L. E. WEINBERG.

REFILLABLE CARTRIDGE FUSE.

APPLICATION FILED MAY 28, 1914.

1,226,151.

Patented May 15, 1917.

Fig. 1

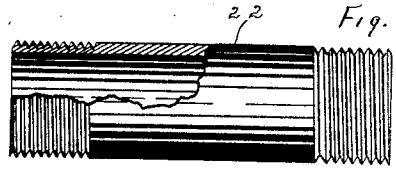


Fig. 2

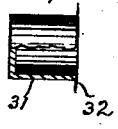


Fig. 3

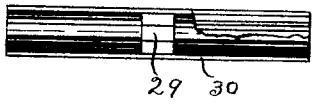


Fig. 4



Fig. 5

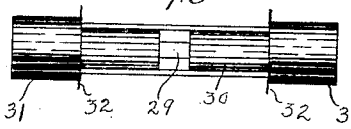


Fig. 6

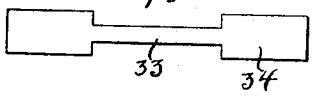


Fig. 7

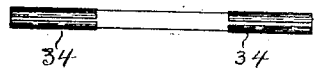


Fig. 10



Fig. 8



Fig. 11



Fig. 9

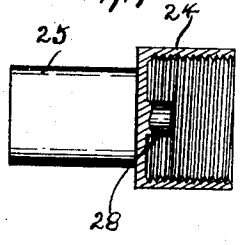


Fig. 12

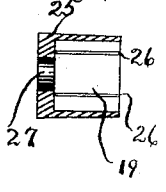


Fig. 13

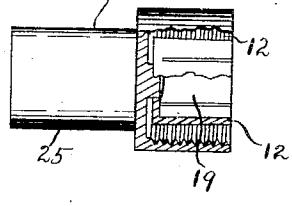


Fig. 14

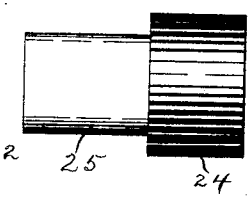


Fig. 15

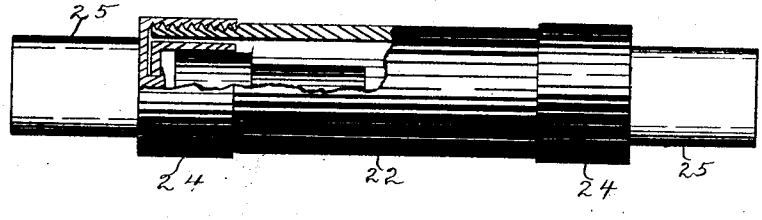


Fig. 16

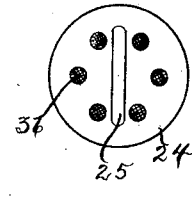


Fig. 17

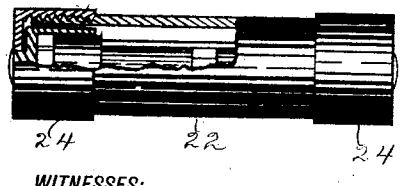


Fig. 18

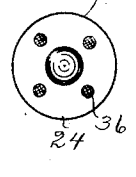


Fig. 19

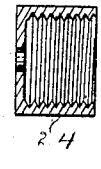


Fig. 20

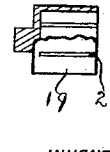
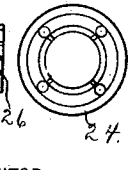


Fig. 21



WITNESSES:

Josf Bisbano

Diana Gordon

INVENTOR

Louis E. Weinberg

by

Asher Blum,

Attorney.

UNITED STATES PATENT OFFICE.

LOUIS E. WEINBERG, OF NEW YORK, N. Y., ASSIGNOR TO STAR FUSE CO., INC., OF NEW YORK, N. Y.

REFILLABLE CARTRIDGE-FUSE.

1,226,151. Specification of Letters Patent. Patented May 15, 1917.

Application filed May 23, 1914. Serial No. 841,447.

To all whom it may concern:

Be it known that I, LOUIS E. WEINBERG, a citizen of the United States, and residing in the county of the Bronx, city and State of New York, have invented certain new and useful Improvements in Refillable Cartridge-Fuses, of which the following is a full and complete specification.

This invention relates to that class of fuses having a permanent outer casing with a replaceable inner inclosed fuse, said inner inclosed fuse being in electrical continuity with the ends of the permanent outer casing, which in turn are in electrical continuity with the mains of the electric circuit.

The object of the present invention is to provide means for the ready and cheap construction of these fuses, to readily enable the inner inclosed fuse to be withdrawn from the outer permanent casing after the said inner inclosed fuse has been blown out.

One embodiment of my invention is set forth in the following description and in the annexed drawings, in which—

Figure 1 shows an elevation partly in section of the external permanent casing,

Fig. 2 shows a brass end cap upon the glass tube inclosing the inner fuse,

Fig. 3 shows an elevation partly in section of the glass tube inclosing the inner fuse,

Fig. 4 is an end view of Fig. 3,

Fig. 5 is an elevation of the assembled glass inner tube inclosing the fuse with its metallic end caps,

Fig. 6 is a plan view of the fuse wire before rolling,

Fig. 7 is a plan view of the fuse wire after rolling,

Fig. 8 is an elevation of the asbestos sleeve at the end of the fuse wire,

Fig. 9 is a longitudinal section of the brass end cap for the exterior casing in fuses of the knife type,

Fig. 10 is an end view of Fig. 7,

Fig. 11 is an end view of Fig. 8,

Fig. 12 is a longitudinal section of the inner brass cap for the end piece of the exterior permanent casing,

Fig. 13 is an elevation partly in section of Figs. 9 and 12 assembled,

Fig. 14 is an elevation of the completed end cap for the permanent exterior casing,

Fig. 15 is an elevation partly in section of the complete and assembled fuse,

Fig. 16 is an end view of the metallic end cap of the permanent outer casing,

Fig. 17 is an elevation partly in section of the assembled fuse of the ferrule type,

Fig. 18 is an end view of Fig. 17,

Fig. 19 is a cross section of the metallic end cap of the permanent casing of the fuse shown in Fig. 17,

Fig. 20 is an elevation partly in section of the inner spring contact of the metallic end cap of the permanent casing of the fuse shown in Fig. 17.

