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A. BAHR

3,408,525

GAS DISCHARGE SURGE ARRESTER

Filed May 26, 1965

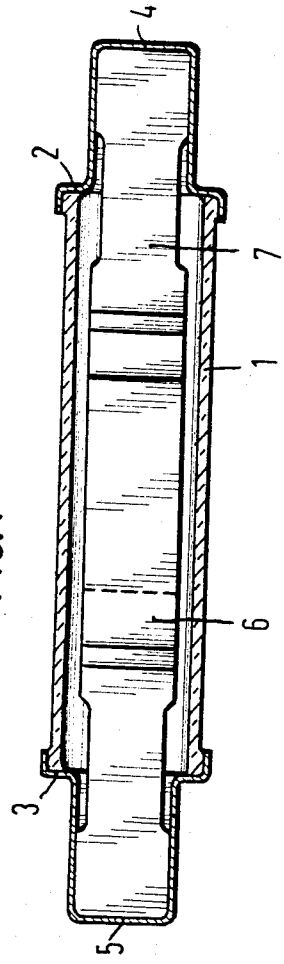

FIG. 1

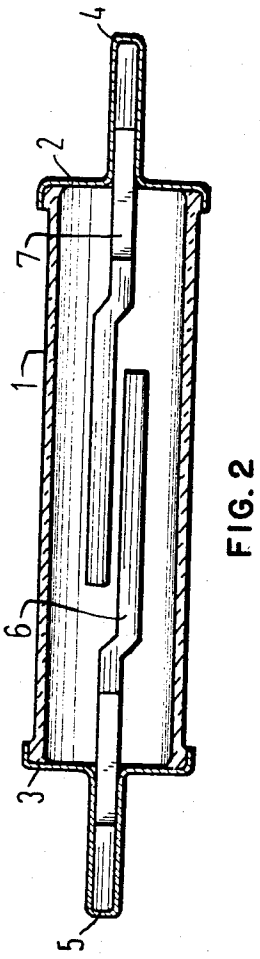

FIG. 2

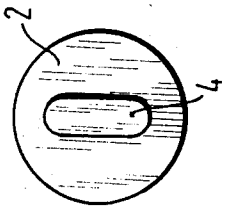

FIG. 3

INVENTOR

ALEX BAHR

BY Lee & Lee ATTORNEYS

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GAS DISCHARGE SURGE ARRESTER

Alex Bahr, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany, a corporation of Germany

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3 Claims. (Cl. 313—146)

ABSTRACT OF THE DISCLOSURE

The invention is directed to a gas discharge voltage regulator which includes a pair of overlapping electrodes. Each of the electrodes is secured in a cup-shaped contact retainer which extend outwardly of the discharge arrester in an axial direction. Spacing of the electrodes can be adjusted by bending the cup-shaped extended portion of the retainers thereby moving the electrodes within the interior of the gas discharge voltage regulator.

The invention relates both to a single-path and also to a multi-path gas discharge voltage overload or surge arrester. In the production of such arrestors it is frequently extremely advantageous to be able to externally readjust the electrode spacings of the arrester which has been sealed gas-tight. The invention has as its object the production of a voltage arrester with a tubular body, of insulating material, which is sealed gas-tight at its ends by contact caps in which the overlapping electrodes are supported. According to the invention the contact caps are provided with outwardly extending cup-shaped contact terminals in which the electrode, in each case, is so supported that by a bending of the contact terminals the electrode spacing is variable without impairing the gas-tight connection between insulating body and the contact caps.

The drawing illustrates an example of construction of a single-path arrester according to the invention, in which:

FIG. 1 is a longitudinal section illustrating the electrodes in plan;

FIG. 2 is a longitudinal section illustrating the electrodes in elevation; and

FIG. 3 is an end elevation.

The insulating body of glass or ceramic material is designated by the numeral 1, and disposed on its ends are contact caps 2 and 3 which are connected by a gas-tight seal with the insulating body. The contact cap 2 has a cup-shaped contact terminal or tongue 4 extending outwardly in axial direction and the contact cap 3 has a contact terminal 5 formed in the same manner. In the contact terminal or tongue 4 there is mounted an electrode 7 and in the contact terminal 5 there is similarly mounted the electrode 6. The electrodes can advantageously be secured in the contact terminals by a hard soldering.

