

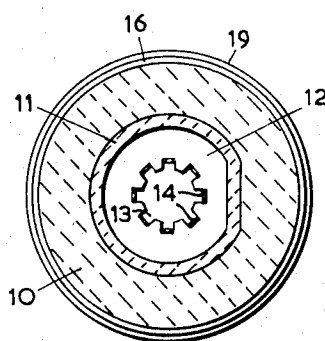
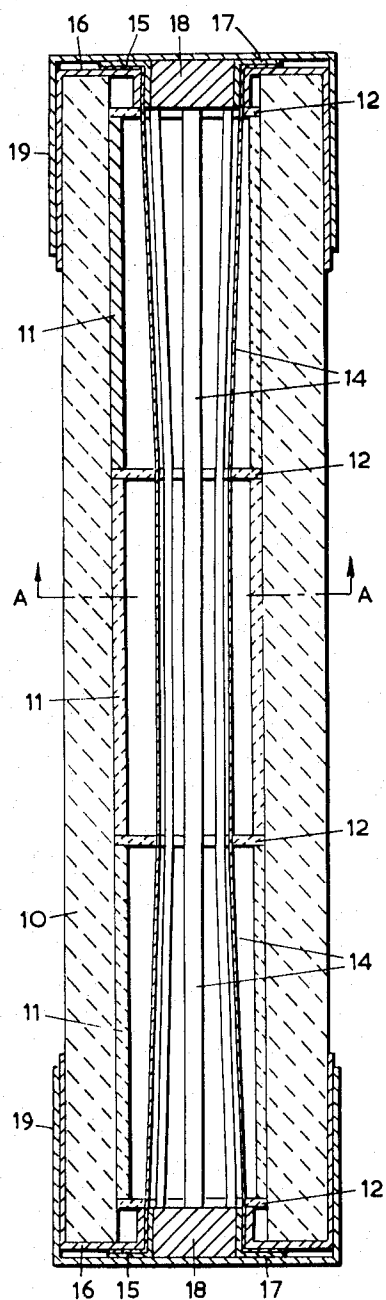
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E. JACKS ET AL

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CARTRIDGE FUSE HAVING SPACER DISC

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Inventors:
Eric Jacks
George William Allerton
By: Stevens, Davis, Miller & Mosher
Attorneys

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CARTRIDGE FUSE HAVING SPACER DISC
Eric Jacks and George William Ollerton, Liverpool, Eng-
land, assignors to The English Electric Company Lim-
ited, Strand, London, England, a British company

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11 Claims. (Cl. 200—131)

This invention relates to fuses and is concerned with arrangements for supporting the fuse elements in a high voltage fuse of the cartridge type.

In constructing a cartridge fuse it is an advantage if the fuse elements are spaced at a predetermined distance from each other and from the inside walls of the fuse body. In medium voltage fuses this is often accomplished by suitably positioning the elements at the fuse caps. However, in the case of fuses above 1000 volts the length of element required is such that it becomes advisable to provide additional support for the elements at intermediate points along their length and this is often achieved by winding the elements on a star-shaped former. A disadvantage of this arrangement is that whilst accurate spacing of the elements from the fuse body wall is maintained, the spacing between the elements themselves is left to the judgment of the operative.

According to the invention, a cartridge fuse having a plurality of fuse elements includes at least one spacer disc mounted in the bore of the fuse body and means for locating said spacer disc or discs at a predetermined position or positions respectively along the length of the bore, holes or slots being provided in the spacer disc or discs for the location of a said fuse element in each said hole or slot, the holes or slots being positioned so as to locate the fuse elements relative to each other and to the bore of the fuse body.

According to a preferred feature of the invention, two or more said spacer discs are mounted in the bore of the fuse body, the spacer discs being fitted into the bore of the fuse body with an interlocking relationship which prevents rotation of the spacer discs about the axis of the fuse body bore.

According to a further preferred feature of the invention, the outer periphery of the spacer discs and the bore of the fuse body have a D-shape so as to provide said interlocking relationship.

Further preferred features of the invention will appear from the following description with reference to the accompanying drawing, wherein:

FIG. 1 is a sectional elevation of one form of high voltage fuse according to the invention, and

FIG. 2 is a sectional view on the line A—A in FIG. 1.

Referring now to FIGS. 1 and 2, the fuse comprises a ceramic fuse body 10 having a D-shaped bore. The fuse body contains three ceramic liners 11 also of D-shape and having a thin wall section in relation to the diameter of the liner. The liners 11 are a sliding fit in the fuse body 10 and serve to locate axially four ceramic spacer discs 12, two of which are disposed at the ends of the fuse body 10 and two at intermediate points along the length. The spacers 12 are annular members having a D-shaped outer periphery enabling the spacers to be located circumferentially in the fuse body bore and have a bore formed with radial slots 13 bearing a fixed relationship to the D-shaped periphery so that the slots in all the spacers are in alignment.