Fig. 21 is an exterior end view of the assembled cap formed by assembling the structures shown in Figs. 19 and 20.

The fuse has a permanent outer casing 22, having an external threading 23 at its ends. This exterior permanent casing 22 may be made of any suitable insulating and non-combustible material, such as wood fiber, or the like. This permanent casing 22 in the knife type of fuse has metallic end caps 24 with inner screw threadings 23. These end caps 24 have suitable knife contacts 25. The end caps 24 are composed of an exterior shell, as shown in Fig. 9, and an interior metallic contact 25, slitted at 26 to render it elastic, and having an end perforation 27 of the same diameter as the projection 28 of the knife edge 25. The metallic end cap 24 is assembled by fitting the inner contact 25 over the projection 28 of the knife edge 25, protruding through a suitable perforation in the end cap 24 when the projection 28 is hammered down, thus efficiently and cheaply assembling the end cap, as shown in Figs. 13 and 14. Within the outer casing 22 is a fuse 29 inclosed in a tube 30 of glass or other insulating material. This inner tube 30 has end brass caps 31, having shoulders 32, which are considerably exaggerated in the drawings. The end caps 31 and the tube 30 are assembled by means of soldering. Some solder that fuses at a higher temperature than the ordinary solder, preferably at 100° to 400° centigrade is placed within the end cap 31, and heated until it melts, then the glass tube 30, which fits snugly within the end tube 31, is pushed therein, the molten solder forming a film between the glass tube 30 and the end tube 31, then the assembled structure is plunged quickly into cold water, when the solder hardens, and firmly connects the parts of the structure. The fuse wire 29 is suitably

connected interiorly to the end metallic caps 31. The fuse wire, before rolling, has a central weakened portion 33, and end portions 34, which are much broader and stronger. These end portions 34 are rolled up, as shown in Fig. 7, to make the completed fuse. After the interior cartridge has been completed, it is inserted into the end caps 24 of the outer casing 22, the heads of the inner end caps 31 fitting firmly within the sockets 25 of the exterior end caps 24, these sockets 25 expanding slightly, because the slits 26 admit the interior fuse cartridge. The structure may be thus very easily and quickly assembled, or taken apart when a fuse has blown.

The shoulders 32 are for the purpose of rendering it easy to detach the blown-out fuse from the exterior casing. It sometimes happens that the intense heat, caused by the blowing out of the fuse, melts the solder connecting the end caps 31 of the tube 30 to that tube, so that this solder coheres to the socket 25 and renders it difficult to withdraw the tube. The shoulder 32 acts as a shield and prevents any adherence between the inner tube and the outer casing.

The soldering of the tips of the glass tube to the end caps 31, and the quick plunging of the heated ends of the glass tube 30 into cold water or the like tends to weaken the glass at its tips, because of the inability of the molecules of the glass to readjust themselves quickly to the rapidly varying changes of temperature, so that the tips of the glass tube are weaker than the central portion, and hence there is a well defined area of breakage for the glass tube, namely, at these weakened ends.

The end caps of the outer and inner tubes may be suitably perforated to allow the escape of heated gases, and the perforations may be suitably protected by wire gauze 36.

The size of the shield 32 may be varied according to the strength of the fuse, so that it would be impossible to insert glass tube 30, save within a socket 25 of a diameter adapted to receive said tube 30, so that it would not be possible to introduce a fuse of greater capacity than desired into a given circuit. This shield also centers the glass tube within the outer tube when inserted and maintains it in such central position.

I have described one embodiment of my invention, but it is clear that others may be devised differing therefrom, but still maintaining the spirit and essence therefrom, as defined in the following claims.

I claim:

1. In a fuse, the combination of a glass tube, metallic end caps closing said tube at the ends thereof, and a film of solder intermediate the ends of said tube and said metallic end caps, said solder being quick-hardened by application of cold after insertion between said tube and said caps in its heated state, and connecting said tube and said end caps, said glass tube being provided with weakened areas at the tips thereof, and a fuse element within said tube and connected to said metallic end caps.

2. In a fuse, an outer casing, an inner glass tube having metallic end caps at the ends thereof, a film of solidified solder intermediate and connecting the ends of said inner tube and metallic end caps, a fuse element within said inner tube and connected to said metallic end caps, said metallic end caps having shoulders projecting therefrom, forming shields adapted to prevent coherence of melted solder with said casing, upon blowing out of said fuse, and adapted to center said tube in said casing.

3. In a fuse, an outer casing, an inner glass tube having metallic end caps at the ends thereof, a film of solidified solder intermediate and connecting the ends of said inner tube and metallic end caps, a fuse element within said inner tube and connected to said metallic end caps, said metallic end caps having shoulders projecting therefrom, forming shields adapted to prevent coherence of melted solder with said casing, upon blowing out of said fuse, and adapted to center said tube in said casing, said shoulders being of a size relative to said outer casing, and adapted to render it impossible to insert said inner tube into an outer casing having a size other than that relative to the size of said shoulders.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

LOUIS E. WEINBERG.

Witnesses:
N. KOMOW,
MARTIN ZAWISTOWSKI.