

[54] **HIGH VOLTAGE CORONA-FREE WIRE TERMINATION**

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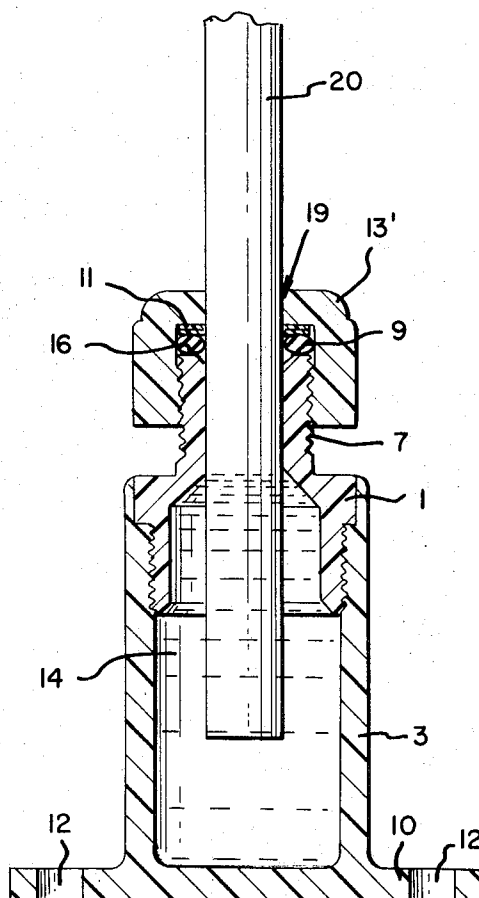
Primary Examiner—Laramie E. Askin

