

[54] HIGH VOLTAGE FUSE ENCLOSURE

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[51] Int. Cl. H01h 85/02

[58] Field of Search 337/199, 202, 222, 224;
174/5, 6, 50; 338/127, 64

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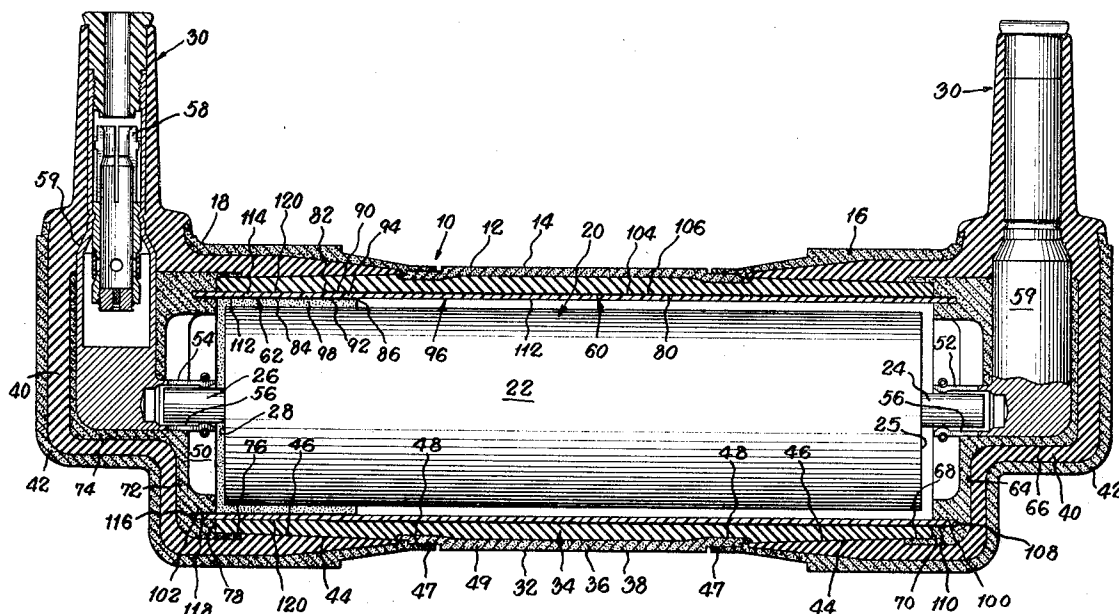
Primary Examiner—J. D. Miller

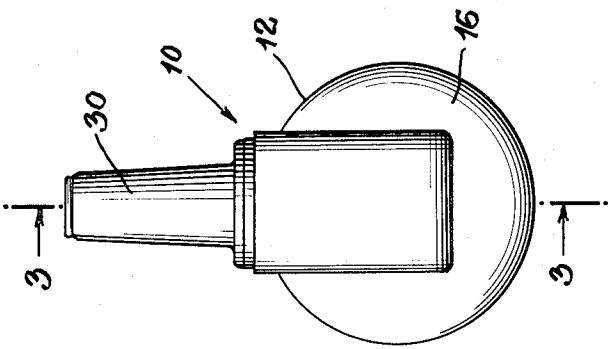
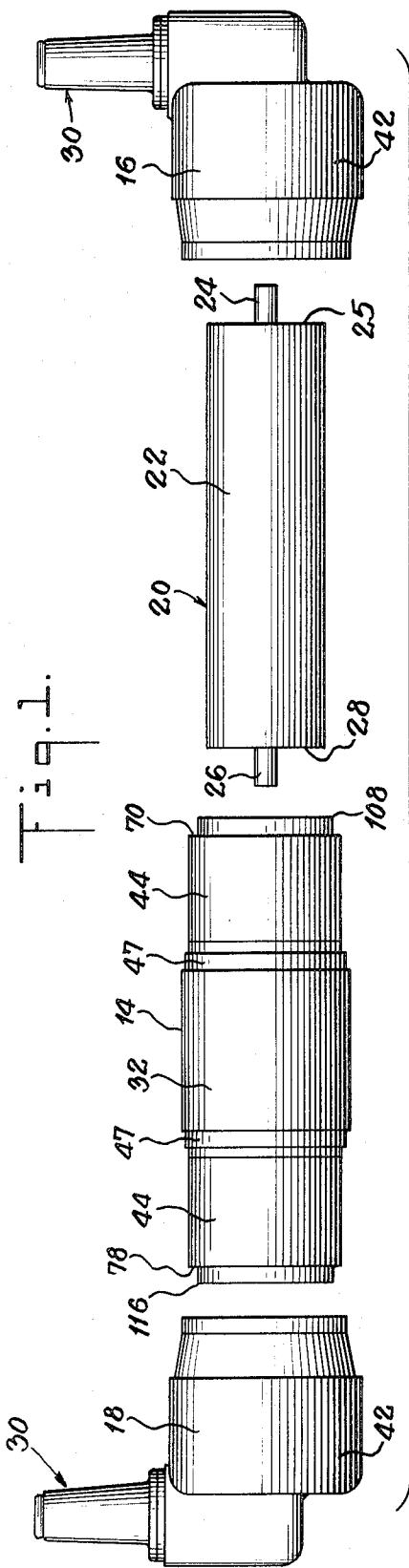
Assistant Examiner—Fred E. Bell