Axially extending fuse elements 14 are received in the slots 13 and it will be observed that as well as supporting the fuse elements the spacers 12 ensure that the fuse elements are maintained at a predetermined distance from each other and from the inner walls of the fuse body 10.

The fuse elements 14 are positioned at the ends of the fuse body by conventional means. The ends 15 of the fuse elements 14 are turned outwards radially and soldered to each of two inner end caps 16 which are a press fit on the outer periphery of the fuse body 10 and engage the outer spacers 12. A thimble 17 of conducting material engages the ends 15 of the fuse elements 14, and the thimble 17 and a plug 18 are maintained in position by an outer end cap 19 which is a press fit on the inner end cap 16. The fuse body bore contains quartz filling.

The fuse described above employs four spacers 12 with a ceramic liner 11 between each pair of spacers. In another embodiment of the invention, for a shorter fuse, a single spacer is located at the centre of the fuse body. In this case the need for aligning spacers does not arise and the shape of the fuse body bore, the liners, and the spacers, is circular.

It has been found that to prevent sagging of the fuse elements, the distance between the spacers or, in the case of a single spacer, between the spacer and the end cap, should not exceed four inches.

What we claim as our invention and desire to secure by Letters Patent is:

1. A cartridge fuse comprising a plurality of fuse elements having spacer disc means mounted in the bore of a fuse body and including liner means for locating said spacer disc means at a predetermined position along the length of said bore, fuse element positioning means formed in said spacer disc means to locate said fuse elements relative to each other and to the bore of said fuse body, said spacer disc means having an external periphery irregularly shaped to correspond with a similar irregularly shaped cross-section of the bore of said fuse body to interlock and prevent rotation of said spacer disc means about the axis of said fuse body.

2. A cartridge fuse according to claim 1 wherein the outer periphery of said spacer disc means and said bore of said fuse body have a D-shape so as to provide said interlocking relationship.

3. A cartridge fuse according to claim 1 wherein the locating means comprises a number of liners which are slidably mounted in the bore of the fuse body, at least one spacer disc being located between two said liners.

4. A cartridge fuse according to claim 1 wherein the spacer disc means are formed with a central bore and with said slots, the slots being arranged to extend radially outwardly from said bore.

5. A cartridge fuse comprising
a body having inner walls defining a hollow bore,
two end caps respectively mounted on two spaced portions of said body and closing said bore,
a plurality of fusible elements extending through said bore and connected to and between the said end caps,

at least two hollow liners surrounding said elements and mounted within, and in slidable engagement with, the said inner walls of the body, and

at least one spacer disc extending across said bore, each said disc being mounted between two adjacent liners and comprising

a wall portion defining a like plurality of mutually spaced apertures through each of which extends a corresponding one of said fusible elements, each fusible element engaging, and being supported by, the said wall portion of the spacer disc.

6. A cartridge fuse according to claim 5, wherein each hollow liner and spacer disc has an outer periphery the shape of which is asymmetrical and matches the shape of the inner walls of said body.

7. A cartridge fuse according to claim 6, wherein the said shape is in the form of the letter D.

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8. A cartridge fuse comprising
 a tubular elongate body of electrically insulating
 material having inner walls defining a cylindrical
 bore,
 two electrically conductive end caps respectively
 mounted on two spaced end portions of said body
 and together closing said bore,
 a plurality of fusible elements extending through said
 bore and connected to and between the said end
 caps,
 a plurality of cylindrical liners surrounding said fusible
 elements and mounted within, and in slidable en-
 gagement with, the said inner walls of the body, and
 at least one electrically insulating spacer disc extending
 across said bore, each said disc being mounted be-
 tween two adjacent liners and comprising
 a wall portion defining a plurality of recesses spaced
 both from each other and said inner walls of the
 bore, the recesses being equal in number to the num-
 ber of said fusible elements and respectively accom-
 modating a said element.
9. A cartridge fuse according to claim 8, wherein the
 wall portion of said spacer disc defines a central aperture
 from which said recesses extend outwardly.

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10. A cartridge fuse according to claim 9, comprising
 a plurality of said spacer discs, each spacer disc and
 hollow liner having an outer periphery the shape of which
 is asymmetrical and matches the shape of the inner walls
 of said body.

11. A cartridge fuse according to claim 10, wherein the
 space within the whole bore contains a quartz filling.

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BERNARD A. GILHEANY, *Primary Examiner.*H. B. GILSON, *Assistant Examiner.*