

J. G. CLEMENS.
REFILLABLE FUSE PLUG.
APPLICATION FILED SEPT. 26, 1911.

1,062,889.

Patented May 27, 1913.
2 SHEETS—SHEET 1.

Fig. 1.

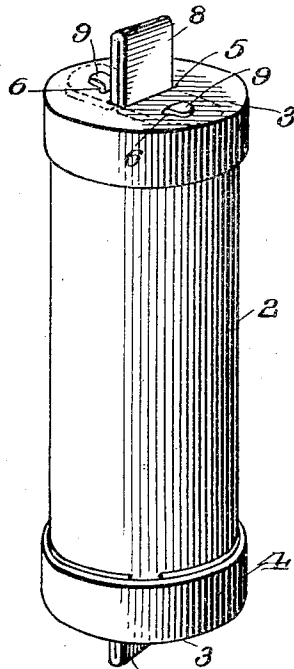


Fig. 2.

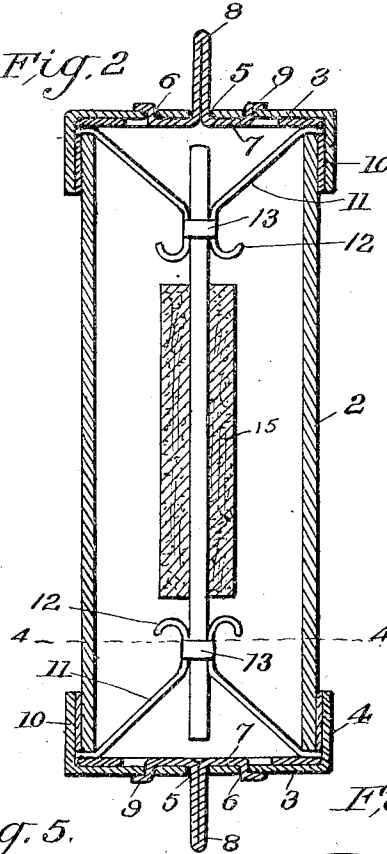


Fig. 3.

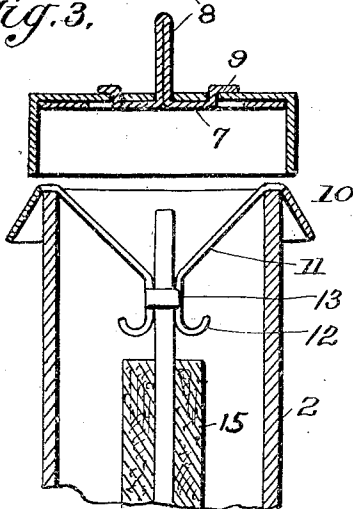


Fig. 5.

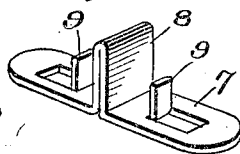


Fig. 6.

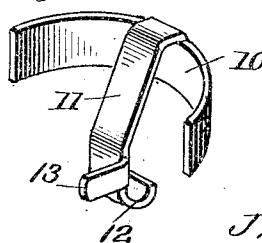
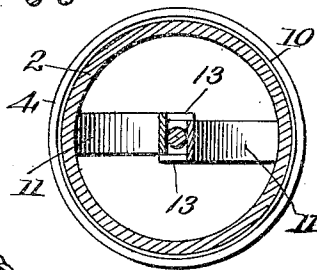


Fig. 4.



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2 SHEETS-SHEET 2.

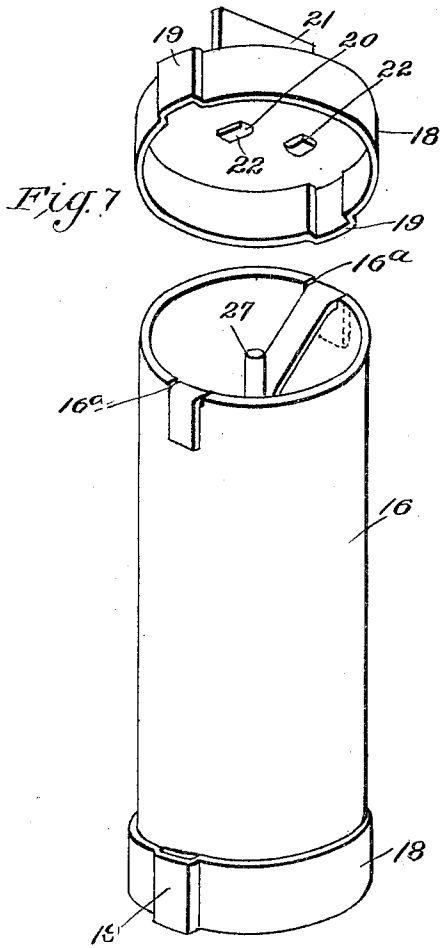


Fig. 8.