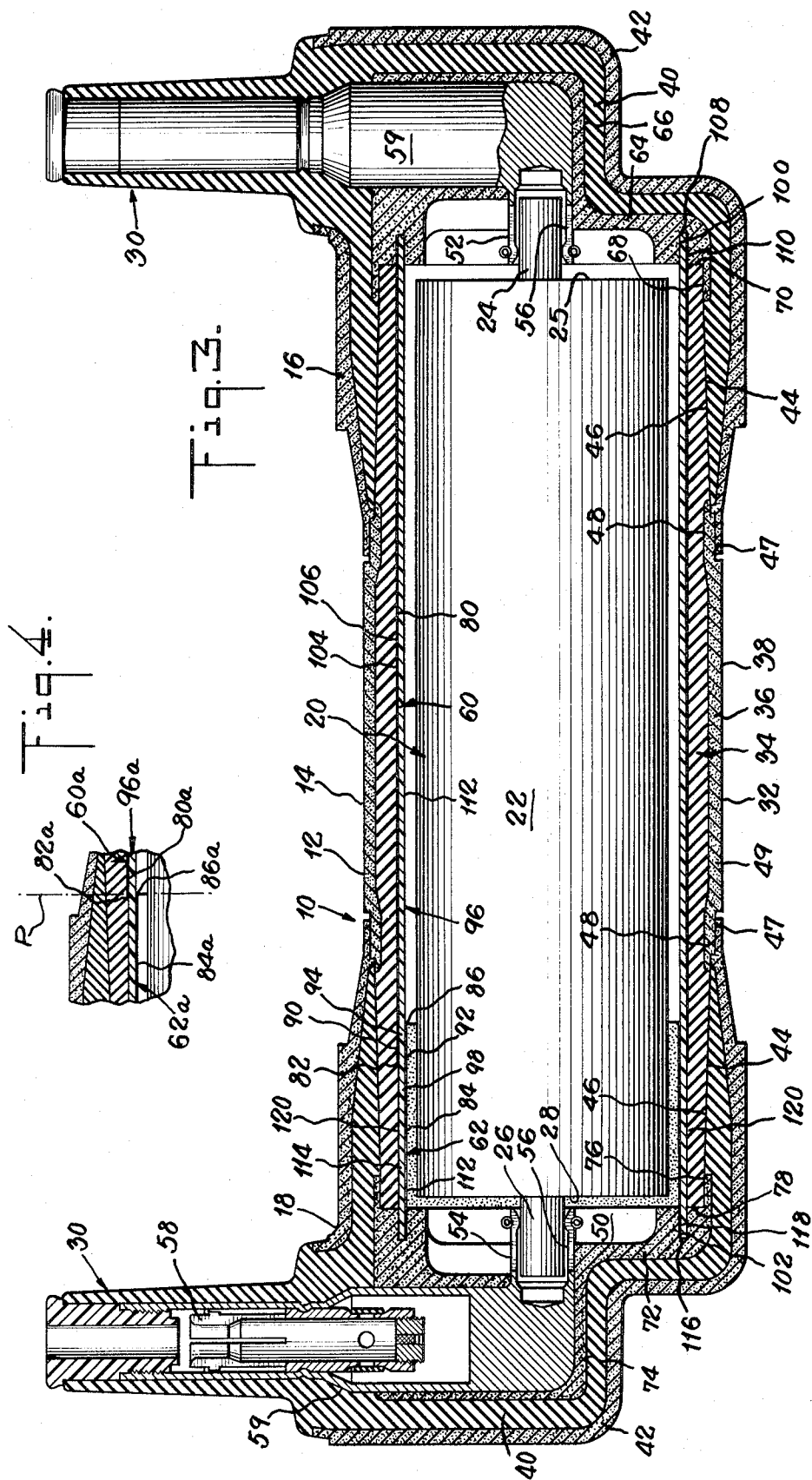
[57] ABSTRACT

A corona-preventing shielding system for use with a high voltage fuse, the system including first and second conductive shield members, each extending longitudinally from adjacent one end of the fuse toward the other and terminating short of the other end of the fuse at longitudinally juxtaposed, and preferably overlapping, portions which are spaced apart but in close enough proximity such that the shield members envelop the fuse to establish an effective corona-preventing shield, but do not contact one another to provide an alternate electrical circuit between the fuse terminals.

