April 10, 1951 O. H. KAMINKY 2,548,112

RESISTOR TYPE ISOLATOR FOR LIGHTNING ARRESTERS

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Fig. 1

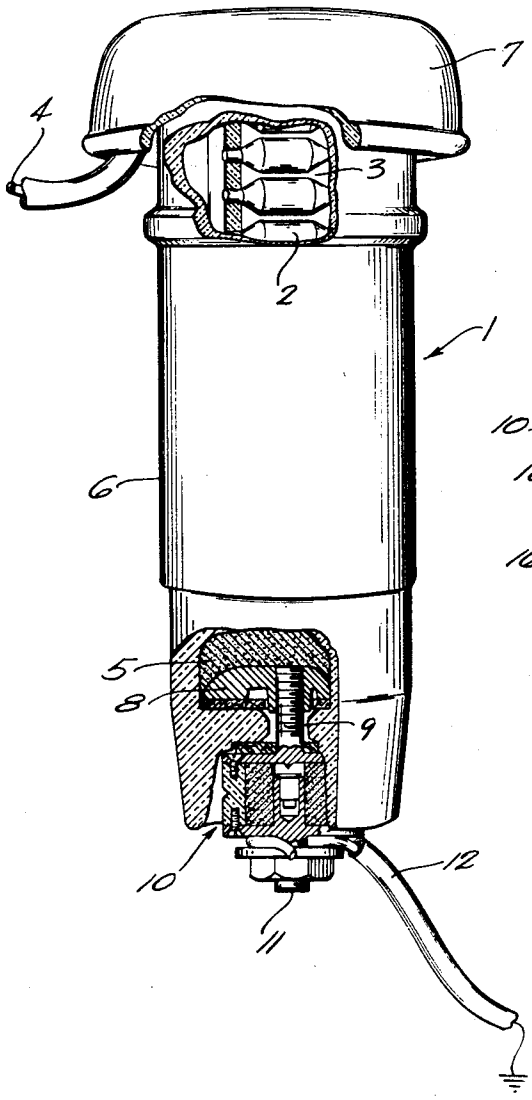
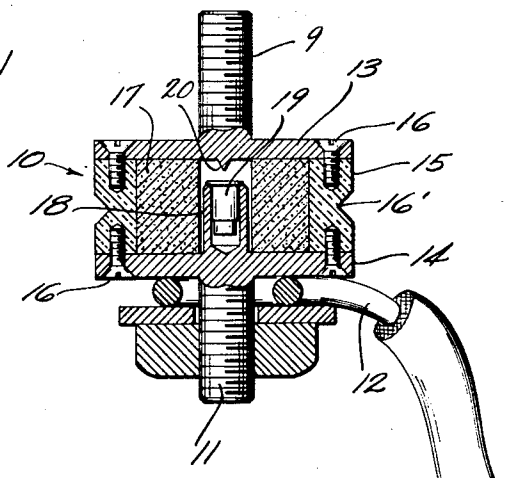


Fig. 2



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RESISTOR TYPE ISOLATOR FOR LIGHTNING ARRESTERS

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5 Claims. (Cl. 200—115)

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This invention relates to a resistor type of isolator for lightning arresters.

Heretofore it has been the practice to provide an isolator for lightning arresters which is associated with a lightning arrester having spark gaps and negative valve material and which is so arranged that for ordinary discharges, the isolator will not function but for unusually heavy discharges which result from a breaking down of the valve material, for instance, the isolator will function and permanently open the circuit to the ground of the lightning arrester. This type of structure is shown in the patent to R. H. Earle, No. 2,315,320 of March 30, 1943 for Automatic Circuit-Interrupting Device owned by the assignee of the present invention.

Prior forms of isolators have been found to have radio interference which resulted from a charge accumulating on the upper electrode of the isolator and discharging to the lower electrode, thereby producing a corona effect, with resulting radio disturbance.

This invention is designed to overcome the above noted defects and objects of this invention are to provide a novel type of isolator which is so made that a resistor provides a path for the discharge from the upper electrode to the lower electrode of any slowly accumulating charge, the resistor being of high enough value so as to prevent the free connection of the electrodes of the isolator and also being of high enough value so as to insure the sparking over from the upper electrode to the cartridge having the explosive charge within the resistor or else the heating of the cartridge due to the heating of the resistor so as to cause the charge to explode and rupture the isolator, thereby disconnecting the lightning arrester from the ground.

Further objects are to provide a very simple construction of resistor type isolator which is compact, which may be readily made, and which may be easily assembled with the usual type of lightning arrester without any alterations of the lightning arrester itself.

An embodiment of the invention is shown in the accompanying drawings, in which—

Figure 1 is a side elevation with parts broken away showing the lightning arrester with the isolator in place.

Figure 2 is an enlarged view partly in section through the isolator showing it removed from the lightning arrester.