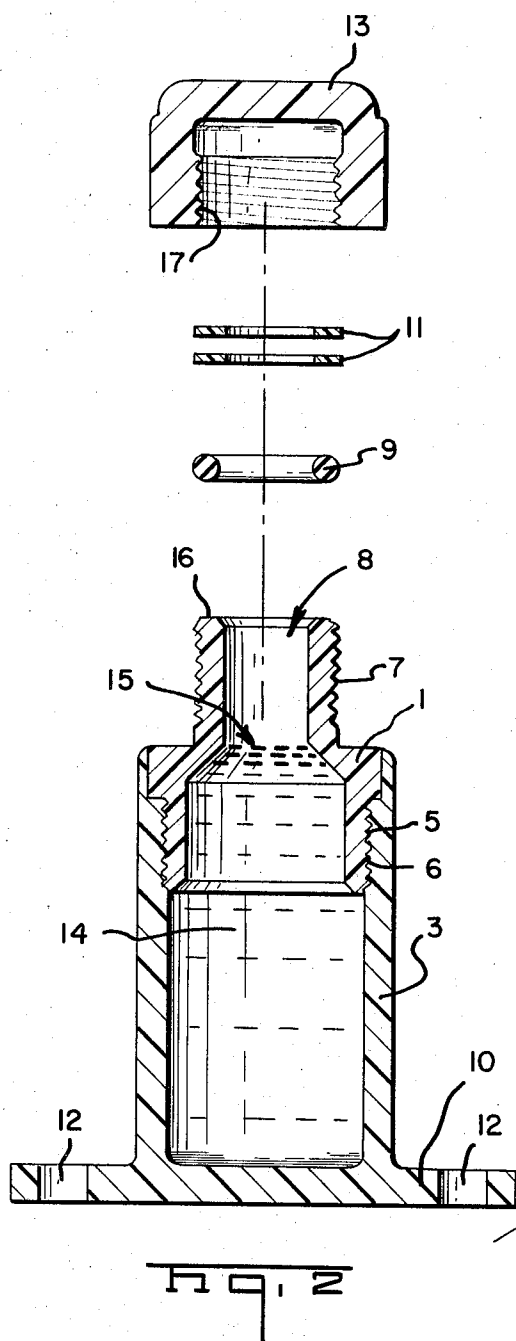
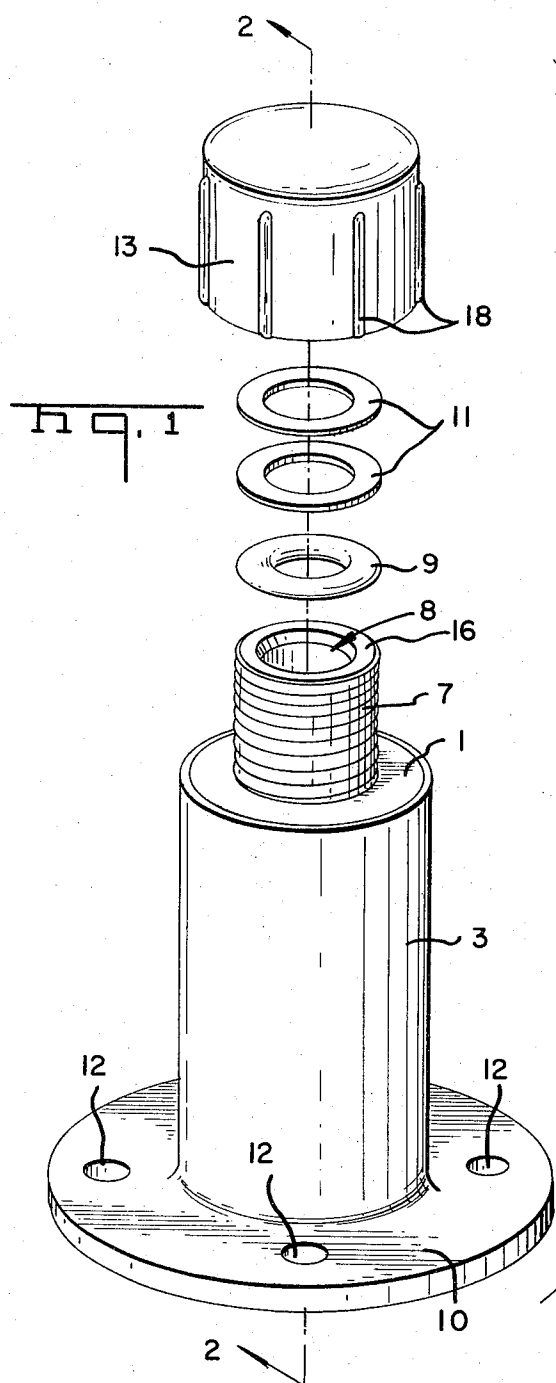
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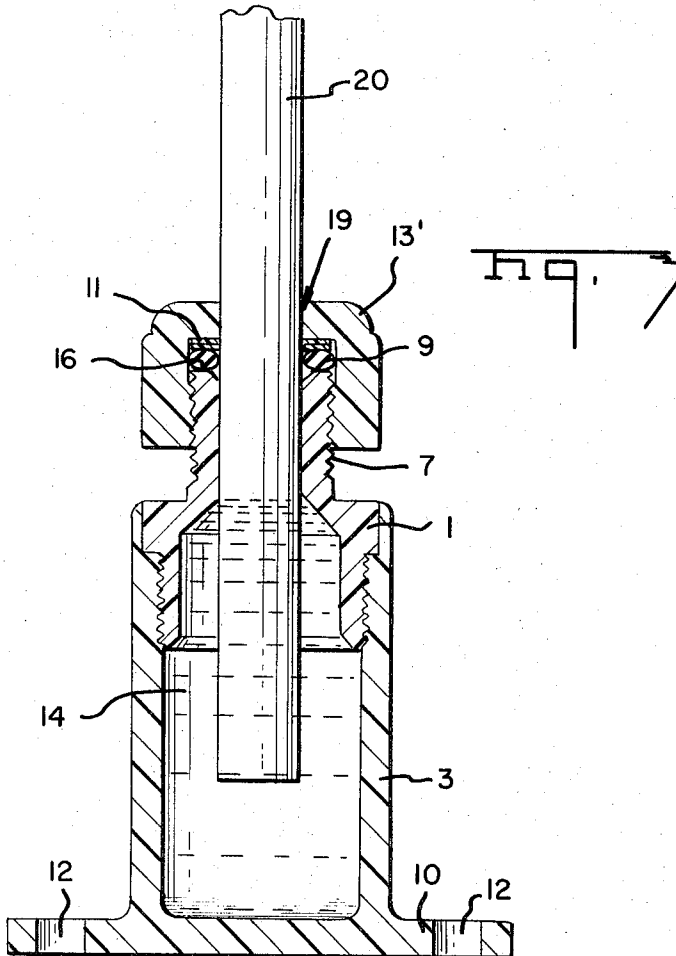
[57] **ABSTRACT**

The disclosure relates to apparatus for terminating the ends of wires having high voltages applied thereto to prevent corona discharge. This is accomplished by providing an enclosure of insulating material capable of withstanding all voltages which will be applied to the wire, the enclosure being filled with a fluid having high insulating properties and capable of conforming to all irregularities in the enclosure, wire and wire insulation. The enclosure has a threaded opening for receiving an O-ring, washers and a threaded cap, the cap being completely closed for storage and being replaced by a cap having an aperture sized for a particular wire which passes therethrough and, upon closure of the cap, makes a sealing fit with the then compressed O-ring. The enclosure may have a flange thereon for receiving bolts or the like therethrough to anchor the enclosure to a base.