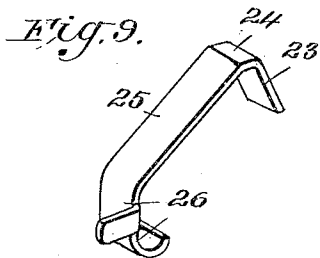
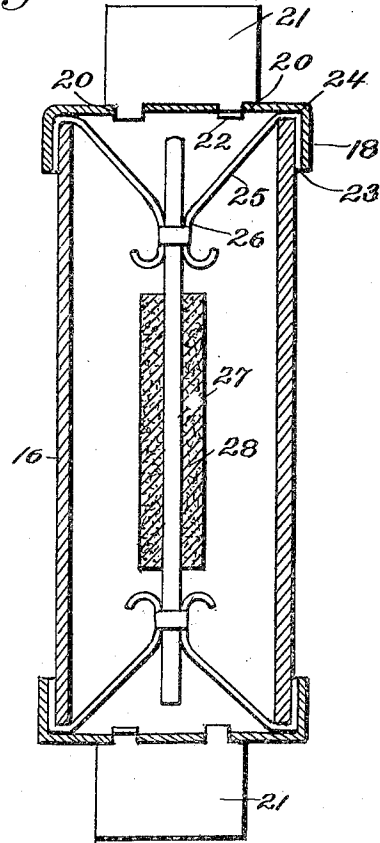
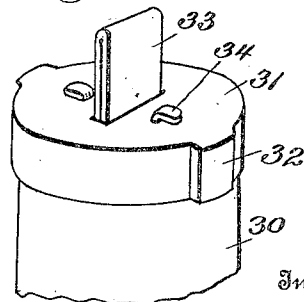


Fig. 10.



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UNITED STATES PATENT OFFICE

JOHN G. CLEMENS, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO FRANK H. KAISER, OF BUFFALO, NEW YORK.

REFILLABLE FUSE-PLUG.

1,062,889.

Specification of Letters Patent.

Patented May 27, 1913.

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To all whom it may concern:

Be it known that I, JOHN G. CLEMENS, citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Refillable Fuse-Plugs, of which the following is a specification.

My invention relates to electrical accessories, and particularly to an improved construction of fuse plug.

One object of my invention is to simplify and cheapen the construction of fuse plugs.

Another object is to produce a fuse plug which may be readily refilled and recharged.

A further object is to provide a plug having resilient fuse engaging members, and preferably to so construct these members that they may be readily removed and replaced, not only to permit the ready replacement of the fuse wire, but also to permit the faces of the clamping members to be scraped so as to secure a good electrical contact between the faces of the clamping members and the fuse.

A further object is to provide means for readily connecting the caps at the ends of the plug with a "knife blade" contact.

Other objects will appear in the course of the following description.

Two embodiments of my invention are illustrated in the accompanying drawings, wherein,

Figure 1 is a perspective view of my improved fuse plug; Fig. 2 is a longitudinal diametrical section thereof; Fig. 3 is a detail section of the upper end of the plug with the cap slightly removed from the tubular body; Fig. 4 is a cross section on the line 4-4 of Fig. 2; Fig. 5 is a perspective view of one of the knife blade contacts removed from the cap; Fig. 6 is a perspective detail view of one of the spring fuse engaging members; Fig. 7 is a perspective view of a preferable form of my invention, the cap being slightly removed from the body of the plug; Fig. 8 is a longitudinal diametrical section of the form shown in Fig. 7; Fig. 9 is a perspective detail view of the form of fuse engaging member shown in

Fig. 7; and, Fig. 10 is a perspective detail view of the upper end of the fuse plug illustrated in Figs. 7 and 8 and showing another means of securing the knife blade contact to the cap.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to these drawings, and particularly to Figs. 1 to 6, in which one form of my invention is illustrated, 2 designates a cylindrical fiber shell. This is preferably formed of a section of fiber tubing, but may be formed of any suitable insulating material. 3 designates the caps at each end of the shell. These caps and their connections are precisely alike and hence the description of one cap will apply to the cap at the other end of the shell. Each of the caps 3 is formed with an annular flange 4 which embraces the end of the shell 2, and each cap is formed with a central transverse slot 5 and the oppositely disposed perforations 6. The knife blade contact which is particularly adapted to be used with the cap, as before described, is formed of a narrow strip of metal designated 7, which is folded upon itself at the middle of the strip so as to form the blade 8 which projects out at right angles to the body of the strip 2. Tongues or spurs 9 are struck up from the body of the strip 1 on each side of the knife blade 8. The knife blade 8 is inserted into the opening 5 of the cap while the spurs or tongues 9 are forced through the opening 6, these spurs or tongues being then turned down so as to hold the knife blade in rigid engagement with the cap. The ends of the strip 7 are rounded off so as to fit against the terminal flange 4 of the cap.

