applied and its internal flange 25 has gripping engagement with the flange 23 of the cap 17. A spot of solder 26 is then applied to the upper edge of the shell and the protruding end of the outer arm of conductor 21 and firmly holds the shell in place as well as establishing conductive connection of the shell with the conductor strip. The core and cap are now assembled with the body and, by referring to Figs. 3 and 4 of the drawing it will be seen that the ears 20 and 22 overlap the front end of the core radially thereof and project toward the center of the core from inner ends of the recesses or grooves 9.

In order to bridge the ears of the conductor strip, there has been provided a fuse strip 27 of such length that it may be fitted into the socket of the body diametrically thereof with the lugs or tongues 28 at its ends engaged in the grooves 9. When the fuse strip is in place it rests against the lugs 20 and 22 of the conductor strips and, since the tongues 28 are engaged in the grooves 9, the fuse strip will be prevented from shifting transversely out of engagement with the lugs. The fuse strip is covered by a transparent disc 29 preferably formed of mica, and this disc is held in place by the retainer ring or sleeve 3 which is screwed into the socket of the body until its inner end bears against the disc and applies pressure to firmly hold the disc and fuse strip in place.

When this fuse plug is in use, it is screwed into a socket of a fuse box and as long as the fuse strip is intact, current will pass through the plug. When an over-load occurs, the fuse strip burns through in the usual manner. However, instead of discarding the entire plug, the ring 3 is unscrewed from the body and the mica disc removed. The pieces of burned fuse strip are then removed and a new fuse strip set in place, the mica disc being then replaced and the retainer ring again screwed into the socket of the body. It will thus be seen that the fuse plug may be again used instead of the entire plug being thrown away when the fuse strip is burned through by an over-load of current.

Having thus described the invention, what is claimed is:

1. In a fuse plug, a cylindrical body having its bore open at both ends and for a portion of its length internally threaded from its front end to form a threaded socket, a core fitted in the bore of said body from the rear end thereof with its front end exposed at the inner end of said socket, a U-shaped conductor strip straddling the wall of said body from the rear end thereof and having the front end of its inner arm bent inwardly of the body to form a lug overlapping the front end of said core, the outer arm of the strip being seated in a groove formed in the body longitudinally thereof, a cap for the rear end of said body, a center terminal pin mounted through the center of said cap, a second conductor strip secured at its rear end to said terminal pin and extending along said core at the opposite side of the body from the U-shaped conductor strip with its front end bent inwardly of the body to form a lug overlapping the front end of the core at the opposite side thereof from the lug of the first conductor strip, pins carried by said cap at opposite sides of the second strip and engaged in seats formed by registering recesses in the body and core to prevent turning of the core in the body, a metal shell screwed upon said body and having a flange at its rear end overlapping marginal portions of said cap, said shell having conductive engagement with the outer arm of the first strip, a fuse strip extending transversely in said socket and bridging the lugs of said conductor strips, said socket having its walls formed with longitudinally extending grooves alined with the conductor strips, said fuse strip having ears at its ends engaged in the grooves of the socket to prevent the fuse strip from moving out of engagement with the ears of the conductor strips, a transparent disc in said socket bearing against and covering the fuse strip, and a retainer sleeve screwed into said socket and bearing against said disc to hold the disc and fuse strip in place.

2. In a fuse plug, a body having a bore open at its front and rear ends and formed with a socket in its forward portion, the wall of said body being formed internally with longitudinal grooves at opposite sides of the socket, a U-shaped conductor strip straddling the wall of said body from the rear end thereof and having a lug at the front end of its inner arm extending inwardly of the body, a core fitting snugly into the bore between the socket and the rear end of the body, a removable cap for the rear end of said body abutting the rear end of said core, a center contact carried by said cap, a second conductor strip fixed to said contact and extending along said core at the opposite side of the core from the first conductor and provided at its front end with a lug extending inwardly of the body and overlapping the front end of the core at a point opposite the lug of the first strip, said lugs being at rear ends of the grooves of the socket, a shell about said body clamping said cap in place and having conductive engagement with the outer arm of the first conductor strip, a removable fuse strip in said socket extending diametrically thereof and bridging said lugs and having its ends engaged in the grooves of the socket to prevent transverse shifting of the fuse strip out of engagement with the lugs, a transparent disc bearing against and covering said fuse strip, and a sleeve screwed into said socket to bear against margins of the disc and hold the disc and fuse strip firmly in position.

3. In a fuse plug, a cylindrical body open at its front and rear ends and having a socket in its forward portion, a removable core in said body between the socket and rear end of the body, a conductor strip carried by said body and having a lug overlapping the front end of said core at one side thereof, a removable cap for the rear end of said body, a center contact car-

ried by said cap, a second conductor strip fixed to said contact and extending along the core at the opposite sides thereof from the first conductor strip and provided with a lug overlapping the front end of the core opposite the lug of the first mentioned conductor strip, a shell about said body holding the cap and core in place and having conductive engagement with the first conductor strip, a removable fuse strip in said socket extending diametrically and bridging said lugs and having its ends engaged in seats in the socket to prevent shifting of the fuse strip out of engagement with the lugs, and a retainer screwer into said socket and removably holding the fuse strip firmly against the lugs.

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