

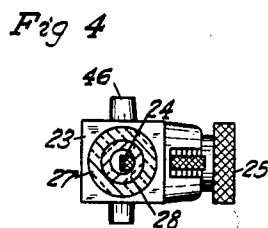
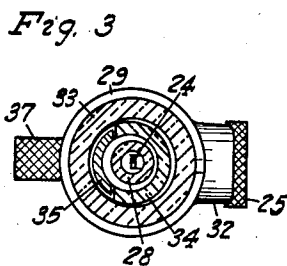
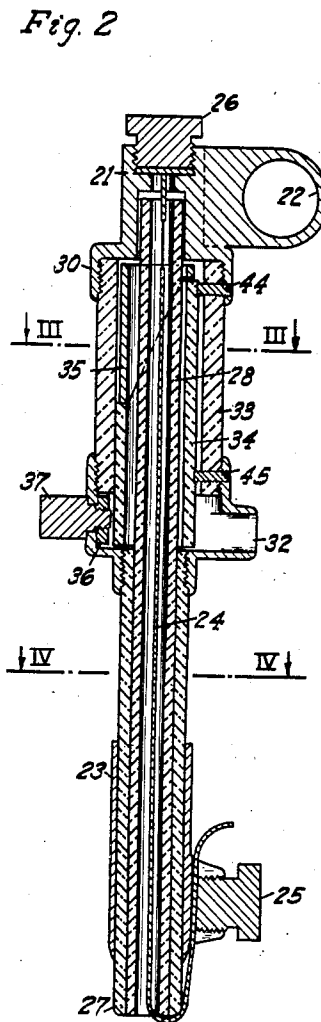
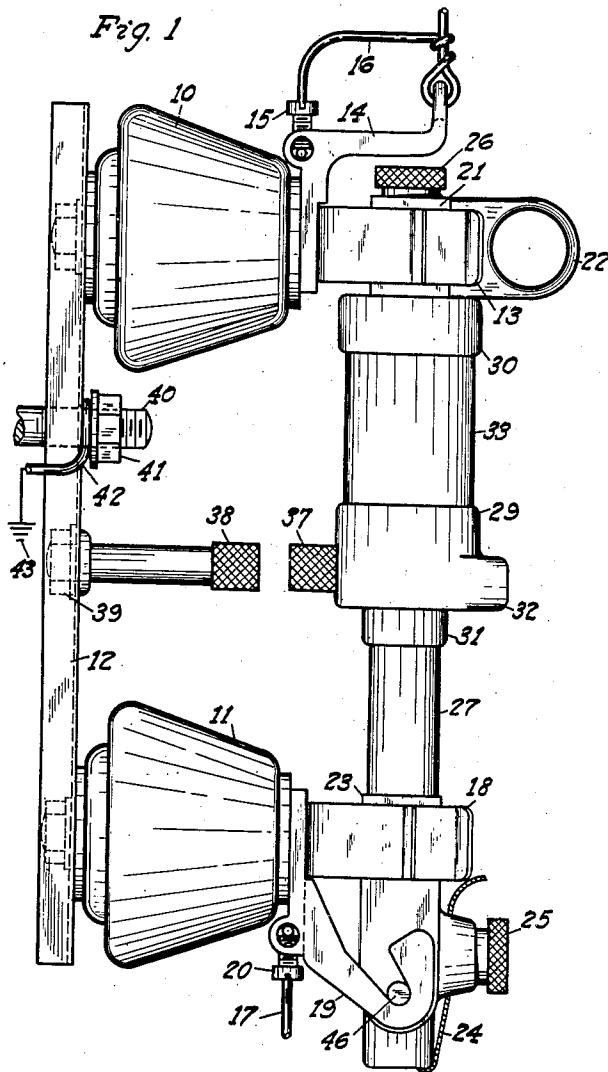
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ELECTRICAL PROTECTIVE DEVICE

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ELECTRICAL PROTECTIVE DEVICE

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6 Claims. (Cl. 200—115)

This invention relates to high voltage protective devices known as expulsion fuses and lightning arresters, and the principal object is to provide in a single compact unit a lightning
5 arrester having a path to ground for superimposed voltages, and also fuse protection in case of overload on a connected circuit.

