SUPERCOMPACT POLYPHASE FUSE

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ABSTRACT OF THE DISCLOSURE

A polyphase fuse is disclosed which is more compact than prior art fuses of this description, and which includes a housing formed by a monolithic block of an inorganic insulating material. This makes it possible to operate the fuse at relatively high temperatures which, in turn, make it possible to reduce the size of the fuse structure. Other important features of the fuse reside in its simplicity of design, and the reduction of the smallest distance between its current-carrying parts pertaining to different phases and its parts having a contact potential pertaining to different phases to the spacing between knife blade contacts.

Field of invention

Polyphase fuses are structures including a plurality of single-phase fuses integrated into a structural unit. Such a unit can be designed to be more compact than several separate single-phase fuses, and it can be replaced more quickly than several single-phase fuses. Thus the application of polyphase fuses greatly reduces downtime in case of replacement of fuses.

Summary of invention

All the current-carrying parts of the polyphase fuse are arranged in a plurality of passageways defined by a monolithic block of inorganic insulating material. There is no current-carrying part associated with each of the passageways which extends beyond the particular passageway. As a result, there is no current-carrying part, or any part having a contact potential, within the space situated on the outside of the monolithic fuse housing between the blade contacts of the polyphase fuse.

Brief description of drawings

Referring now to the drawings, FIG. 1 is in part a front elevation and in part a vertical section of a polyphase fuse embodying the present invention and shows that fuse associated with fuse clips adapting the fuse to be used as a disconnect switch.

FIG. 2 is partially a side elevation and partially a longitudinal section of the structure of FIG. 1;

FIG. 3 is a horizontal section taken along 3—3 of FIG. 1; and

FIG. 4 is an isometric view of a detail of the structure of FIGS. 1 to 3.

Description of preferred embodiment

Referring now to the drawings, numeral 1 has been applied to indicate a block of an inorganic material as, for instance, casted asbestos cement. Block 1 has a plurality of parallel passageways 2 which are substantially cylindrical and circular in cross-section. The geometrical axes X of passageways 2 are arranged substantially in the common plane Y—Y (see FIG. 2). Each of the plurality of passageways 2 has a pair of openings 2a at the ends thereof. A plurality of pairs of blade contacts 4 arranged at right angles to plane Y—Y projects with the axially inner ends thereof into one of said plurality of passageways 2. Each pair of knife blade contacts 4 is spaced equidistantly from the front surface and from the rear surface of block 1. The structure further includes a plurality of fuse link means 5 each arranged in one of passageways 2 and each conductively interconnecting one of said plurality of pairs of blade contacts 4. In the embodiment of the invention shown each fuse link means includes a pair of multiperforated silver ribbons sandwiching with the axially outer ends thereof the axially inner ends of one pair of blade contacts 4.

Reference numeral 6 has been applied to indicate a plurality of bodies of arc-quenching filler, each in one of passageways 2. Each body 6 of arc-quenching filler consists preferably of pure quartz sand, and each body 6 of arc-quenching filler has a pair of end surfaces 6a in spaced relation from said pair of openings 2a of each of said plurality of passageways 2.

The structure further includes a plurality of pairs of end plugs 7 of insulating material. Each pair of end plugs 7 projects into one of said plurality of passageways 2 and each position one of said plurality of pairs of blade contacts 4 from the internal wall of one of said plurality of passageways 2. In other words, end plugs 7 form insulating bushings for the passage of blade contacts 4. Plugs 7 are preferably made of a synthetic resin.

To be more specific, plugs 7 are preferably made of a synthetic casting resin pertaining to the family of epoxy resins.

Reference numeral 8 has been applied to indicate a plurality of washers of washers of electric insulating material. Each washer 8 is provided with a substantially rectangular cut-out (not shown) to allow the passage of blade contacts 4. Each washer 8 is interposed between one of the bodies 6 of arc-quenching filler and one of end plugs 7.

In the embodiment of the invention shown in the drawings the internal wall of each of passageways 6 defines a pair of shoulders 2b adjacent openings 2a, and washers 8 rest with the outer periphery thereof against the aforementioned shoulders 2b. Washers 8 form barriers between the bodies of quartz sand 6 and the plugs 7.

