J. H. PROCTER AND M. J. SANDIN.

REFILLABLE FUSE.

APPLICATION FILED JAN. 25, 1919. RENEWED APR. 10, 1922.

1,425,692. **Patented Aug. 15, 1922.**

Fig. 1.

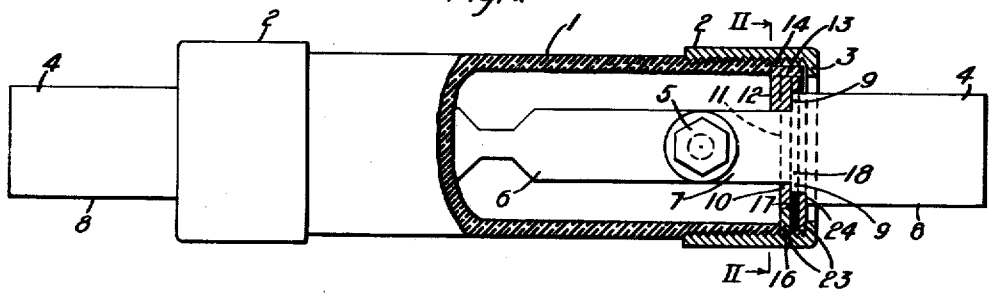


Fig. 2.

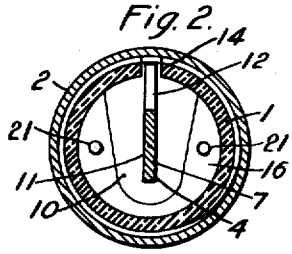


Fig. 4.

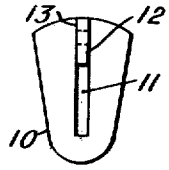


Fig. 3.

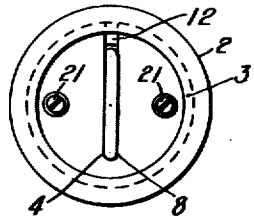


Fig. 5.

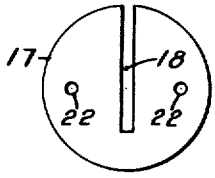


Fig. 6.

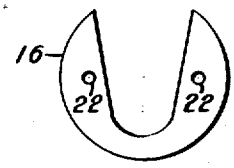


Fig. 7.

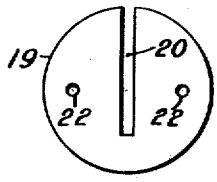


Fig. 9.

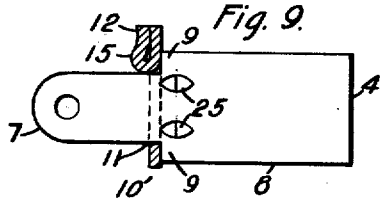


Fig. 10.

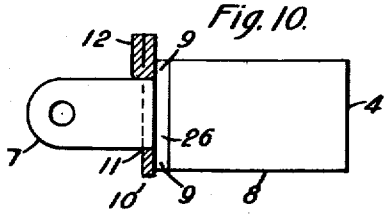
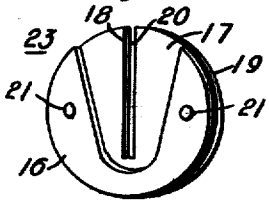


Fig. 8.



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UNITED STATES PATENT OFFICE.

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REFILLABLE FUSE.

1,425,692. Specification of Letters Patent. Patented Aug. 15, 1922.

Application filed January 25, 1919, Serial No. 273,024. Renewed April 10, 1922. Serial No. 551,195.

To all whom it may concern:

Be it known that we, JOSEPH H. PROCTER, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, and MAURITS JEROME SANDIN, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Refillable Fuses, of which the following is a specification.

Our invention relates to fuses and particularly to refillable-cartridge fuse terminals.

One object of our invention is to provide end walls, for a refillable-cartridge fuse, that shall assist in aligning knife-blade terminal members, provide packing for sealing the cartridge and, by being removable as units, transversely and from one side only of the blade members, shall facilitate the operation of refilling the cartridge.

Another object of our invention is to provide a cartridge fuse terminal that, for compactness, shall comprise a transverse web of such dimensions as to permit of its passage through the tube and of a form that when it is disposed in co-operative relation with a complemental removable plate therefor constitutes a single disk of uniform thickness and greater diameter than the bore of the tube.

In practicing our invention, we provide a fuse cartridge having blade contact terminal members at the ends thereof and transversely-disposed closure, aligning and packing members embracing the blades and of such relation to one another as to minimize the total thickness of the end walls of the cartridge.

Further, these members are connected to permit the removal thereof as a single unit and formed to permit the removal, transversely and from one side only, of the blade member.

Fig. 1 of the accompanying drawings is a longitudinal view, partially in elevation and partially in section, of a cartridge fuse embodying our invention; Fig. 2 is an interior end view of the same, taken along the line II—II of Fig. 1; Fig. 3 is an exterior end view of the device as illustrated in Fig. 1; Figs. 4, 5, 6, 7 and 8 are detail views of the component members of an end wall embodied in our invention and Figs. 9 and 10 are detail views of modifications of a terminal member embodied in our invention.

A tubular body member 1, of fiber or other suitable insulating material, is threaded, at its ends, to receive ferrules 2 having inwardly projecting flanges 3.

