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ELECTRICAL FUSE OF THE CARTRIDGE TYPE INCORPORATING CYLINDRICAL ASSEMBLY OF FUSIBLE LINKS

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Fig. 1.

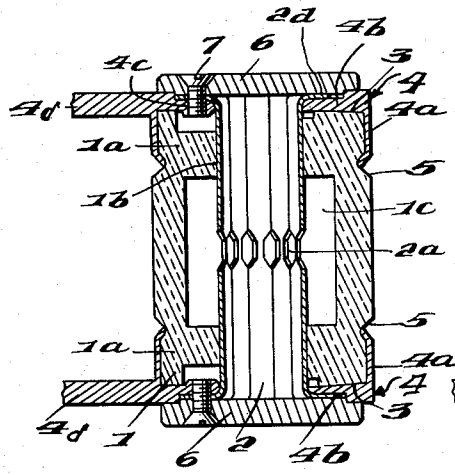
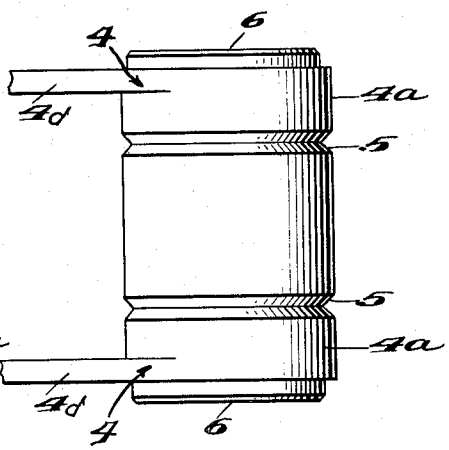


Fig. 2.



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ELECTRICAL FUSE OF THE CARTRIDGE TYPE INCORPORATING CYLINDRICAL ASSEMBLY OF FUSIBLE LINKS

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1 Claim. (Cl. 200—131)

The present invention relates to electrical fuses having a fusible element which is adapted to be connected in an electrical circuit and in which the fusible element melts to thus interrupt the circuit when the current which passes through the element becomes excessive.

The object of the present invention is to provide an improved electrical fuse construction of the general type described and wherein the fusible element is arranged within a tubular housing of insulating material. Plate-shaped connecting pieces are clamped by means of flanges thereon to opposite ends of the tubular housing, and opposite ends of the fusible element are either soldered or welded to these connecting pieces in order to provide a low-resistance electrical connection therebetween.

One embodiment of the invention is illustrated in the accompanying drawing in which FIG. 1 is a longitudinal view of the fuse in central section, and FIG. 2 is a view of the fuse in elevation.

With reference now to the drawing, the fuse comprises a cylindrical tubular body of insulating material 1. The opposite end walls 1*a* of the body member 1 are provided with aligned cylindrical openings 1*b* to receive and support the corresponding end portions of a cylindrical array of fuse strips 2, and the central portions of these strips are provided with portions 2*a* of reduced cross section which are designed to melt at a predetermined magnitude of current which passes through them. As is seen from FIG. 1 the external diameter of the cylindrical array of fuse strips 2 is substantially equal to the diameter of the openings 1*b* in the end walls so as to provide a good support for the fuse strips and maintain them in their proper positions. The central portions of the fuse strips 2 lie within a cavity 1*c* in the tubular body 1 and this cavity is preferably filled with quartz sand, not shown, and is subjected to overpressure when the fuse strips melt.

Plate-shaped connecting pieces 4 are provided for the opposite ends 3 of the tubular body 1 and these are clamped in place on those ends by means of circular flanges 4*a* which are preferably rolled at their edges into peripheral notches 5 provided on the exterior surface of the tubular body 1. Preferably, the connecting pieces 4 and their flanges are pressed from one piece of electrically conductive metal. These connecting pieces also include annular plate portions 4*b* which overlie the end walls 3 and which lie in face-to-face electrical contact with correspondingly positioned radially extending foot portions 2*d* of the fuse strips 2, the connecting piece portions 4*b* being either soldered or welded to the foot portions 2*d* of the fuse strips in order to provide a uniform and minimum of contact resistance and therefore a minimum heating. Each of the connecting pieces 4 also includes a connecting lug 4*d* which is integral with the plate portion 4*b* and these connecting lugs 4*d*, in the present embodiment,

extend in a direction laterally outward from the flanges 4*a* and tubular body 1. These lugs 4*d* are adapted to be connected directly to the circuit components in which the fuse is inserted, and hence eliminates interposition of any intermediate electrical junction points at which undesirable transfer resistances could arise, there being necessary only the soldered connections between the opposite ends of the fuse strips 2 and the lugs 4*d*.

A cover plate 6 is provided at each end of the fuse and these cover plates are secured in place over the ends of the fuse element 2 and the connecting pieces 4 by means of screws 7 which thread into holes 4*c* provided in the portions 4*b*.

A primary advantage of the fuse construction in accordance with the invention is that there is practically no so-called "contact" resistance between the connecting pieces 4 and the fuse elements 2 since these parts are soldered or welded to each other. With fuse constructions employing screw or other pressure-dependent joints or connections between current carrying parts of the fuse, a "contact" resistance factor does arise and the magnitude of the resistance will vary with the pressure and hence will not be uniform. Hence, the voltage drops across the resistance contact vary and thus are not uniform and result in a considerable and variable amount of heating within the fuse body. With the improved construction according to the invention, the only possible pressure-dependent contacts are confined to the connection of the entire fuse itself into the electrical circuit which it is to protect, for which purpose screw joints or blade contacts are provided, and neither of which has been included in the drawings. The formation of the connecting pieces with their flanges and fuse element connecting portions from a single blank by a pressing operation also results in a most economic manner of production.

While the improved fuse construction in accordance with the invention is of general use, it is particularly adapted for use in semiconductor-rectifier apparatus because of its uniform and minimum resistance value. Such a fuse is connected in series with each rectifier cell and it is operationally important that the fuse have these two characteristics.

I claim:

In an electrical fuse construction, the combination comprising a cylindrical body member of insulating material, said body member including a centrally located cavity defined in part by the end walls of said body member and said end walls including aligned cylindrical openings having a diameter smaller than said cavity which receive and support the corresponding end portions of a cylindrical array of fuse strips having an external diameter substantially equal to the diameter of the cylindrical openings in said end walls, said fuse strips including fusible central portions of reduced cross section lying within said cavity and foot portions extending radially at each end thereof, a connecting piece of electrically conductive material including an annular plate portion provided with a circular flange clamped over each end of said cylindrical body member, said foot portions of said fuse strips being united to said plate portions of said connecting pieces by means of a heat joint such as by soldering or welding, said plate portions of said connecting pieces each including a connecting lug integral therewith, and a cover plate secured in place over each end of said cylindrical array

of fuse strips and over said plate portions of said connecting pieces by means of screws passing through said cover plates into threaded apertures in said plate portions of said connecting pieces.

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