Referring to the drawings, it will be seen that the lightning arrester has been indicated generally by the reference character 1 and consists of

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a series of conducting members 2 forming a series of gaps 3 arranged for connection between the power line 4 and valve material 5, which latter has negative resistance characteristics. The lightning arrester may have a ceramic body part 6 of cylindrical shape and an upper cap or cover 7 of insulating material. It is provided with a lower terminal 8 into which is screwed the connecting threaded portion 9 of an upper terminal of an isolating device indicated generally by the reference character 10. This isolating device has a second terminal or lower terminal 11 which is connected by means of a flexible ground conductor 12 to the ground as indicated in Figure 1.

The isolating device is shown more in detail in Figure 2 and it will be seen that the upper terminal consists of the disk-like member 13 which has the threaded stem 9 previously described. It also has a lower terminal consisting of a disk-like member 14 having the lower threaded portion 11.

The upper and lower terminals or first and second terminals 13 and 14 of the isolating device are in abutting relation to the upper and lower faces of an annular insulating spacing member or breakable shell 15. This shell is weakened by means of an annular groove 16' intermediate its ends. Preferably, fastening means 16 in the form of screws extend through the disks 13 and 14 and into the breakable shell 15. The breakable shell surrounds an annular resistor 17 which is composed of negative resistance material such as silicon carbide commonly known as Granulon. This resistor may be of a compacted form so as to retain its annular shape as shown in Figure 2, or may be a powder held in place by suitable means not shown.

The lower terminal 14 is provided with a hollow upwardly projecting stem 18 which carries an explosive charge such as the loaded cartridge 19. Preferably the upper terminal 13 is provided with a centrally located sparking tip 20.

The isolator operates in substantially the same manner as that of the isolator of the patent hereinabove mentioned. However, this isolator has an additional and different function from that of the prior isolator. As stated hereinabove, it has been found that there is an accumulation of charge on the upper electrode so that there is a difference in voltage between the upper and lower electrodes. This causes a corona effect or slight sparking or slight discharge which produces radio interference. The provision of the resistor 17 of negative resistance material serves to effectively conduct away any accumu-

lated charge and to thus prevent radio interference. It is preferable that the negative resistance material have relatively high resistance so that the upper and lower terminals of the isolator are substantially electrically separate. There is, however, a sufficient amount of conduction to prevent the radio interference hereinabove noted.

When an excessive amount of current flows, the explosive charge is ignited either by sparking or by the heating of the resistor 17, the result being the same in both cases. The charge explodes, thus breaking the shell or casing 15 and allowing the bottom terminal of the isolator to drop away and electrically disconnect the lightning arrestor from the ground.

It will be seen that a very simple type isolator has been provided which is of the resistor type and adds to the heretofore known advantages of the isolator, such as shown in the prior patent, the additional features enumerated above thus eliminating radio interference.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. The combination of a lightning arrester having one end arranged for connection to a power line and having a second end, an isolating device having a first terminal connected to the said second end of said lightning arrester and having a second terminal connected to the ground and having an annular breakable shell normally holding said first and second terminals apart, an explosive charge arranged to explode and break said shell on excessive flow of current from said first to said second terminals, and a resistor composed of negative resistance material bridging the said first and second terminals of said isolating device.

2. The combination of a lightning arrester having one end arranged for connection to a power line and having a second end, an isolating device having a first terminal connected to the said second end of said lightning arrester and having a second terminal connected to the ground and having an annular breakable shell normally holding said first and second terminals apart, an explosive charge arranged to explode and break said shell on excessive flow of current from said first to said second terminals, and a resistor composed of negative resistance material bridging the said first and second terminals of said isolating device, said resistor being annular and surrounding said explosive charge.

3. The combination of a lightning arrester having one end arranged for connection to a power line and having a second end, an isolating device having a first terminal connected to the said second end of said lightning arrester and having a second terminal connected to the ground and having an annular breakable shell normally holding said first and second terminals apart, an explosive charge arranged to explode and break said shell on excessive flow of current from said first to said second terminals, and a resistor composed of negative resistance material bridging the said first and second terminals of said isolating device, the explosive charge being in close proximity to said first electrode and to said resistor and arranged to be ignited on excessive flow of current either by sparking between the first and second electrodes of said isolating device or by the heating of said resistor.

4. The combination of a lightning arrester having one end arranged for connection to a power line and having a second end, an isolating device having a first terminal connected to the said second end of said lightning arrester and having a second terminal connected to the ground and having an annular breakable shell normally holding said first and second terminals apart, an explosive charge arranged to explode and break said shell on excessive flow of current from said first to said second terminals, an annular resistor surrounding said explosive charge and bridging the terminals of said isolating device, said first and second terminals abutting the ends of said shell, and fastening means extending through said first and second terminals and into said shell.

5. The combination of a lightning arrester having one end arranged for connection to a power line and having a second end, an isolating device having a first terminal connected to the said second end of said lightning arrester and having a second terminal connected to the ground and having an annular breakable shell normally holding said first and second terminals apart, an explosive charge arranged to explode and break said shell on excessive flow of current from said first to said second terminals, an annular resistor surrounding said explosive charge and bridging the terminals of said isolating device, said first and second terminals abutting the ends of said shell, and fastening means extending through said first and second terminals and into said shell, said shell having an annular weakened portion intermediate its ends.

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