For the purpose of gripping the fuse wire I provide at each end of the shell 2, a pair of fuse wire clamping members, one of which is illustrated in Fig. 6. Each member of a pair comprises a semi-circular strip of spring metal 10, this metal being preferably brass and having at its middle, an angularly bent tongue 11, preferably formed integral with the strip. This tongue 11 is inclined

from the adjacent end of the shell toward the middle thereof and toward the axial center of the shell. The terminal end of this tongue 11 is bent to form a hook-shaped portion 12. The tongue 11 is resilient and the terminal end is formed with a lug 13 which projects at right angles to the face of the terminal end of the tongue so that when both of the spring clamps are in position as illustrated in Fig. 4, the lug 13 of one tongue 11 will be in lateral alinement with the lug 13 of the opposed tongue 11. It is to be particularly noted that the strip 10, which forms the body of the clamping member, is disposed at such an angle to tongue 11 that when the spring members are in place, as illustrated in Fig. 2, and the cap 3 is forced down, the flange 4 of the cap pressing inward on the strips 10 will force the spring tongues 11 toward the axial center of the plug and hence force the terminal ends of the spring tongues into close engagement with each other or with the fuse wire 14 inserted between the terminal ends of the spring tongues. The fuse wire 14 may be of any suitable and well known character, and is of sufficient length to be supported between the opposite pairs of spring tongues 11. Preferably the fuse wire is surrounded along its middle portion with an asbestos covering designated 15.

In assembling a fuse plug in accordance with my invention, the knife blade contacts formed by the strip 7 are disposed in place on the inside of the caps, the tongues 9 being turned down upon the exterior face of the caps as previously described. A pair of clamping members, before described, are then placed in position upon the upper end of the fiber shell 2, and a piece of fuse wire is disposed between the terminal ends of the tongues. By doing this, the outside part of the clamp, that is the strip 10, is thrown outward, the cap 3 is then forced down over the spring clamp and this forces the strips 10 against the outer face of the shell 2, thus causing the spring tongues 11 of the clamps to engage the fuse wire with a firm resilient grip, making a thoroughly good electrical contact between the fuse wire and the terminal ends of the spring tongues. One end of the fuse being now assembled, the plug is tipped up and the asbestos sleeve or covering 15 is slipped upon the fuse wire, when this is in position, the second pair of clamping members is disposed upon the end of the shell 2 and the other cap placed in position, thus completing the fuse. While I have shown in this form the caps as being provided with knife blades 8, it will be of course understood that these knife blades might be left off if desired. It will be seen by this construction that the caps may at any time be removed, and then when re-

moved, the clamping members will immediately release the fuse wire which may be readily replaced. It will further be seen that the contact faces of the fuse wire and of the clamping members may be readily scraped or cleaned so as to secure a good electrical contact between the faces of the terminal members and the fuse wire. If any part should break it may be readily replaced. The knife blade strip 7 may be readily detached from the cap if desired, and a new knife blade strip inserted.

In Figs. 7 to 9 I show still another form of my invention, which form I regard as preferable. This form is in all essential respects the same as that previously described. It comprises a shell 16 of fiber or other non-conducting material, this shell at its opposite ends being provided with oppositely disposed notches 16^a. The notches at each end of the shell being diametrically opposite each other. The cap 17 is formed preferably of thin brass and has an annularly extending marginal flange 18. The side wall or flange 18 is enlarged at diametrically opposite points as at 19 to form pockets for the reception of the clamping strips. The face of the cap is preferably provided with the oppositely disposed perforations or slots 20 for engagement with lugs 22 formed upon the lower end of a knife blade contact 21. In assembling the cap and knife blade, these lugs 22 are inserted through the opening 20 and then oppositely turned with each other, thus firmly connecting the knife blade to the cap. At each end of the shell there is disposed a pair of fuse wire clamping members, each clamping member of a pair consisting of a strip of metal 23 bent at approximately right angles as at 24, so as to form two legs, one of these legs being longer than the other, and the longer leg 25 being curved to form a hook-shaped terminal end 26. The strips 23 are of a width just sufficient to enter the notches 16^a in the end of the shell 16, so that the short legs of the clamping members extend over the outside of the shell 16. The fuse wire 27 is of exactly the same character before described and is surrounded by the sleeve or protective layer 28. This fuse plug is assembled in the same manner as the former fuse plug previously described, and it will be seen that when the cap is put in place upon the end of the shell 16 that the short legs of the clamping members will be received in the pockets or enlargements 19 of the cap, and that when the cap is forced inward upon the shell 16, the tension of the clamping members will be increased and will grip the fuse wire so as to secure a thoroughly good electrical contact. It will further be seen that the pockets 19 and the notches 17 prevent the clamping members from getting out of

