

No. 773,201.

PATENTED OCT. 25, 1904.

L. W. DOWNES.
FUSE.

APPLICATION FILED APR. 29, 1904.

NO MODEL.

FIG. 1.

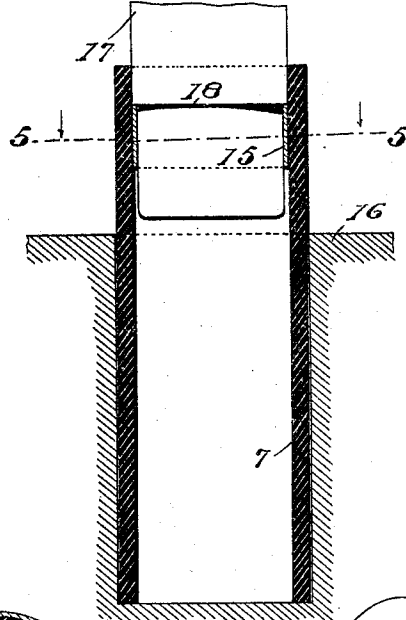
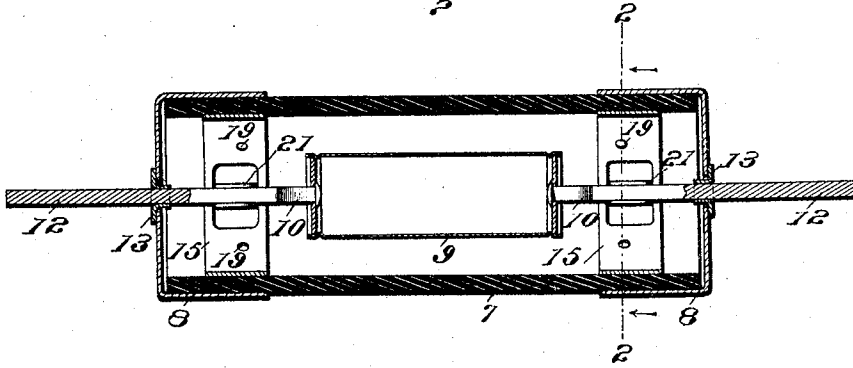


FIG. 5.

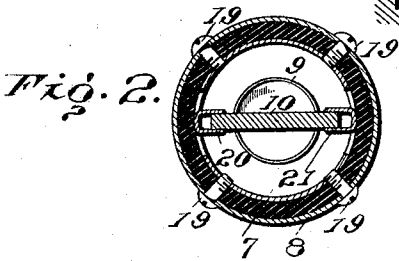
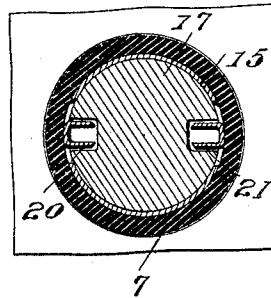


FIG. 4.

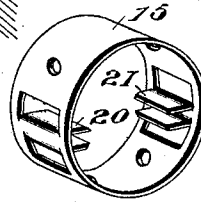


FIG. 3.

Inventor

Louis W. Downes,

Witnesses

H. B. [Signature]
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By

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UNITED STATES PATENT OFFICE.

LOUIS W. DOWNES, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE
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FUSE.

SPECIFICATION forming part of Letters Patent No. 773,201, dated October 25, 1904.

Application filed April 29, 1904. Serial No. 205,551. (No model.)

To all whom it may concern:

Be it known that I, LOUIS W. DOWNES, a resident of Providence, Rhode Island, have invented a new and useful Improvement in Fuses, which invention is fully set forth in the following specification.

My invention relates particularly to inclosed electric fuses in which the inclosing casing comprises a hollow shell of fibrous or analogous material closed at one or both ends by a cap or caps.

The principal objects of the improvements constituting my invention are to provide means for securely fastening the caps in place against the internal gaseous pressures generated upon blowing of the fuse and to provide means for firmly and rigidly supporting and holding in place the terminal blades which are connected with the fuse-link within the casing and project through the caps. In providing means to accomplish the last-stated object I prevent sidewise movement of the terminal blades by the ordinary handling of service, and thereby avoid pushing of the finely-divided filling away from the sides of the blades within the casing and the consequent formation of objectionable air-spaces about the terminal blades and the fuse-link. Furthermore, said means serve to hold the fuse-link and blade-terminals in proper position in the shell before the caps are put in place or after they are removed, thereby greatly facilitating assemblage and filling of the fuse and reloading of the same after it is blown.

The preferred embodiment of my invention can be best understood by reference to the accompanying drawings, wherein—

Figure 1 is a longitudinal section. Fig. 2 is a transverse section on line 2 of Fig. 1. Fig. 3 is a detail perspective of the securing-ring. Fig. 4 is a sectional view showing means employed in inserting the securing-ring in the end of the tubular casing, and Fig. 5 is a section on line 5 of Fig. 4.

The inclosing casing of the fuse comprises a tubular shell 7, of fibrous or other non-conducting material, closed at its ends by metal-

lic caps 8. 9 is a metallic fuse-link, shown as of tubular form, though any other suitable form may be employed. Link-terminals 10, connected to opposite ends of fuse-link 9, pass through slots in the caps 8, the projecting ends constituting fuse-terminals 12, adapted to be engaged with terminal clips in the well-known manner. Flanged plates 13, soldered to the caps and to the fuse-terminals, serve to rigidly connect the latter to the caps, as described in my application, Serial No. 184,308, filed December 8, 1903. The casing is usually filled with finely-divided material, the function of which is well understood.