Another object is to provide in a unit for the purpose above described a unitary assembly comprising a lightning arrester and a fuse which may
10 be readily removed for inspection and/or repair.

With these and other objects in view which will appear as the description proceeds, my invention resides in the construction and arrangement of parts making up the novel combination
15 into a unitary assembly, in which combination the number of parts is greatly reduced over those required for separately mounted devices.

In the drawing, Fig. 1 is a side elevational view of the device in the service position; Fig. 2
20 is an elevational view of the device, illustrating the removable portion in section; Fig. 3 is a sectional view as seen from the plane indicated by the line III—III; and Fig. 4 is a similar view
25 from the plane indicated by the line IV—IV.

Referring in detail to the drawing, a pair of insulators 10 and 11 are secured in spaced relation in any suitable manner to the metal
30 base 12. For mounting the device, the bolt 40 extends through the base 12 to attach it to any suitable support by the nut 41. For maintaining the base at ground potential, one end of the ground wire 42 is clamped against the base 12
35 by the nut 41, and the other end extended to the ground 43.

The upper contact clip 13, together with the upper terminal 14, is secured to the top of the upper insulator 10; the former members being
40 maintained at the potential of the line conductor 16 by means of the upper terminal screw 15. In a similar manner, the lower contact clip 18, together with the lower terminal 19, is electrically connected to the load conductor 17 by means
45 of the lower terminal screw 20.

The arrester-fuse, or the removable portion of the device illustrated in section by Fig. 2, includes the fuse-tube of insulating material, which
50 consists of the weather resisting covering 27 and the fiber line 28. At the upper end, the latter is provided with the upper contact 21 for cooperation with the upper contact clip 13, and similarly at the lower end with the lower contact
55 23 for cooperation with the lower contact clip 18. The pivots 46, extending laterally from opposite sides of the lower contact 23, are pro-

vided to engage the hooks formed at the lower end of the lower terminal 19, this arrangement being a well known device for guiding the contacts to their respective clips. The eye 22, formed integral with the upper contact 21, is
5 for the same purpose.

The fuse-link 24 extends through the fuse-tube 28 in the usual manner, and electrically connects the upper contact 21 with the lower contact 23 by means of the lower and upper
10 screws 25 and 26 respectively.

The lightning arrester embodied in the device is similar in many respects to the arc-extinguishing device described in my Patent No. 2,002,042; dated May 21, 1935, and operates on
15 the same principle. The arrester is carried by the fuse-tube adjacent the upper end thereof between the upper contact 21 and the lower contact 23. The arrester includes the nested arrangement of the outer hollow tubular insulator
20 33 and the inner tube of insulating material 34, both of which are of some material which will evolve gas in the presence of an arc, the upper sloping electrode of conducting material 35, and the lower electrode of conducting material 36.
25 The upper arrester housing 30, formed integral with the upper contact 21, and the lower arrester housing 29, are secured to the respective ends of the outer arrester tube 33. Housing 29 is provided with a downwardly extending portion
30 31 having internal threads which engage cooperating threads on the weather-proof covering of insulating material 27 of the fuse-tube 28.

An outwardly extending vent 32, integral with
35 the lower housing 29, directs the gaseous flame attending the operation of the device away from the upper and lower contacts 21 and 23 respectively. The inner arrester tube 34 is retained in abutting engagement with the inner
40 surface of the outer arrester tube 33 along a vertical line between the lowermost point of the upper electrode 35 and the lower electrode 36, this being accomplished by the upper and lower retaining screws 44 and 45 respectively.

The usual leakage gap necessary to prevent damage to the insulating material employed in the arrester unit, as may be caused by creepage current, is provided by the spaced conducting
45 members 37 and 38, the former being secured in electrical contact with the lower arrester electrode 36, and the latter with the metal base 12 by means of the nut 39.

