Dec. 17, 1957 E. W. SUGDEN 2,816,988

ELECTRIC FUSES

Filed May 11, 1955

Fig. 1.

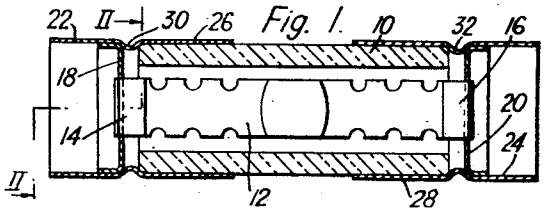


Fig. 2.

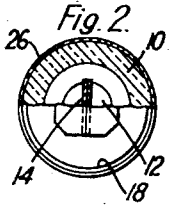


Fig. 3.

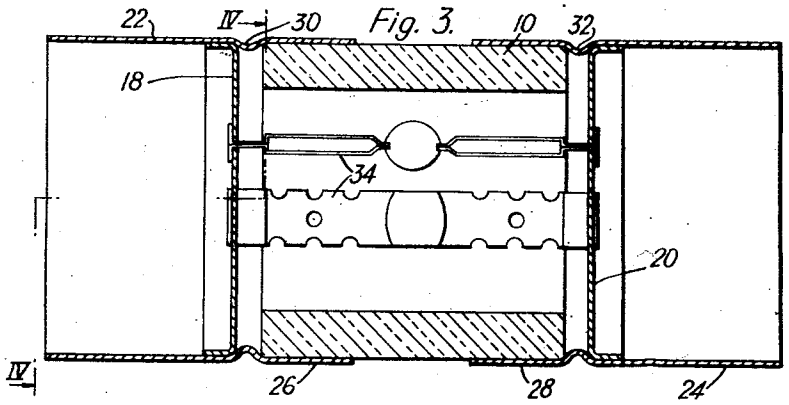


Fig. 4.

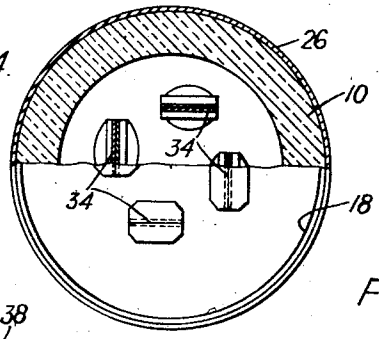


Fig. 5.

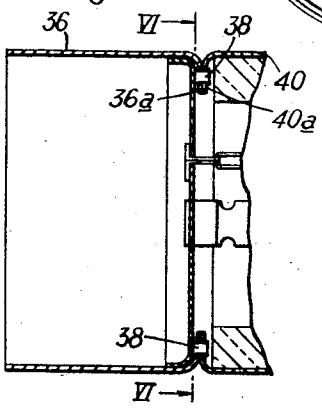
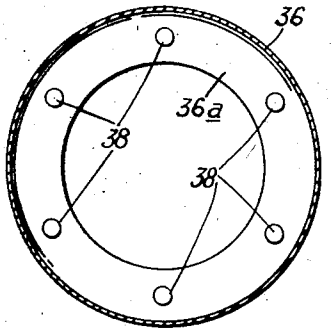


Fig. 6.



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ELECTRIC FUSES

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Claims priority, application Great Britain May 13, 1954

4 Claims. (Cl. 200—131)

This invention relates to electric fuses of the cartridge type, particularly cartridge fuses in which the passage of current through the fuse is liable to give rise to the generation of a considerable amount of heat within the cartridge. The invention is particularly applicable to cartridge fuses of the kind shown and described in British specification No. 669,378 where one or more fuse links are provided within a ceramic cartridge casing.

The metal end caps which fit over each end of the cartridge casing are frequently secured to the terminals of the circuit into which it is desired to insert the fuse by means of narrow end blades or by L-shaped tabs firmly attached to the end caps. It has been found, however, that the heat generated in such fuses frequently causes the ends of the cartridge to become over-heated and an undesirable rise in temperature to occur at the circuit terminal connections.

The aim of the present invention is to provide means for dissipating the troublesome heat.

According to the invention, the ends of the cartridge are provided with a pair of cylindrical metal extensions which are capable of taking up and dissipating a large amount of the heat generated with the cartridge during the passage of current through the fuse.

In order that the invention may be thoroughly understood, three examples of cartridge-type fuses in accordance with it will now be described with reference to the accompanying drawings in which:

Figure 1 is a side elevation in section of a 100 amp. fuse in accordance with the invention;

Figure 2 is a section taken on the line II—II in Figure 1;

Figure 3 is a side elevation in section of a 400 amp. fuse in accordance wtih the invention;

Figure 4 is a section taken on the line IV—IV in Figure 3;

Figure 5 is a part of a modification of the fuse shown in Figure 3; and

Figure 6 is a section taken on the line VI—VI in Figure 5 with parts of the fuse omitted for the sake of clarity.