Heretofore it has been customary to secure the caps 8 to the shell 9 by passing screws or pins through the former and into or through the latter. Experience demonstrates that, particularly in the case of high-capacity fuses, caps thus connected with the shell are sometimes blown off with disastrous and dangerous results. This is most likely to happen in case of short-circuit or heavy overload when the fuses are employed on circuits of normally large generator capacity. Under such conditions the metal of the fuse-link is instantaneously volatilized, and the gas thus formed, together with the high temperature generated by the momentarily-formed arc, create powerful pressure within the casing. In the case of four-hundred-ampere fuses this pressure has been estimated to be as high as nine hundred pounds to the square inch. The desirability of more securely fastening the caps in place, preferably with a resisting strength at least equal to that of the fibrous shell, is therefore apparent. The use of clamping-bolts instead of screws might in a measure afford the desired security of fastening; but the difficulty and consequent expense of bringing the bolts and their nuts into proper engagement with both ends of the casing closed are serious objections.

In accordance with my present invention a metallic ring or band 15 of such size as to fit closely within the shell 7 is forced into the end of said shell to the proper position. This

may be accomplished by placing the shell in a socket 16, Fig. 4, and then forcing the ring 15 into place by a suitable implement 17, having a shoulder 18, which bears against the upper edge of the ring. By limiting the downward movement of the implement 17 the ring will be forced into the shell to the desired position. The shell is then turned end for end in the socket and another ring 15 placed in its other end. The parts of the fuse, including the caps 8, having screw-holes there-through, are then assembled, as shown in Fig. 1. The holes in the caps are then continued by boring through the shell 7 and the rings 15. Screw-threads are cut in the openings through the rings 15 and the screws 19 put in place. The threads on the screws engage the threaded openings in the rings 15, and the ends of the fibrous shell are tightly clamped between the caps and the rings. While I have described what is believed to be the most convenient method of procedure, it is apparent that the holes may be made before the parts are assembled and that the ring or band need not continuously extend around the interior of the shell so long as it is of such dimensions as to temporarily hold itself in position by engagement with the inner surface of the shell.

Each band or ring 15 is provided with two pairs 20 21 of inwardly-projecting ears or lugs, which are shown as being struck up out of the material of the ring. They may of course be formed in any other suitable manner. At its opposite edges the terminal blade fits closely between the pairs of ears. Each blade is thus not only supported at the point where it passes through the cap, but is given additional support within the casing. The rigidity of the blade-terminals is thus greatly increased, and the fuse is enabled to withstand rough handling in packing, shipping, and use.

What I claim, and desire to secure by Letters Patent, is—

1. In an inclosed electric fuse, a shell, a band fitting closely within the open end of the shell, a cap fitting over and closing said open end of the shell, and securing means passing from the cap through the wall of the shell into engagement with the band and securing the latter against the inner surface of the shell.

2. In an inclosed electric fuse, a shell, a ring fitting closely within an open end of the shell, and securing means passing from the cap through the wall of the shell into engagement with the ring, and connecting the cap and ring with the shell gripped between them.

3. In an inclosed electric fuse, a shell, a cap fitting over and closing an open end of the shell, a ring fitting closely within said open end of the shell, and one or more screws passing from the cap through the wall of the shell

into engagement with the ring and connecting the cap and ring with the shell gripped between them.

4. In an inclosed electric fuse, a shell, a cap fitting over and closing an open end of the shell, a ring fitting closely within an open end of the shell, and screws passing from the cap through the wall of the shell into engagement with screw-threaded openings in the ring and connecting the cap and ring with the shell gripped between them.

5. In an inclosed electric fuse, a shell, a cap closing an open end of the shell, a fuse-link, a terminal passing from said fuse-link through the cap, and projections or ears fixed within the shell and engaging and holding the terminal between the fuse-link and the cap.

6. In an inclosed electric fuse, a shell, a cap closing an open end of the shell, a fuse-link, a terminal passing from said fuse-link through the cap, a band fixed within the open end of the shell, and projections or ears on said band engaging and holding the terminal between the fuse-link and the cap.

7. In an inclosed electric fuse, a shell, a cap closing an open end of the shell, a fuse-link, a terminal passing from said fuse-link through the cap, a ring fitting closely in the open end of the shell, and projections or ears on said ring engaging and holding the terminal between the fuse-link and cap.

8. In an inclosed electric fuse, a shell, a band fitting closely within the open end of the shell, a cap fitting over and closing said open end of the shell, securing means passing from the cap through the wall of the shell into engagement with the band and connecting the cap and band with the shell gripped between them, a fuse-link within the casing, a terminal passing from said fuse-link through the cap, and ears or projections on the band engaging and holding the terminal between the fuse-link and cap.

9. In an inclosed electric fuse, a shell, a ring fitting closely within an open end of the shell, a cap fitting over and closing said open end of the shell, securing means passing from the cap through the wall of the shell into engagement with the ring and connecting the cap and ring with the shell gripped between them, a fuse-link within the casing, a terminal passing from said fuse-link through the cap, and ears or projections on the ring engaging and holding the terminal between the fuse-link and cap.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIS W. DOWNES.

Witnesses:

CATHERINE G. BRADLEY,
NELLIE G. BRADLEY.