34 Claims, 4 Drawing Figures







HIGH VOLTAGE FUSE ENCLOSURE

The present invention relates generally to the incorporation of high voltage fuses into power distribution systems and pertains, more specifically, to corona-preventing structural arrangements for enclosures within which such fuses are housed.

In recent years, heavy emphasis has been placed upon the development of underground electrical power distribution systems, especially in light industrial, commercial, and residential areas. Various power distribution components, such as shielded electrical cables, transformers, and electrical connectors have been evolved for use in such systems.

Among these components, shielded electrical connectors have been developed which are easily assembled in the field at the terminal ends of electrical cables so as to facilitate the construction and installation of underground power distribution systems. The numerous advantages of such connectors have spurred the development of structural arrangements which operate successfully under even higher voltages than those voltages already accommodated by earlier connectors. Many structural arrangements which have enabled such successful operation at higher voltages have done so through the elimination of potential corona-producing areas within the structure by providing electrically conductive shields which surround these areas to reduce electrical stresses and thus prevent corona discharges.

High voltage fuses can be the source of undesirable corona discharges, particularly when installed in grounded enclosures. While it would be advantageous to have available an enclosure for a high voltage fuse which is as easily assembled in the field and is at least as effective in coping with the problem of corona discharges as currently available connectors developed for high voltage power distribution systems, the use of corona shielding techniques, as found in such connectors, to eliminate corona discharge within a fuse enclosure is not entirely appropriate in view of the additional requirement that a "blown" fuse in a circuit must open the circuit completely and a corona-preventing shield must not provide an alternate current path which bypasses the fuse to maintain a complete circuit.

It is therefore an object of the invention to provide a high voltage fuse enclosure which is easily assembled in the field and readily opened for fuse replacement, and which incorporates a corona-preventing shielding system that does not provide an alternate circuit by-passing the fuse.

Another object of the invention is to provide a shielding system for a high voltage fuse which envelopes the fuse sufficiently to prevent deleterious corona discharges when the fuse is intact, but is discontinuous so as to provide no alternate electrical circuit which can bypass the fuse.

Still another object of the invention is to provide a high voltage fuse enclosure which is compatible with other electrical components now in use in high voltage distribution systems and which provides many of the same advantages, in the way of installation and service, found in such components.

A further object of the invention is to provide a high voltage fuse enclosure having an effective internal corona-preventing shielding system, as described above, and which is relatively economical to manufac-

ture using materials and techniques already developed for use in similar high voltage components.

A still further object of the invention is to provide a high voltage fuse enclosure having an effective internal corona-preventing shielding system, as described above, and which is easily installed by simplified assembly in the field and readily dismantled for replacement of the fuse.

The above objects, as well as still further objects and advantages, are attained by the invention which may be described briefly as a corona-preventing shielding system for a high voltage fuse having longitudinally opposed ends and a terminal adjacent each end, the system comprising first conductive shield means for being electrically connected to one terminal of the fuse and enveloping one end of the fuse such that the first shield means extends longitudinally in the direction toward the other end of the fuse, second conductive shield means for being electrically connected to the other terminal of the fuse and enveloping the other end of the fuse such that the second shield means extends in the direction toward the first shield means, with each conductive shield means extending in its respective longitudinal direction toward the other shield means to establish longitudinally juxtaposed portions without contacting the other shield means, the longitudinally juxtaposed portions being in close enough longitudinal proximity to establish an effective corona-preventing shielding envelope and being spaced from one another such that the shielding envelope does not provide an alternate electrical circuit between the fuse terminals.

The invention will be more fully understood, while additional objects and advantages thereof will become apparent, by reference to the following detailed description of embodiments of the invention illustrated in the accompanying drawing, in which:

FIG. 1 is an exploded front elevational view of a fuse enclosure constructed in accordance with the invention;

FIG. 2 is an enlarged end elevational view of the enclosure, assembled;

FIG. 3 is a further enlarged longitudinal cross-sectional view taken along line 3—3 of FIG. 2; and

FIG. 4 is a fragmentary view of a portion of a longitudinal cross-sectional view similar to FIG. 3, but illustrating an alternate embodiment.

Referring now to the drawing, and especially to FIG. 1 thereof, a high voltage fuse enclosure constructed in accordance with the invention is illustrated at 10 and is shown having a housing 12 with a three-part construction including a central sleeve 14 and a pair of end caps 16 and 18 within which a fuse 20 is to be enclosed.