Block 1 is preferably made of casted asbestos cement. If this material is used in preference to steatite or porcelain, certain precautions must be taken fully set forth in U.S. patent to E. Salzer et al., 3,281,556, Oct. 25, 1966, for Electric Cartridge Fuses. Reference may be had to this patent in regard to the use of densified asbestos cement for forming block 1.

Reference numeral 9 has been applied to indicate fuse clips for receiving the axially outer ends of blade contacts 4. Transverse pins 10 project through the lower fuse clips 9 as seen in FIG. 1, making it possible to pivot the entire polyphase fuse structure as a unit about pins 10. As shown in FIG. 4, the lower ends of the lower blade contacts 4 are provided with oblong slots or incisions 4a intended to be engaged by pins 10.

In FIG. 1 the smallest distance between fuse clips 9 pertaining to different phases has been designated by the reference character d1, and the smallest distance between current-carrying parts on the outside of block 1 pertaining to different phases has been designated by reference character d2. It will be apparent from FIG. 1 that

This is but one form of expressing the great compactness which may be achieved by means of polyphase fuses constructed in accordance with the present invention. To be more specific, the total width W of block 1 can be as small as the distance d1 between fuse clips of contiguous phases permits.

Block 1 is substantially prismatic and has a width W substantially exceeding the depth D thereof. The axially outer end surfaces of end plugs 7 are flush with the upper and lower surfaces of the block 1, thus giving a neat.
and smooth appearance to the composite polyphase fuse structure.

In the foregoing I have described my invention solely in connection with an illustrative specific embodiment thereof. Since many variations and modifications may be made and be obvious to those skilled in the art, I prefer to be bound not by the specific disclosure herein contained, but only by the appended claims.

I claim as my invention:

1. A polyphase fuse including in combination:
   (a) a monolithic block of an inorganic insulating material having a plurality of parallel passageways having geometrical axes arranged substantially in a common plane, each of said plurality of passageways having a pair of openings at the ends thereof;
   (b) a plurality of pairs of blade contacts arranged at right angles to said common plane, each pair of said plurality of pairs of blade contacts projecting with the ends thereof into one of said plurality of passageways;
   (c) a plurality of fuse link means each arranged inside one of said plurality of passageways and each conductively interconnecting one pair of said plurality of pairs of blade contacts;
   (d) a plurality of bodies of pulverulent arc-quenching filler each in one of said plurality of passageways and each having a pair of end surfaces in spaced relation from said pair of openings of one of said plurality of passageways; and
   (e) a plurality of pairs of end plugs of electric insulating material, each pair of said plurality of pairs of end plugs projecting into one of said plurality of passageways and each positioning one of said plurality of pairs of blade contacts with respect to the internal wall of one of said plurality of passageways.

2. A polyphase fuse as specified in claim 1 wherein said block is substantially prismatic, made of a fibrous cementitious material and has a front surface and a rear surface whose width substantially exceeds the depth of said block, wherein each pair of said plurality of pairs of blade contacts is spaced equidistantly from said front surface and said rear surface of said block, and wherein each of said plurality of pairs of end plugs have outer surfaces flush with surfaces of said block.

3. A polyphase fuse as specified in claim 1 wherein said plurality of pairs of end plugs are made of a synthetic resin.

4. A polyphase fuse as specified in claim 1 wherein said plurality of pairs of end plugs are made of a synthetic casting resin pertaining to the epoxy family of resins.

5. A polyphase fuse as specified in claim 1 including a plurality of pairs of washers of electric insulating material each interposed between one of said plurality of bodies of pulverulent arc-quenching filler and one of said plurality of pairs of end plugs.

6. A polyphase fuse as specified in claim 1 wherein the internal wall of each of said plurality of passageways defines a pair of shoulders adjacent said pair of openings thereof, said fuse including a plurality of pairs of washers of electric insulating material each resting on one pair of said plurality of pairs of shoulders and each separating one of said plurality of bodies of arc-quenching filler from one of said plurality of pairs of end plugs.

7. A polyphase fuse as specified in claim 1 wherein said block is made of densified asbestos cement and wherein said pulverulent arc-quenching filler is quartz sand.

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