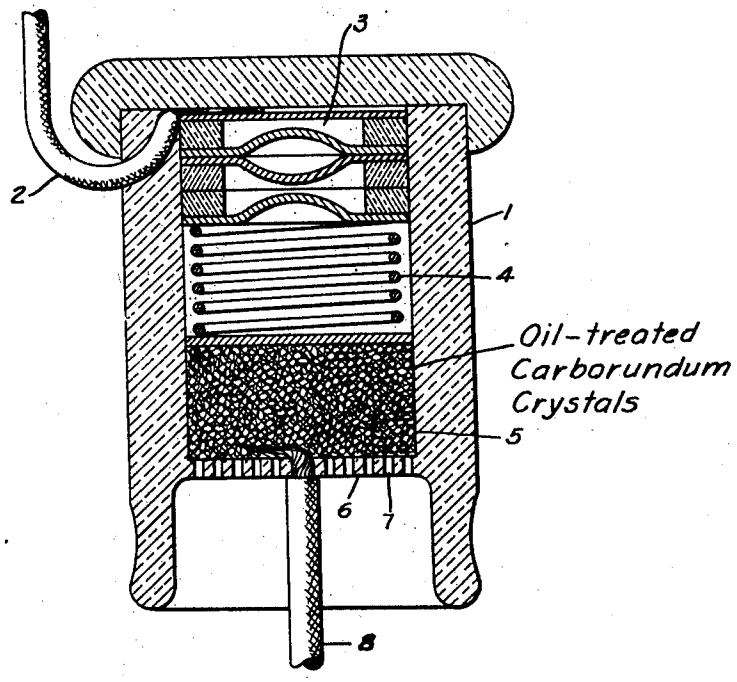
Nov. 10, 1936. C. E. KRAUSE 2,060,509

ARRESTER OF EXTREMELY HIGH DISCHARGE CAPACITY

Filed March 15, 1934



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Patented Nov. 10, 1936

2,060,509

UNITED STATES PATENT OFFICE

2,060,509

ARRESTER OF EXTREMELY HIGH DISCHARGE CAPACITY

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Application March 15, 1934, Serial No. 715,613

20 Claims. (Cl. 175—30)

My invention relates to lightning arresters or excess-voltage discharge devices, and it has particular relation to such devices which are designed for carrying extremely high currents which may, in some cases, be as high as 100,000 amperes, or even higher.

Many lightning arresters in the past have been carrying currents of the order of 500 amperes or 1,000 amperes, or possibly 5,000 amperes or slightly more, under conditions of maximum discharge, but difficulties have been experienced when the discharges have been much heavier, because of changing of the arrester-characteristics and failure of the arrester. The old low-discharge-current ratings of lightning arresters were satisfactory during the time when electrical transmission-line engineers were content to regard a direct lightning stroke as a rare occurrence of such intense severity that they could not be expected to cope with it, thereby knowing that they would face a power-outage in the event of such an occurrence. In more recent years, it has been realized that a direct lightning stroke is neither so rare nor so ungovernably destructive in its energy-discharge as had been imagined in previous times.

A demand has been created, therefore, for lightning arresters which would be expected to handle much heavier current-discharges than heretofore. This demand has been partially met by self-extinguishing arc-devices, such as that which is described in a patent application of Julius J. Torok, Serial No. 594,193, filed February 20, 1932, for an Electrical discharge device, but this device was more like a spill-over arc-device than a lightning arrester, in that it was incapable of extinguishing itself, once it had arced over, until the arc had been blown out, whereas lightning arresters, as the term is frequently understood, have some sort of valve action for restoring the substantially non-conducting condition of the arrester in response to a reduction of the applied voltage, while the arrester is still discharging.

A common type of lightning arrester, to which my invention is applicable, consists of a body of loosely packed silicon-carbide crystals or, in general, a porous body capable of carrying a multitude of tiny discharges in its pores, and extinguishing said discharges, in response to a predetermined reduction in the applied voltage, by reason of the effect of the pores themselves, or the effect of the space-limitations of the multitudinous paths between the loose silicon-carbide crystals.

In accordance with my invention, I have found that such lightning arresters may be adapted to carry heavier currents, without substantially changing their well-known valve-characteristics, by having included therein a heat-volatile non-conducting material, preferably, though not necessarily, disposed so that it does not fill the pores or space-discharge paths, so that, when the arrester is discharging, a gas-blast of substantially non-ionized particles will be liberated, which quickly blows out the pores or space-discharge paths and permits the arrester to operate, as to its valve-characteristics, more nearly as if it had been handling the smaller currents which lightning arresters were commonly heretofore expected to handle. Such heat-volatile material may consist of an insulating oil, or other substantially non-conducting liquid, or it may consist of a solid material such as boric acid.

An exemplary form of embodiment of my invention is illustrated in the accompanying drawing, the single figure of which is a cross-sectional view of an arrester embodying my invention.