Fuse 20 is a standard high voltage fuse having a cylindrical dielectric casing 22, a first terminal 24 at one end 25 of the fuse and a second terminal 26 at the other end 28 of the fuse. The terminals 24 and 26 are electrically interconnected within the fuse 20 for passing current from one terminal to the other. Upon exceeding a predetermined amount of current, the interconnection will be interrupted, i.e., the fuse will "blow," and no further current will pass through the fuse between terminals 24 and 26. Fuse 20 must then be replaced.

In order to place fuse 20 in the line of a high voltage electrical distribution system, the fuse is slipped into the sleeve 14 of the housing 12 and the end caps 16 and 18 are joined with sleeve 14 to enclose the fuse 20

within the housing 12. An electrical circuit between bushings 30 located in each end cap 16 and 18 is completed by the fuse 20 and the enclosure 10 is then connected in series in the line to be protected by fuse 20, by connecting the line to the bushings 30, all as will be described in greater detail below.

Turning now to FIGS. 2 and 3, as well as to FIG. 1, the sleeve 14 of housing 12 has a generally tubular composite wall 32 which preferably includes an inner tubular portion 34 of an electrically insulating elastomeric material and an outer tubular portion 36 of an electrically conductive elastomeric material. The inner and outer tubular portions 34 and 36 are preferably molded together, such as by molding the inner portion first and then molding the outer portion around the inner portion so that the juncture 38 between the tubular portions 34 and 36 is continuous and void-free. Preferably, the compounds of the tubular portions 34 and 36 are based upon the same polymer to assure strong bonding. An ethylene-propylene terpolymer, available commercially under the trademark NORDEL, of E.I. du Pont de Nemours & Company, is an example of a polymer which has been used successfully for this purpose. Insulating NORDEL is used for the inner tubular portion 34 and conductive NORDEL is used for the outer tubular portion 36.

Likewise, the end caps 16 and 18 of the housing 12 preferably are of a composite construction including an inner member 40 of an insulating elastomer and an outer member 42 of a conductive elastomer.

The component parts of the housing 12, namely, the sleeve 14 and the end caps 16 and 18, are provided with complementary means shown in the form of a plug extension 44 at each end of the sleeve 14 and a complementary receptacle 46 in each end cap 16 and 18. The corresponding relative dimensions of each plug extension 44 and the respective receptacle 46 are such that each end cap 16 and 18 may be fitted over a corresponding plug extension 44 for ready assembly in the field, the resilient property of the elastomer of the end caps permitting the dilation of the receptacles 46 to admit the plug extensions 44 and establish a watertight seal between each end cap 16 and 18 and the sleeve 14, as well as to make electrical contact between the outer tubular portion 36 of the sleeve and the outer members 42 of the end caps by engagement of plug portions 47 with receptacle portions 48. The tight fit between the sleeve 14 and the end caps 16 and 18 assures that the receptacle portions 48 grip the plug portions 47 to make electrical contact therewith and thus assure electrical continuity in an outer shield 49 across the fuse enclosure 10. At the same time, the tight fit increases the dielectric strength of the creep path along the plug extension 44. Such assembly of the end caps 16 and 18 with the sleeve 14 establishes a sealed chamber 50 in the housing 12, within which chamber the fuse 20 is enveloped.

In order to complete an electrical circuit through the fuse 20, a first electrical contact 52 is located in the end cap 16 while a second electrical contact 54 is similarly located in end cap 18. Each contact 52 and 54 includes a socket 56 which is complementary to the corresponding terminals 24 and 26 of the fuse 20, so that engagement of the end caps 16 and 18 with the sleeve 14 to close the housing 12 and seal chamber 50 will engage each contact 52 and 54 with a respective terminal 24 and 26. The contacts 52 and 54 are each integral with

a bushing 30, each bushing being constructed to receive a complementary electrical connector (not shown) to connect the fuse enclosure 10 into a line to be protected by the fuse. The construction of the particular bushings 30 shown in connection with the illustrated embodiments is fully described in U.S. Pat. No. 3,654,590, wherein the advantages of such bushings are explained. It is sufficient for the purposes of the instant description to merely point out that each bushing 30 is provided with an electrical contact socket 58 which is connected to a respective contact 52 or 54 through a conductive tubular member 59 which is integral with each contact 52 and 54. A contact pin (not shown) of a complementary connector may be engaged with each contact socket 58 to place the fuse 20 in a line of an electric circuit. It will be apparent that other bushing constructions are feasible.

The interior of the fuse enclosure 10 is provided with a corona-preventing shielding system, the purpose of which is to protect the component parts of the housing 12 as well as the casing of the fuse, when necessary, against the deleterious effects of corona discharges which could result from uncontrolled electrical stresses within the fuse enclosure 10. To this end, the housing 12 is provided with corona-preventing shield means illustrated as shield members in the form of first and second layers 60 and 62, respectively, of electrically conductive material.