Terminal blade members 4, preferably of copper, are disposed partially inside and partially outside the ends of the member 1. Bolts 5, or other suitable means, secure a fusible element 6 between apertured inner end portions 7 of the members 4 and the latter may be attached by the outer end portions 8 thereof to terminal jaws or clips (not shown) of an electric circuit. The portions 8, being of greater width than the portions 7, provide shoulders 9 against which rest transversely-extending webs 10 of substantially fan shape and having central openings 11 therein conforming to the portions 7. The webs 10 rigidly embrace the portions 7 and form a gas-tight joinder therewith as, by being soldered, wedged or otherwise suitably secured thereto.

As illustrated in Fig. 4, each web 10 comprises a flat piece of copper or other suitable material of substantially fan shape. An initially centrally-disposed three-sided rectangular tongue portion 12 is pressed out of the plane of the web 10 and bent into and around a notch 13 in one edge of the same to constitute a positioning lug, Figs. 1, 2 and 3, that engages a notch 14 at the end of the member 1, and prevents turning of the terminal member 4 with respect to the member 1.

The tongue portion 12 may be formed with a relatively wide curve 15, Fig. 9, as a precaution against fracture at the bend and extend only to the edge of the web 10, in which form the notch 13 is omitted.

A discoidal plate member 16, preferably of the same material and thickness as the

web 10, is centrally recessed and formed to closely embrace the web 10 in edge-to-edge relation therewith, whereby the member 16 and the web 10 constitute substantially a single disk of uniform thickness and greater diameter than the bore of the tubular member 1.

A packing washer 17, of leather or other suitable material, having a centrally disposed slot 18 adapting it to be slipped transversely over the portion 8 of the member 4, may be removably positioned between a metal washer 19, having a centrally disposed slot 20, and the member 16 by screws 21 that extend through holes 22 in the members 16, 17 and 19 to form a removable compound washer or unitary-wall structure 23 for mounting on the portion 8 adjacent the web 10 to permit the latter and the member 16 to assume the above described single-disk relation.

In order to prevent longitudinal displacement of the member 16 with respect to the web 10 and the terminal member 4, the portion 8 is provided with an edge notch 24 in which portions of the washers 16 and 19 are disposed adjacent the plate 10.

In Fig. 9 projections 25, suitably formed, as by knocking up the surface of the member 4, serve as means for preventing the longitudinal displacement of the member 23.

In Fig. 10 a transverse groove 26, in one or both sides of the member 4, serves to prevent the displacement of the member 23.

When the wall structure 23 is placed in operative relation to the member 4 and the web 10, it is maintained in position against the end of the member 1 by the flange 3 of the ferrule 2. The packing washer 17 covers the engaging edges of the web 10 and the member 16 to retard the escape of gas therebetween and may be of slightly greater diameter than the washer 19 to retard the escape of gas between the latter and the flange 3.

When the element 6 is volatilized, removal of the ferrules 2 from the member 1 permits the withdrawal of the terminal members 4. One or both of the wall structures 23 at the ends of the member 1 may be removed from the members 4 before or after replacing the volatilized element in position between the portions 7. Thus the members 4, connected by a new element 6, may be placed in the member 1 from either end thereof and the wall structures 23 replaced, after which the ferrules 2 may be screwed into position on the member 1.

The unitary-wall structure or compound washer 23 is adapted to be attached to and detached from the member 4 by a single transverse sliding movement towards or from one edge only of the latter, thereby greatly facilitating the manipulation of the device.

The arrangement further serves as an efficient gas and flame check to minimize the danger to surrounding objects, forms a neat and compact device, and by reason of the relation existing between the web 10 and the member 16, reduces the end wall to substantially a minimum of thickness and material.

While we have shown and described particular forms of our invention, many changes may be effected therein, without departing from the spirit and scope thereof, as set forth in the appended claims.

We claim as our invention:

1. A refillable cartridge fuse comprising a tubular insulating body member, a terminal member disposed at the end thereof, and having a transverse web portion having its greatest dimension less than the diameter of the interior thereof, means for preventing the turning of the terminal member with respect to the tubular member, a member conforming to the web portion and embracing the same to form a disk of greater diameter than the interior of the tubular member, means for preventing longitudinal displacement of said embracing member with respect to said terminal member and means for maintaining all of the members in relative position with respect to said tubular member.

2. A refillable cartridge fuse comprising a tubular body member, a terminal member disposed at the end thereof, a transverse web portion rigidly and gas-tightly mounted on said terminal member and being of less extent in its greatest transverse dimension than the diameter of said tubular member, means for preventing the turning of the terminal member with respect to the tubular member, a member embracing the web portion and constituting therewith a single composite disk of greater diameter than the interior of the tubular member, means for preventing relative longitudinal displacement of the members constituting said disk, and a removable ferrule for securing all of the members in relative position.

3. A refillable cartridge fuse comprising a tubular body member, a terminal blade member disposed at the end thereof, a transverse web connected to the blade member and of smaller lateral dimensions than the interior of the tubular member, said connection being gas tight, means for preventing the turning of the blade member with respect to the tubular member, a plate engaging the web and together therewith constituting a single composite disk of uniform thickness and greater diameter than the interior of the tubular member, a slotted discoidal packing washer, a metal washer simi-

lar to the latter and joined thereto, said similar washers being slipped transversely over the terminal member and co-operating therewith to prevent longitudinal displacement of said plate with respect to said web, said similar washers also serving as a gas seal over the engaging edges of the plate and the web, and a removable ferrule securing all of the members in relative position.

In testimony whereof, we have hereunto subscribed our names this 21st day of Jan., 1919.

JOSEPH H. PROCTER.
MAURITS J. SANDIN.