The 100 amp. fuse shown in Figures 1 and 2 comprises a ceramic cartridge **10** within which is arranged a fuse link **12**. The ends **14**, **16** of the fuse link pass through slits in a pair of end caps **18**, **20** and are soldered down onto the outer surfaces of the end caps. The latter are located within a pair of cylindrical copper extensions **22**, **24** which are formed integrally with metal rings **26**, **28** surrounding the end portions of the cartridge **10**. The division between each of the extensions **22**, **24** and its associated ring **26**, **28** is marked by an internal annular ridge **30**, **32** formed by pressing an annular groove into the metal from the outside.

The extensions **22**, **24** are designed to take up and dissipate a large amount of the heat generated within the cartridge during the passage of current through the fuse, and the fact that the rings **26**, **28** and the extensions 22, 24 are integrally formed ensures good thermal

conductivity between them. It is to be noted that the combined length of the extensions is not less that the diameter of the cartridge **10**.

Figures 3 and 4 are views corresponding to Figures 1 and 2 of a 400 amp. fuse. The construction of the fuse is basically the same as that of the 100 amp. fuse shown in Figures 1 and 2 except that four fuse links **34** are provided. The function of the extensions **22**, **24** in all four figures is, of course, exactly the same, and although the extensions **22**, **24** and the rings **26**, **28** in Figures 3 and 4 are of slightly different proportions to those shown in Figures 1 and 2, the extensions nevertheless have a combined length which is not less than the diameter of the cartridge **10**.

Figures 5 and 6 show part of a modification of the fuse shown in Figures 3 and 4. In the modification, the cylindrical extensions are not formed integrally with the rings surrounding the ends of the cartridge. Thus, Figure 5 shows one end of the fuse from which it will be seen that the cylindrical extension **36** is provided with an inwardly-extending flange **36***a* which is firmly secured by rivets **38** to a corresponding flange **40***a* provided on the end of the metal ring **40**. In order to secure good thermal conductivity between the joined flanges, the riveted connections are supplemented by a soldered or brazed connection. The other end of the fuse is, of course, of identical construction.

Although the modification described in Figures 5 and 6 is that of a 400 amp. fuse, it is to be understood that this form of connection between the extensions and the rings surrounding the ends of the cartridge can be applied to fuses of other ratings. Similarly, the form of connection between the extensions and the rings surrounding the cartridges shown in Figures 1–4 is not limited to 100 amp. or 400 amp. fuses.

I claim:

1. An electric fuse comprising an open-ended cylindrical cartridge, at least one fuse link arranged within said cartridge, metal end caps at both ends of said cartridge for closing said cartridge and supporting both ends of said fuse link, soldered connections between said end caps and said ends of said fuse link, a pair of hollow cylindrical metal extensions having open outer ends provided on the ends of said cartridge, peripheral surfaces on said end caps closely engaging the inner cylindrical surfaces of said cylindrical extensions, said extensions having an outer diameter at least equal to the diameter of the cartridge and being capable of taking up and dissipating a large amount of the heat generated within said cartridge during the passage of current through said fuse link.

2. An electric fuse comprising an open-ended cylindrical cartridge, at least one fuse link arranged within said cartridge, metal end caps at both ends of said cartridge for closing said cartridge and supporting both ends of said fuse link, soldered connections between said end caps and said ends of said fuse link, a pair of metal rings on the ends of said cartridge, an inwardly-directed flange on the periphery of each of said metal rings, a pair of hollow cylindrical metal extensions having open outer ends provided on the ends of said cartridge, an inwardly-extending peripheral flange formed on one end of each of said extensions, means for securing said flanges of said extensions to said flanges of said metal rings, said securing means being such as to ensure good thermal conductivity between said metal rings and said extensions, said end caps having peripheral surfaces in close engagement with said flanged ends of said extensions.

3. An electric fuse comprising an open-ended cylindrical cartridge, at least one fuse link arranged within said cartridge, metal end caps at both ends of said car-

tridge for closing said cartridge and supporting both ends of said fuse link, soldered connections between said end caps and said ends of said fuse link, a pair of metal rings fitted over the ends of said cartridge, a pair of hollow cylindrical metal extensions having open outer ends formed integrally with said metal rings, an annular ridge dividing each of said rings from its integrally-formed extension and formed by pressing an annular groove into the metal from the outside, peripheral surfaces on said end caps in close bearing engagement with said annular ridge.

4. An electric fuse comprising an open-ended cylindrical cartridge, at least one fuse link arranged within said cartridge, metal end caps at both ends of said cartridge for closing said cartridge and supporting both ends of said fuse link, soldered connections between said end caps and said ends of said fuse link, a pair of hollow cylindrical metal extensions having open outer ends provided on the ends of said cartridge, said extensions being of a diameter not substantially different from the diameter of said cartridge and having a combined length which is not less than the diameter of said cartridge, peripheral surfaces on said end caps in close engagement with the inner cylindrical surfaces of said extensions.

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