First layer 60 envelops end 25 of fuse 20 and includes an end portion 64 of conductive elastomeric material which extends around and makes electrical contact with the tubular member 59 of the bushing 30 and the integral contact 52 of the end cap 16. The juncture 66 between the end portion 64 and the inner member 40 of the end cap 16 is continuous and void-free. End portion 64 extends along the receptacle 46 at 68 so as to overlap the end surface 70 of the plug extension 44 with which end cap 16 is engaged to eliminate electrical stresses along the end surface 70.

Likewise, second layer 62 envelops the other end 28 of fuse 20 and includes an end portion 72 of conductive elastomeric material which extends around and makes electrical contact with the tubular member 59 of the other bushing 30 and the integral contact 54 of the end cap 18. The juncture 74 between the end portion 72 and the inner member 40 of the end cap 18 is continuous and void-free. End portion 72 extends along the receptacle 46 at 76 so as to overlap the end surface 78 of the other plug extension 44 with which end cap 18 is engaged to eliminate electrical stresses along the end surface 78.

The first layer 60 includes a generally tubular portion 80 extending axially along the wall 32 of the sleeve 14 in the longitudinal direction from the first contact 52, and the corresponding end 25 of the fuse 20, toward the second contact 54, and the other end 28 of the fuse. The tubular portion 80 terminates at 82, short of end portion 72.

The second layer 62 includes a generally tubular portion 84 extending axially along the wall 32 of the sleeve 14 in the longitudinal direction from the second contact 54, and the corresponding end 28 of the fuse 20, toward the first contact 52, and the other end 25 of the fuse. The tubular portion 84 terminates at 86, short of end portion 64.

In the embodiment of FIGS. 1 through 3, tubular portion 80 extends beyond the terminus 86 of tubular portion

tion 84 and tubular portion 84 extends beyond the terminus 82 of tubular portion 80 thereby establishing longitudinally extending juxtaposed portions 90 and 92 of the first and second layers 60 and 62, respectively, which portions 90 and 92 actually overlap axially with one another and are spaced apart transversely, or radially, so that the first and second layers do not make contact with one another to provide an alternate circuit between the contacts 52 and 54. The axial length of the overlapping juxtaposed portions 90 and 92 is great enough, and the gap 94 between the overlapping juxtaposed portions 90 and 92 is small enough, to assure that the envelope provided by the overlapping layers 60 and 62 is sufficient to establish effective corona-preventing shielding system when the circuit, together with the fuse 20 therein, is energized. In this connection, it is noted that when the fuse 20 is intact, the voltage drop across the fuse is negligible so that both layers 60 and 62 are brought to essentially the same potential. Should the fuse "blow," the circuit between contacts 52 and 54 will be completely interrupted since layers 60 and 62 are discontinuous and provide no alternate circuit between the contacts.

While it is preferable that the juxtaposed portions 90 and 92 overlap axially, as illustrated in the embodiment of FIGS. 1 through 3, under some conditions it is sufficient that the tubular portions 80 and 84 of layers 60 and 62, respectively, merely be longitudinally juxtaposed (without overlap) in such close longitudinal proximity as to establish an effective corona-preventing shielding system while still being electrically insulated from one another so as to provide no alternate circuit between the contacts 52 and 54. Thus, as illustrated in the alternate embodiment of FIG. 4, tubular portions 80a and 84a of layers 60a and 72a, respectively, have terminal ends 82a and 86a, respectively, which lie in the same plane P passing radially through tube 96a between the layers and perpendicular to the longitudinal direction. The illustrated portions of layers 60a and 62a are therefore juxtaposed in close longitudinal proximity, but are spaced apart laterally, or radially, so as to be out of contact with one another. The term "close longitudinal proximity" is meant to describe the location of the terminal ends of the layers relative to one another in a longitudinal direction and includes the location of the terminal ends of the layers near the plane passing radially between the layers, as well as in that plane, as illustrated in FIG. 4. Since devices of the nature of fuse enclosure 10 are designed to operate at various voltages, usually in the range of approximately 8kV to 21kV, some combinations of operating voltage and enclosure configuration will be encountered which permit the accommodation of electrical stresses without deleterious corona discharges where the shield members are longitudinally juxtaposed without overlapping. In such instances, it is sufficient to juxtapose the tubular portions of the layers which comprise the shield members in close longitudinal proximity while still adequately insulating one portion from the other.