6 Claims, 3 Drawing Figures







HIGH VOLTAGE CORONA-FREE WIRE TERMINATION

This invention relates to a corona-free termination for wires having high voltages impressed thereon and, more specifically, to such wires which would be normally unconnected to external apparatus during testing procedures and the like.

It is well known in the art that wire and especially stranded wire which has high voltages thereon will exhibit corona discharge when unconnected to external apparatus. This problem exists in industry, for example, when a high voltage power supply is to undergo test. Such power supplies must be tested under corona-free conditions. Connection of such power supplies to external apparatus to perform such tests often presents problems either due to the unavailability of such external apparatus in the test laboratory or due to the high cost of such external apparatus relative to the power supply which precludes its use due to the possibility of damage to such external apparatus from a faulty power supply. It is readily apparent that failure to connect the power supply to external apparatus results in hanging high voltage wires which, under test, will exhibit the undesirable corona discharge. To date, the prior art has failed to solve this problem in a simple and relatively inexpensive manner.

In accordance with the present invention, the above noted problems of the prior art are overcome and there is provided an apparatus capable of inexpensively terminating high voltage wires to prevent corona discharge during testing procedures. This is accomplished by providing an enclosure of insulating material capable of withstanding all voltages which will be applied to the wire, the enclosure being filled with a fluid having high insulating properties and capable of conforming to all irregularities in the enclosure, wire and wire insulation. The enclosure has a threaded opening for receiving an O-ring, washers and a threaded cap, the cap being completely closed for storage and being replaced by a cap having an aperture sized for a particular wire which passes therethrough and, upon closure of the cap, makes a sealing fit with the then compressed O-ring. The enclosure may have a flange thereon for receiving bolts or the like therethrough to anchor the enclosure to a base.

It is therefore an object of this invention to provide a relatively inexpensive termination for unconnected high voltage wires.

It is a further object of this invention to provide a termination for a wire having high voltage impressed thereon which is easily placed onto the wire.

It is a yet further object of this invention to provide a termination for a high voltage wire wherein the wire is encased in a highly insulating liquid enclosed in a highly insulating enclosure.

The above objects and still further objects of the invention will become immediately apparent to those skilled in the art after consideration of the following preferred embodiment thereof, which is provided by way of example and not by way of limitation, wherein:

FIG. 1 is an exploded view of the termination in accordance with the present invention with the particular cap used for storage;

FIG. 2 is a cross-section taken along the line 2—2 of FIG. 1; and

FIG. 3 is a cross-section of the termination in accordance with the present invention with the particular cap used during wire termination.

Referring now to FIGS. 1 and 2, there is shown an exploded view of the termination. The termination includes an enclosure portion 3 in the form of a cylinder or bottle having threads 5 therein for mating with the threads 6 of a top member 1. The top member 1 along with the enclosure portion 3 form the complete enclosure. The top member 1 includes an aperture 8 extending therethrough and a threaded portion surrounding the aperture 8. The top portion 1 is required as a separate unit to provide for different size wires, the aperture 8 being sized to provide a clearance fit with the insulation passing therethrough. The enclosure portion 3 and top member 1 are formed from an insulating material which is capable of withstanding any voltage which would be expected to be impressed upon a wire positioned therein. The members 1 and 3 can be formed, for example, from a molded glass epoxy. The enclosure portion 3 also includes a flange 10 having apertures 12 therein through which a bolt (not shown) or other anchoring device can pass to anchor the enclosure to a base member.