place or shifting around the upper end of the shell. The main object of having notches in the ends of the fiber tube 16 and providing the pockets 19 in the side walls of the brass cap, is for the purpose of accurately lining up both of the knife blades parallel with each other so that no care will have to be taken in placing the brass cap in position. In the other form of my invention, care must be taken that the spring clamps do not get out of position opposite to each other in putting on the cap, as any rotative movement of the cap will tend to shift the clamping members relative to each other, and it is obvious that they must be opposite to each other in order to firmly and securely grasp the fuse wire.

As previously stated, I do not wish to limit myself to the use of caps provided with knife blades illustrated in Fig. 1, with the fuse-engaging members illustrated in Fig. 6, as the fuse-engaging members shown in Fig. 9 and the cap shown in Fig. 7 might be used with the form of knife blade shown in Fig. 5. In Fig. 10 I have illustrated a cap such as that shown in Fig. 7, with a knife blade such as that shown in Fig. 5. In Fig. 10, 30 designates a fiber shell, 31, a brass cap formed with enlargements or pockets 32 at opposite points on its sides, and 33 designates the knife blade which is made as illustrated in Fig. 5 by taking a flat strip of metal and opening it at its middle to form a medially disposed blade constituting the knife blade proper, the strip being provided with outstanding lugs 34 which pass through perforations in the cap 31.

Having thus described the invention what is claimed is:

1. A fuse plug comprising an electrical shell of insulating material, metallic caps disposed at the ends of the shell and having marginal flanges extending around the ends of the shell, and resilient fuse engaging clamping members disposed within the opposite ends of the shell, said clamping members being held in resilient clamping engagement with a fuse by said caps.

2. A fuse plug comprising a tubular shell of insulating material, oppositely disposed metallic caps closing the ends of the shell, and oppositely disposed pairs of fuse clamping members located at opposite ends of the shell, each pair comprising oppositely disposed resilient angular clamping strips extending radially over the edge wall of the shell at opposite points in its diameter, said clamping members being forced into resilient engagement with each other by the shell.

3. A fuse plug comprising a tubular shell of insulating material, metallic caps at each end of the shell, and oppositely disposed pairs of fuse clamping members located at

opposite ends of the shell, each pair comprising oppositely disposed, resilient, angular clamping strips extending radially over the edge wall of the shell at opposite points in its diameter, the clamping members of each pair having their inner ends divergently curved.

4. A fuse plug comprising a tubular shell of insulating material, metallic caps at each end of the shell, and oppositely disposed pairs of fuse clamping members located at opposite ends of the shell, each pair comprising oppositely disposed resilient angular clamping strips extending radially over the edge wall of the shell at opposite points in its diameter, the clamping members of each pair having their inner ends divergently curved and formed with complementary guiding ears extending at right angles to the respective clamping members.

5. A fuse plug comprising a tubular shell of insulating material, a fuse longitudinally extending within the shell, oppositely disposed pairs of fuse gripping devices, each pair comprising oppositely disposed angular strips of metal extending over the ends of the shell, one leg of each strip extending along the exterior of the shell toward the middle thereof, the other leg extending along the interior of the shell and toward the axial center thereof, and metallic caps covering the ends of the shell and engaging the outward legs of the clamping devices to force the inner legs toward and into engagement with each other and with the ends of the fuse wire.

6. A fuse plug comprising a tubular shell of insulating material, oppositely disposed metallic caps closing the ends of the shell, and oppositely disposed pairs of fuse clamping members located at opposite ends of the shell, each pair comprising oppositely disposed clamping strips extending radially over the edge wall of the shell at opposite points in its diameter, each clamping strip having an angular portion engageable by the adjacent cap to force the inner end of the clamping member inward and against the fuse wire.

7. A fuse plug including in its organization a non-conducting shell, a cap extending over said shell and perforated at opposite points, and a knife blade contact comprising a strip folded at its middle to form the knife blade, the ends of said strip being turned at right angles to the blade and formed with upwardly projecting pins adapted to project through the perforations in the cap.

8. A fuse plug including in its organization a non-conducting shell, a cap extending over said shell, said cap being transversely slitted and formed at opposite points on each side of said slit with perforations, and

a knife blade contact comprising a strip of metal bent at its middle to form parallel portions forming a knife blade, the ends of said strip being outwardly bent at right angles to the knife blade to form a base equal in length to the internal diameter of the cap, said base having upwardly turned lugs struck from it projecting through the per-

forations of the cap and turned down thereon.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN G. CLEMENS. [L. S.]

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."