For best operation of the device, it is essential that the various insulating members have such
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electrical strength that electrical break-down from the line conductor 16 to the ground 43 shall include the path along the line of abutment of the outer surface of the inner arrester tube 34 with the inner surface of the outer arrester tube 33; that is, between the lowermost point of the upper arrester electrode 35 and the lower arrester electrode 36.

From the embodiment of my invention herein specifically described, other equivalent arrangements will be readily apparent, and it is to be understood that the invention herein disclosed is to be limited only as is necessitated by the prior art and the appended claims.

What I claim is new, and desire to secure by Letters Patent, is:

1. In a protective device, insulating means supporting upper and lower spaced conducting terminals, a fuse-tube spanning said terminals, a hollow tubular insulator having gas evolving wall material carried by said fuse-tube between said terminals, spaced electrodes associated with said tubular insulator, structural means for causing sparkover between said electrodes to occur within said tubular insulator, and vent means for said insulator, said vent means being arranged to direct the gas evolved in response to sparkover within said insulator in a direction away from both said upper and lower terminals.
2. In a protective device, insulating means supporting upper and lower spaced conducting terminals, a fuse-tube spanning the terminals, a hollow tubular insulator having gas evolving wall material internally thereof carried by said fuse-tube between said terminals, said fuse-tube extending longitudinally through said tubular insulator, spaced electrodes associated with said insulator, structural means for causing sparkover between said electrodes to occur within said insulator, and vent means for said insulator, said vent means being arranged to direct the gas evolved in response to sparkover in a direction away from both said upper and lower terminals.
3. In a protective device, insulating means supporting upper and lower spaced conducting terminals, a swingably mounted fuse-tube spanning said terminals, a fuse-link within said fuse-tube connecting said terminals, a hollow tubular insulator having gas evolving wall material therein mounted on said fuse-tube between said terminals, spaced electrodes associated with said insulator, structural means for causing sparkover between said electrodes to occur within said insulator, and vent means for said insulator, said vent means being arranged to direct the gas evolved in response to sparkover in a direction away from both said upper and lower terminals.

4. In a protective device, a fuse-tube of insulating material, contacts secured to said fuse-tube adjacent the respective ends thereof, an adjustable fuse-engaging member associated with each contact for removably supporting within said fuse-tube a fuse-link electrically connecting said contacts, a hollow tubular insulator of gas evolving material supported on said fuse-tube between said contacts, spaced electrodes associated with said tubular insulator, said electrodes being arranged to provide a preferential spark path therebetween within said insulator, and vent means for said insulator, said vent means being arranged so as to direct the gas evolved in response to sparkover in a direction away from said contacts.

5. A protective device comprising a grounded metal base, spaced insulators secured near the respective ends of said base, upper and lower conducting terminals secured to said insulators, a removably mounted fuse-tube spanning said terminals, a hollow tube of an insulating material subject to thermal damage from creepage current carried by said fuse-tube between said terminals, said fuse-tube extending longitudinally through said hollow tube, upper and lower spaced electrodes associated with said hollow tube, said electrodes being arranged to provide a preferential spark path within said hollow tube, means for electrically connecting the upper electrode to the upper terminal, and elements constituting a spark gap interposed between said lower electrode and said base, whereby damage to said hollow tube due to creepage current is prevented.

6. A protective device comprising a metal base, spaced insulators secured near the respective ends of said base, upper and lower conducting terminals secured to said insulators, a fuse-tube spanning said terminals, a removably supported fuse-link within said fuse-tube electrically connecting said terminals, a hollow tube of insulating material having gas evolving material therein mounted on said fuse tube between said terminals, said fuse-tube extending longitudinally through said hollow tube, normally insulated conducting upper and lower electrodes associated with said hollow tube, said electrodes being arranged to provide a preferential arc path within and longitudinally along said hollow tube, means for electrically connecting the upper electrode to the upper terminal, elements constituting a spark gap interposed between the lower electrode and said base, and a vent for said hollow tube, said vent being arranged to direct the gases attending sparkover between said electrodes in a direction away from said base.

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