The enclosure is filled with a liquid 14 up to a liquid level 15 as shown in FIG. 2. The liquid 14 must have good insulating properties at high voltages and be capable of conforming to a totally irregular shape and exclude all air. In this case the liquid 14 must conform to the interior shape of the enclosure as well as the exterior shape of all wire strands and the insulation thereon to eliminate all air in the region. Suitable fluids 14 have been found to be liquid fluorocarbons, one known as FC 40 working particularly well. The liquid 14 must also be inert relative to the enclosure, the wire and insulation thereon and the O-ring 9 to be discussed hereinafter.

The O-ring 9 is positioned around the aperture 8 on the lip 16 of the top portion 1. The O-ring can be formed from any electrically insulating resilient material as is well known in the art. A pair of washers 11, preferably of polytetrafluoroethylene is placed over the O-ring 9 and a cap 13 having threads 17 and finger grips 18 is positioned over the O-ring 9 and washers 11 and is threaded onto the threads 7 of top portion 1. The cap 13 shown in FIGS. 1 and 2 has a continuous upper surface and is therefore used for storage of the termination when not in use. When the termination is to be used, a cap 13' is substituted for the cap 13, the only difference being an aperture 19 in the cap which is sized to the diameter of the wire insulation as shown in FIG. 3 to provide a clearance fit.

Referring again to FIG. 3, there is shown a terminated wire 20 in the termination of the present invention. The character references refer to the parts listed above and an apertured cap 13' sized to the insulation of wire 20 is shown. In operation, first the wire 20 is passed through the cap 13', then passed through washers 11 and then through O-ring 9. A sufficient amount of wire is passed below the O-ring 9 so that the wire end is positioned in the liquid 14. The cap 13' is then threaded onto the threads 7 to force the washers 11 against the O-ring 9 and deform the O-ring to provide a seal between the cap 13', the washers 11, the wire 20 and the top 16 of portion 1. The washers 11 reduce friction between the cap and the O-ring. Due to the sizing of aperture 8 to the diameter of the insulation of

wire 20, wire 20 makes a clearance fit with aperture 8 and thereby forces air out of the enclosure. Due to the sizing of aperture 8, the wire 20 is positioned at the center of the fluid 14. The wire is tightly positioned within the enclosure due to the frictional force applied thereto by O-ring 9. Therefore a great deal of force is required to remove the wire 20 from the enclosure. If properly assembled, the enclosure can therefore hang from the end of wire 20 though it is preferred that the enclosure be anchored via flange 10 and apertures 12 as discussed above.

It can be seen that there has been provided a relatively inexpensive and simple high voltage termination which is easily installed and reusable.

Though the invention has been described with respect to a specific preferred embodiment thereof, many variations and modifications will immediately become apparent to those skilled in the art. It is therefore the intention that the appended claims be interpreted as broadly as possible in view of the prior art to include all such variations and modifications.

What is claimed is:

1. An electrical conductor subjected to a high voltage having a termination comprising,

a hollow enclosure formed of an electrically insulating material, said enclosure including an aperture through its wall,

an electrically insulating liquid filling at least a portion of said enclosure,

closure means for said aperture mounted on said enclosure about the aperture,

said conductor passing through the closure means, extending through the aperture and terminating within the liquid, said closure means including an O-ring seated on the rim of said aperture and means to force said O-ring against said rim and said conductor.

2. A high voltage conductor termination as set forth

in claim 1 wherein said enclosure includes a threaded region surrounding said aperture and said means to force said O-ring is a threaded cap threadedly engaging the threads surrounding said aperture.

3. A high voltage conductor termination as set forth in claim 2 wherein said enclosure further includes anchoring means integral therewith for securing it to a support.

4. An electrical conductor subjected to a high voltage having a termination comprising,

a hollow enclosure formed of an electrically insulating material, said enclosure including an aperture through its wall,

an electrically insulating liquid filling at least a portion of said enclosure,

closure means for said aperture mounted on said enclosure about the aperture,

said conductor passing through the closure means, extending through the aperture and terminating within the liquid, said enclosure including a bottom portion and a top portion forming an electrically insulating liquid tight seal with said bottom portion, said aperture being disposed in said top portion, wherein said closure means includes an O-ring seated on the rim of said aperture and means to force said O-ring against said rim and said conductor.

5. A high voltage conductor termination as set forth in claim 4 wherein said enclosure includes a threaded region surrounding said aperture and said means to force said O-ring is a threaded cap threadedly engaging the threads surrounding said aperture.

6. A high voltage conductor termination as set forth in claim 5 wherein said enclosure further includes anchoring means integral therewith for securing it to a support.

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