As shown in the drawing, the arrester consists of an insulating housing 1, containing a line-lead 2 at the top, to which is connected a series gap device 3 which may be held in place by a spring 4 bearing against a body of silicon-carbide crystals 5, or other porous lightning arrester, which has been treated with oil or boric acid or other heat-volatile matter. The porous arrester 5 is supported by a bottom plate 6 which is provided with ventholes 7 to release the discharge gases, and the arrester is completed by a ground lead 8 extending through the bottom thereof.

If oil is used as the volatile matter, it is only necessary to coat the silicon-carbide crystals with the oil, and such coating is preferred to an actual immersion in oil, although I do not exclude the possibility of immersion in my broader claims. If boric acid is utilized, a few particles of boric-acid powder, distributed among the silicon-carbide crystals, may be utilized.

It will be understood that the materials and the particular structural shape hereinabove suggested and illustrated in the drawing are to be considered as illustrating my invention rather than restricting my invention, as obviously many variations may be resorted to without departing from its essential spirit and scope. I desire, therefore, that the appended claims shall be accorded the broadest construction consistent with their language and the prior art.

I claim as my invention:

1. A porous lightning arrester having heat-

volatile non-conducting material therein for producing a relatively non-conducting gas-blast in the pores for interrupting a discharge therein.

2. A granular lightning arrester having space-discharge paths between a large number of granules, and having heat-volatile non-conducting material therein for producing a relatively non-conducting gas-blast in said space-discharge paths for interrupting a discharge therein.

3. A porous lightning arrester having distributed throughout the same, a material capable of discharging an arc-extinguishing blast of substantially non-ionized particles in the pores in response to a discharge therein.

4. A granular lightning arrester having space-discharge paths between a large number of granules, and having, distributed throughout the same, a material capable of discharging an arc-extinguishing blast of substantially non-ionized particles in said space-discharge paths in response to a discharge therein.

5. A porous lightning arrester having a substantially insulating liquid therein.

6. A granular lightning arrester having space-discharge paths between a large number of granules, and having a substantially insulating liquid therein.

7. A granular lightning arrester having space-discharge paths between a large number of non-cohering granules and having heat-volatile non-conducting material therein for producing a relatively non-conducting gas-blast in said space-discharge paths for interrupting a discharge therein.

8. A granular lightning arrester having space-discharge paths between a large number of non-cohering granules, and having, distributed throughout the same, a material capable of discharging an arc-extinguishing blast of substantially non-ionized particles in said space-discharge paths in response to a discharge therein.

9. A granular lightning arrester having space-discharge paths between a large number of non-cohering granules, and having a substantially insulating liquid therein.

10. A granular lightning arrester having space-discharge paths between a large number of non-cohering silicon-carbide granules, and having heat-volatile non-conducting material therein for producing a relatively non-conducting gas-blast in said space-discharge paths for interrupting a discharge therein.

11. A porous lightning arrester having heat-volatile material therein, but not filling the pores, for producing a relatively non-conducting gas-blast in the pores for interrupting a discharge therein.

12. A granular lightning arrester having space-discharge paths between a large number of granules, and having heat-volatile material therein, but not filling said space-discharge paths, for producing a relatively non-conducting gas-blast in said space-discharge paths for interrupting a discharge therein.

13. A porous lightning arrester having, distributed throughout the same, but not filling the pores, a material capable of discharging an arc-extinguishing blast of substantially non-ionized particles in the pores in response to a discharge therein.

14. A granular lightning arrester having space-discharge paths between a large number of granules and having, distributed throughout the same but not filling said space-discharge paths, a material capable of discharging an arc-extinguishing blast of substantially non-ionized particles in said space-discharge paths in response to a discharge therein.

15. A porous lightning arrester having a substantially insulating liquid therein, but not filling the pores.

16. A granular lightning arrester having space-discharge paths between a large number of granules, and having a substantially insulating liquid therein, but not filling said space-discharge paths.

17. A granular lightning arrester having space-discharge paths between a large number of non-cohering granules, and having heat-volatile material therein, but not filling said space-discharge paths, for producing a relatively non-conducting gas-blast in said space-discharge paths for interrupting a discharge therein.

18. A granular lightning arrester having space-discharge paths between a large number of non-cohering granules, and having, distributed throughout the same but not filling said space-discharge paths, a material capable of discharging an arc-extinguishing blast of substantially non-ionized particles in said space-discharge paths in response to a discharge therein.

19. A granular lightning arrester having space-discharge paths between a large number of non-cohering granules, and having a substantially insulating liquid therein, but not filling the pores.

20. A granular lightning arrester having space-discharge paths between a large number of non-cohering silicon-carbide granules, and having heat-volatile material therein, but not filling the space-discharge paths, for producing a relatively non-conducting gas-blast in said space-discharge paths for interrupting a discharge therein.

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