It is preferable to keep the gap 94 small so as to minimize any deleterious effects on the control of electrical stresses in the vicinity of the gap. At the same time, gap 94 must be great enough to prevent electrical breakdown between the layers 60 and 62. Thus, a barrier, shown in the form of tube 96 of high dielectric strength material, capable of withstanding the voltages applied to the circuit, is interposed between the juxtaposed

portions of tubular portions 80 and 84 of layers 60 and 62. The tube 96 extends longitudinally beyond the juxtaposed overlapping portions 90 and 92 to assure that the tube wall 98 establishes a barrier sufficient to preclude electrical breakdown between the terminal ends 82 and 86 of the juxtaposed portions. In fuse enclosure 10, the tube 96 extends axially along the entire length of the sealed chamber 50 and is seated within slots 100 and 102 provided in end caps 16 and 18, respectively. The tube 96 preferably is fabricated of a relatively rigid, high strength dielectric material, such as a phenolic resin or a glass-reinforced epoxy resin, so as to add to the structural integrity of the sleeve 14, as well as to perform its assigned dielectric function; however, tube 96 may be fabricated of a suitable insulating elastomeric material.

The tubular portion 80 of layer 60 is contiguous with the exterior surface 104 of the wall 98 of tube 96 and is in intimate contact with the inner tubular portion 34 of the wall 32 of the sleeve 14. Preferably, the tubular portion 80 is fabricated of a conductive elastomeric material which is molded integral with the inner tubular portion 34 so that the juncture 106 between the inner tubular portion 34 and the tubular portion 80 of layer 60 is continuous and voidfree. Such a construction can be accomplished by first molding or coating the tubular portion 80 onto the exterior surface 104 of the wall 98 of tube 96 and then molding the inner tubular portion 34 of the wall 32 around the tube 96, leaving the tube end 108 protruding from the end surface 70 of the plug extension 44 so that electrical contact will be made between the tubular portion 80 and the end portion 64 of the end cap 16 at 110, rendering the layer 60 continuous. Alternately, the exterior surface 104 of the tube wall 98 can be coated with a conductive material to establish tubular portion 80 and the tube 96 can be inserted into the inner tubular portion 34 with a fit tight enough to attain the desired void-free juncture 106 at the interface between the tubular portion 80 of layer 60 and the inner tubular portion 34 of wall 32.

The tubular portion 84 of layer 62 is not only contiguous with, but is in intimate contact with the interior surface 112 of the wall 98 of tube 96 to minimize the possibility of corona discharges occurring at the interface 114 between the tubular portion 84 and the interior surface 112. Tubular portion 84 may be fabricated of a conductive elastomeric material which is coated or otherwise applied on the tube wall 98 and which extends along the protruding end 116 of the tube 96 so as to make electrical contact with end portion 72 of end cap 18 at 118, rendering the layer 62 continuous. Here again, molding of the inner tubular portion 34 around the tube 96 will attain the desired intimate contact between the inner tubular portion 34 of wall 32 and the exterior surface 104 of tube wall 98 so as to provide a void-free juncture 120.

The overlapping portions 90 and 92 of tubular portions 80 and 84 of layers 60 and 62 are spaced from both ends 108 and 116 of the tube 96 so as to be spaced a sufficient distance from the end portions 64 and 72 of the layers to preclude electrical breakdown along the juncture 120 from portion 80 to opposite end portion 72, and along interior surface 112 from tubular portion 84 to opposite end portion 64. While such a condition can be met by locating the overlapping portions 90 and 92 at any one of many positions along the tube 96, it is preferable to position the overlapping por-

tions such that the length of the tubular portion 84 is held to a minimum. The reasons for minimizing the length of tubular portion 84 are twofold: First, it is more difficult to apply conductive material to the interior surface 112 of the tube wall 98. Second, the presence of a potential gradient across both the interface 114 and the juncture 120 increases the possibility of the occurrence of corona discharges over the possibility of corona discharges occurring along the single juncture 104 between the tubular portion 80 of layer 60 and the inner tubular portion 34 of wall 32.

It is noted that the construction of the fuse enclosure 10 is such that end caps 16 and 18 have identical structures and are interchangeable, decreasing the cost of manufacture while increasing ease of installation and replacement of component parts. The end cap construction also enables the use of component parts from existing bushings 30.

It will be apparent that the illustrated corona-preventing shielding system is equally applicable to fused connectors, junctions and like devices in which a fuse enclosure is an integral part of such a device, rather than an independent circuit element, as shown. Thus, the housing of the fuse enclosure may be constructed with different numbers of component parts of various configurations to accommodate the particular device within which a fuse is to be housed.