The arrester can either be bonded or soldered in a conventional manner and evacuated by means of a pump stem connection to an automatic pump or to a gas-filling unit, filled with a noble gas and sealed. It can, however, just as well be designed and constructed in a form without a pump connection. If an arrester, for example, does not have the required ignition voltage tolerance, it is then possible, by a slight bending of one or both contact terminals, to move the electrodes toward or away from each other without loosening or impairing the glazing or soldering at the closure points. To prevent the bending force from being too great, the relation of the material thickness to the diameter of the contact pieces must be suitably selected. The form of the contact elements likewise plays a part. In an arrester of the form disclosed in the drawings it is favorable if the ratio of material thickness to diameter is made

$$\frac{\text{Material thickness}}{\text{Diameter}} = \frac{0.2 \ldots 0.3}{8}$$

A voltage arrester of the construction according to the invention can bear a heavy load, because the heat is drawn off directly to the contact terminal. Its manufacture is simple and inexpensive. In two-path or multi-path gas discharge voltage overload arresters an exact balancing of the response voltages of the individual discharge paths can be effected after the manufacture.

In order to avoid the occurrence of excessively high contact resistances, the arresters are subjected, after their manufacture, to a conductive surface treatment. It is expedient, however, to carry out the correction of the electrode spacings prior to such treatment. As experience has shown, through hydrogen absorption in connection with the coating thickness of the conductive coating, for example, of nickel, the base material is so stiffened that a readjustment of the electrodes is made much more difficult. If, however, the previously readjusted arrester is provided with a conductive coating, the material embrittling that occurs, insuring that the electrode spacings, once set, are not changed by the magnetic forces normally occurring in operation.

On the other hand, through selection and suitable dimensioning of the material as to thickness and strength, it is possible to determine the level of the current at which the electrodes of the gas discharge voltage overload arrester according to the invention engage in a permanent short circuit, as for example, at 10 ka. according to VDE 0845. Thereby, even after destruction of the arrester electrical protection of the installation is assured.

Changes may be made within the scope and spirit of the appended claims which define what is believed to be new and desired to have protected by Letters Patent.

I claim:

1. A gas discharge voltage overload arrester, comprising a tubular insulating body which is sealed gas-tight at its ends by contact caps, and overlapping electrodes disposed in said body and supported in said contact caps, each of said contact caps having a cup-shaped contact terminal extending outwardly in axial direction in which a respective electrode is supported, said caps being constructed to enable a bending of the contact terminals relative to the body, said electrodes are secured in the contact terminal by means of hard soldering, said electrodes being adjusted to each other, said contact caps being provided with a nickel coating of a predetermined thickness, and the gaseous absorption of the contact cap material in conjunction with said predetermined thickness of nickel material causes an extensive embrittling of the cap material such that contact forces will not change the initially adjusted electrode spacing, whereby the electrode spacing is externally adjustable without impairing the seal between the insulating body and the contact caps.

2. A gas discharge voltage arrester according to claim 1, wherein the electrodes are so spaced that the magnetic forces of a current search in excess of a predetermined magnitude cause a permanent short circuiting of the electrodes.

3. A gas discharge voltage overload arrester comprising:

a housing of insulating material having a pair of openings formed therein;

electrodes extending through the openings of said housing and positioned adjacent and overlapping one another within said housing; and

contact cap means secured to said housing over each of said openings and secured to the ends of each of said electrodes, each of said contact cap means having a cup-shaped contact terminal extending outwardly in axial direction in which a respective electrode is supported, said cap means being constructed to enable a bending of the contact terminals relative to the housing, said cap means providing a gas tight seal over the openings of said housing for externally adjusting the position of said electrodes relative to one another within said housing without impairing the seal between the housing and the contact caps.

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JOHN W. HUCKERT, *Primary Examiner.*

A. J. JAMES, *Assistant Examiner.*