It is to be understood that the above detailed description of a preferred embodiment of the invention is provided by way of example only. Various details of design and construction may be modified without departing from the true spirit and scope of the invention as set forth in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A corona-preventing shielding system for a high voltage fuse having longitudinally opposed ends and a terminal adjacent each end, said system comprising:

first conductive shield means for being electrically connected to one terminal of the fuse and enveloping one end of the fuse such that said first shield means extends longitudinally in the direction toward the other end of the fuse;

second conductive shield means for being electrically connected to the other terminal of the fuse and enveloping the other end of the fuse such that said second shield means extends in the direction toward the first shield means; with

each said conductive shield means terminating intermediate said one and said other fuse terminal, respectively, the terminating portions of each said conductive shield means being

longitudinally juxtaposed in close enough longitudinal proximity with respect to each other to establish an effective corona-preventing shielding envelope about said fuse and to prevent the formation of an electrical field stress concentration between the terminating portions of each said conductive shield means, and being transversely spaced from one another such that the shielding envelope does not provide an alternate electrical circuit between the fuse terminals.

2. The invention of claim 1 wherein a member of high dielectric strength material is interposed between the transversely spaced terminating portions of the first and second conductive shield means.

3. The invention of claim 3 wherein:

said member of high dielectric strength material is a tube having interior and exterior surfaces; and said first and second shield means respectively include generally tubular portions, one of said tubular portions extending along and being contiguous with the exterior surface of said tube and the other of said tubular portions extending along and being contiguous with the interior surface of said tube.

4. The invention of claim 3 wherein at least said other of the tubular portions is in intimate contact with the interior surface of said tube.

5. The invention of claim 4 wherein said tubular portions are comprised of conductive elastomeric material.

6. The invention of claim 4 wherein the tube has a length great enough to extend longitudinally from adjacent one end of the fuse to adjacent the other end of the fuse.

7. The invention of claim 3 wherein the respective transversely spaced terminating portions of said first and second layers of conductive material axially overlap one another.

8. The invention of claim 1 wherein the respective terminating portions of said transversely spaced first and second conductive shield means lie in a common transverse plane substantially perpendicular to the longitudinal extent of said fuse.

9. The invention of claim 1 wherein the respective terminating portions of said transversely spaced first and second conductive shield means longitudinally overlap one another.

10. The invention of claim 1 wherein the terminating portion of said second conductive shield means is located further from the central longitudinal axis of said fuse than the terminating portion of said first conductive shield means, and the terminating portions of said first and second conductive shield means are both located closer to said one terminal of said fuse than to said other terminal of said fuse.

11. The invention of claim 1 wherein the respective terminating portions of said first and second layers of conductive material lie in a common transverse plane substantially perpendicular to the longitudinal extent of said fuse.

12. A high voltage fuse enclosure for a fuse having opposed ends and a terminal adjacent each end, said enclosure comprising:

a housing having a wall, at least a portion of which is of insulating material, said wall including a generally tubular, axially extending portion and further portions for closing the tubular portions to establish a sealed chamber within which the fuse is to be enveloped;

a first contact member in said housing for engaging one terminal of the fuse;

a second contact member in said housing for engaging the other terminal of the fuse;

a first layer of conductive material electrically connected to the first contact member and extending along the wall toward the second contact member, said first layer terminating intermediate said first and second contact members;

a second layer of conductive material electrically connected to the second contact member and extending along the wall toward the first layer of said

second layer terminating intermediate said first and second contact members;

the terminating portions of said first and second layers being axially juxtaposed with one another in such close axial proximity that the first and second layers establish a corona-preventing envelope within said wall, said envelope being effective to surround said chamber and prevent the formation of an electrical stress concentration between said terminating portions,

said terminating portions of said first and second layers being transversely spaced from one another to prevent the completion of an alternate electrical circuit between the first and second contact members.

13. The invention of claim 12 wherein said first and second layers are generally tubular for extending along the wall toward the second and first contacts, respectively.

14. The invention of claim 12 wherein the transverse spacing between the terminating portions of the first and second layers is relatively small and a barrier of high dielectric strength material is interposed between the terminating portions.

15. The invention of claim 14 wherein the barrier of high dielectric strength material is a tube received within said housing in juxtaposed relation to said generally tubular, axially extending portion of said wall, said tube extending axially beyond the terminating portions toward each contact member to further isolate the first and second layers from one another.

16. The invention of claim 15 wherein the housing wall insulating material includes an elastomeric material, said first layer being a conductive elastomeric material integral with the insulating elastomeric material of said wall and extending along the exterior of said tube in intimate contact therewith, and said second layer extends along the interior of said tube in intimate contact therewith.

17. The invention of claim 14 wherein the housing wall insulating material includes said barrier of high dielectric strength material to further isolate the first and second layers from one another.

18. The invention of claim 14 wherein the barrier of high dielectric strength material is a tube having a wall with interior and exterior surfaces and first and second ends and extending essentially along the entire length of the chamber;

said terminating portion of the first layer extends along the exterior surface of the tube from the first end of the tube toward the second layer, which terminating portion of said first layer terminates short of the second end of the tube;

said terminating portion of the second layer extends along the interior surface of the tube from the second end of the tube toward the terminating portion of the first layer, which terminating portion of said second layer terminates short of the first end of the tube.

19. The invention of claim 18 in which the terminating portion of the first layer is axially located closer to the second end of the tube than the terminating portion of the second layer so that said terminating portions axially overlap and are spaced radially apart by the wall thickness of the tube.

20. The invention of claim 19 wherein the axially overlapping terminating portions of said first and sec-

ond layer are both located nearer to the second end of said tube than to the first end of said tube.

21. The invention of claim 12 wherein the housing wall insulating material includes an elastomeric material and the first layer is a conductive elastomeric material integral with the insulating elastomeric material of the tubular portion of the housing wall.

22. The invention of claim 12 wherein said first and second layers are comprised of conductive elastomeric materials.

23. The invention of claim 12 wherein the first and second layers are integral with the tube of high dielectric strength material.

24. The invention of claim 12 wherein the housing comprises:

a tubular part, at least a portion of which is comprised of elastomeric material;

at least one end part, at least a portion of which is comprised of elastomeric material, engageable with one end of the tubular part; and

complementary plug and receptacle means on said elastomeric portions of the tubular and end parts, said means having relative dimensions for engaging the end part with the tubular part in watertight relationship to seal the chamber and protectively encase the fuse.

25. The invention of claim 12 wherein the terminating portion of the second layer of conductive material is located further from the central axis of said fuse than the terminating portion of said first layer, and the terminating portions of said first and second layers of conductive material are both located closer to said first contact member than to said second contact member.

26. A high voltage fuse enclosure for a fuse having opposed ends and a terminal adjacent each end, said enclosure comprising:

a housing including

a first part including a generally tubular, axially extending portion of insulating elastomeric material; and

at least one second part at least a portion of which is insulating elastomeric material, engageable with the first part to establish a sealed chamber within which the fuse is to be enveloped;

a first contact in said first part for engaging one terminal of the fuse;

a second contact in said second part for engaging the other terminal of the fuse;

a tube having a wall of high dielectric strength material extending axially along the chamber in intimate contact with the tubular portion of the first part;

a first layer of conductive material electrically connected to said first contact and having at least a portion extending along the exterior surface of the tube wall from one end of the tube toward the other end of the tube and terminating short of said other end;

a second layer of conductive material electrically connected to said second contact and having at least a portion extending along the interior surface of the tube wall from said other end toward said one end thereof and terminating short of said one end; and

said first and second layers being axially juxtaposed in close axial proximity and radially spaced apart by the wall thickness of the tube of high dielectric

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strength material such that the first and second layers establish a corona-preventing shield around said chamber without completing an alternate electrical circuit between the first and second contacts.

27. The invention of claim 26 wherein the first layer is comprised of a conductive elastomeric material integral with the insulating elastomeric material of the tubular portion of the first part.

28. The invention of claim 26 wherein the first and second layers are comprised of conductive elastomeric materials.

29. The invention of claim 26 wherein the first and second layers are integral with the tube of high dielectric strength material.

30. The invention of claim 26 wherein the terminal ends of both the first and second layer are located closer to said other end of the tube than to said one end of the tube.

31. The invention of claim 26 wherein the tube of

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high dielectric strength material extends axially from adjacent the first contact to adjacent the second contact.

32. The invention of claim 26 including complementary plug and receptacle means on the elastomeric portions of the first and second parts, said means having relative dimensions for engaging the second part with the first part in watertight relationship to seal the chamber and protectively encase the fuse.

33. The invention of claim 26 wherein the respective terminating portions of said radially spaced apart first and second layers of conductive material lie in a common transverse plane substantially perpendicular to the longitudinal extent of said fuse.

34. The invention of claim 26 wherein the respective terminating portions of said radially spaced apart first and second layers of conductive material axially overlap one another.

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,818,407
DATED : June 18, 1974
INVENTOR(S) : Nelson W. Edgerton

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, line 52, "portions" (second occurrence) should be

--portion--; and

Column 8, line 66, "of" should be a comma (,).

Signed and Sealed this

ninth Day of March 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,818,407 Dated June 18, 1974

Inventor(s) Nelson W. Edgerton

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 35; change "72a" to --62a--;

Column 6, line 36; change "potion" to --portion--;

Column 8, Claim 3, line 1; change "3" (second occurrence) to --2--;

Column 8, Claim 7, line 20; change "3" to --2--;

Column 10, Claim 23, line 11; change "12" to --15--.

Signed and sealed this 8th day of October 1974.

(SEAL)

Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents