Dec. 26, 1961 L. V. CHABALA ET AL 3,015,008

CIRCUIT INTERRUPTER CONSTRUCTION

Filed March 9, 1960

Fig. 1

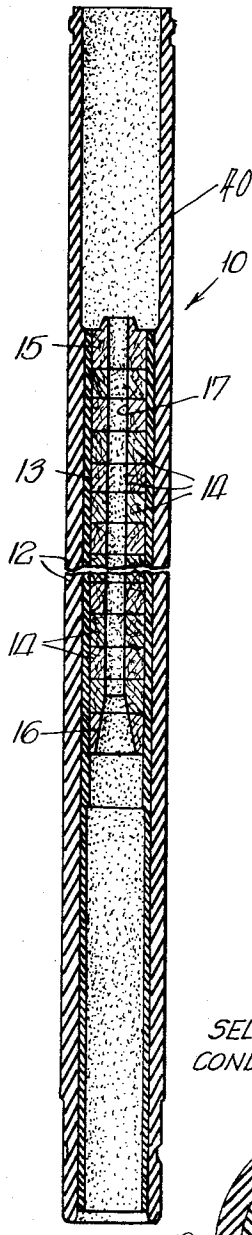


Fig. 2

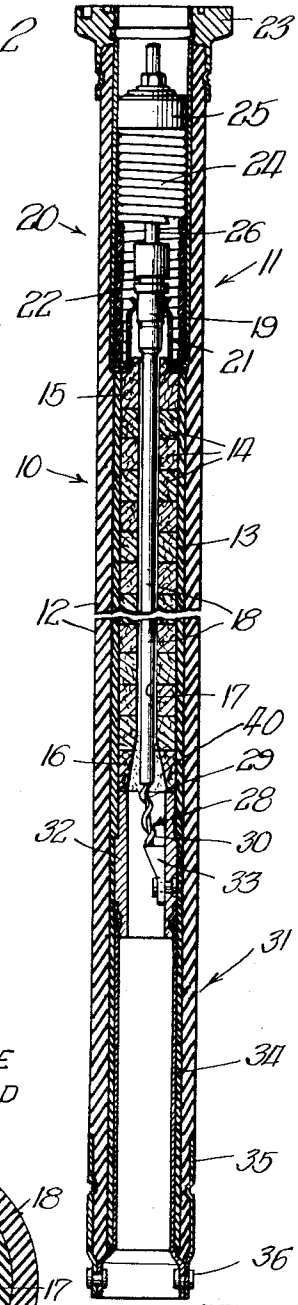
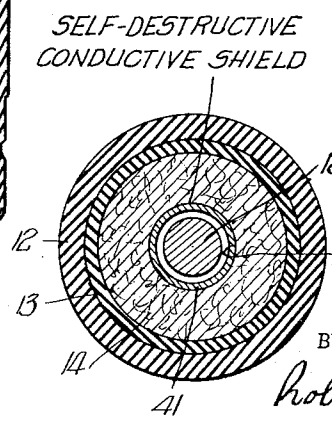


Fig. 3.



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CIRCUIT INTERRUPTER CONSTRUCTION

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This invention relates, generally, to high voltage circuit interrupters and it has particular relation to such interrupters of the fuse type. It constitutes an improvement over the invention disclosed in U.S. Patent No. 2,877,322, issued March 10, 1959.

The patent just referred to relates to the provision of a semi-conducting path between the terminals of a high voltage fuse over the surface of the bore through which a movable conductor is withdrawn on operation of the device for shielding the conductor from the destructive effects of corona discharge. The semi-conducting path is formed by coating the surface of the bore through which the conductor, which may be a rod-like terminal, moves with high resistance conducting material in an amount sufficient to have the desired shielding effect outwardly of the movable conductor. It is desirable that the shielding from corona discharge be effective as long as the conductor remains stationary and the fusible means which prevents its movement remains intact. Upon blowing of the fusible means and interruption of the current flow in the circuit, accompanied by withdrawal of the conductor or rod-like terminal through the bore, the semi-conducting path should be destroyed in order that there be no leakage path through the blown fuse. Under the blown fuse conditions, the terminals of the fuse are at different potential levels and the insulation therebetween is required to withstand this potential difference and in addition potentials resulting from switching and other surges to which the high voltage line connected to the fuse is subjected.

While the heat of the arc drawn incident to circuit interruption and blowing of the fusible means ordinarily is effective to destroy the semi-conducting path over the surface of the bore in the solid arc extinguishing material to an extent sufficient to restore the insulation through the blown fuse to the desired value, it has been found that there are some instances where sufficient destruction of the conducting path is not effected with the result that leakage current may flow after circuit interruption or that the resistance of the path through the blown fuse may be reduced to such an extent that a flashover therethrough will take place on the application of a subsequent switching or other surge to the high voltage line. Under conditions of relatively low fault current interruption, only a portion of the semi-conducting coating may be destroyed and this may be insufficient to provide the desired degree of insulation through the fuse housing after the fusible means has blown.

Accordingly, among the objects of this invention are: To provide a semi-conducting path between the terminals of a high voltage fuse that is capable of destroying itself on blowing of the fusible means; to provide a self-destructive semi-conducting shield between the terminals of the fuse and around the movable conductor or rod-like terminal thereof; to initiate the self-destruction of the semi-conducting path by the arc drawn incident to blowing of the fuse in such manner that the destruction of the path continues after the arc drawn incident to the circuit interruption is extinguished; to incorporate with the material providing the semi-conducting path, a material that, once destruction thereof is initiated by the heat of the arc, continues to burn or otherwise decompose and thus convert itself and the material forming the semi-conducting path into a good insulating material; to apply the self-destructive coating to the surface of the bore in the solid arc extinguishing material in which the arc is drawn and extinguished followed by application of the semi-conducting coating; to apply the self-destructive coating and the semi-conducting coating simultaneously; to combine the self-destructive material and the semi-conducting material and apply them as a single coating over the surface of the bore in the solid arc extinguishing material in which the arc is drawn and extinguished; and to form the self-destructive material into one or more thin walled cylindrical members and to use them to line the bore in the solid arc extinguishing material in which the arc is drawn and extinguished followed by application over the inner surface of the cylindrical member or members of the semi-conducting coating to provide the conducting shield around the movable conductor or rod-like terminal as long as the fusible means remains intact.

Other objects of this invention will, in part, be obvious and in part appear hereinafter.

This invention is disclosed in the embodiments thereof shown in the accompanying drawing and it comprises the features of construction, combination of elements and arrangement of parts that will be exemplified in the constructions hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of this invention reference can be had to the following detailed description, taken together with the accompanying drawing, in which:

FIGURE 1 is a vertical sectional view of a fuse housing in which the present invention is embodied;

FIGURE 2 is a vertical sectional view of a replaceable fuse assembly employing the housing shown in FIGURE 1; and

FIGURE 3 is a horizontal sectional view, at an enlarged scale, taken generally along the line 3—3 of FIGURE 2.

Since the details of construction of the fuse housing and of the replaceable fuse unit assembly with which the present invention is disclosed are generally the same as described in U.S. Patent No. 2,877,322, issued March 10, 1959, the same general description and reference characters there employed are here reproduced where applicable.

Referring now particularly to FIGURE 1 of the drawing it will be observed that the reference character **10** designates, generally, a fuse housing which forms a part of a replaceable fuse assembly that is indicated, generally, at **11** in FIGURE 2. The fuse assembly **11** is of the type shown in U.S. Patent No. 2,651,695 and can be employed in connection with the fittings there shown to provide a dropout fuse construction. The present invention, as well as the invention of Patent No. 2,877,322, can be employed with other fuse constructions, for example, the construction shown in U.S. Patents Nos. 2,662,138 and 2,662,139 as well as other similar fuses that are used on high voltage circuits.

The fuse housing **10** includes a fuse tube **12** which preferably is formed of a phenolic condensation product and may be provided with a fiber liner **13** that is threaded therein as shown in U.S. Patent No. 2,662,138. Within the fiber liner **13** and intermediate the ends of the fuse tube **12** is a stack of cakes **14** of arc extinguishing material such as boric acid. At the upper end there is provided a reinforcing ring **15** while at the lower end there is a throat **16**. Extending through the reinforcing ring **15**, cakes **14** of arc extinguishing material and the throat **16** is a bore **17** from the surface of which an arc extinguishing medium is evolved due to the heat of an arc that is drawn on operation of the fuse. Movably mounted in the bore **17** is a conductor **18** that preferably

is in the form of a rod-like terminal which is provided with a contact member **19** at its upper end for connection to one terminal that is indicated, generally at **20**. The terminal **20** includes contact fingers **21** which engage directly the contact member **19** and which are suitably connected to a conducting tube **22** that has a close fit with the upper end of the fuse tube **12** and is connected to an upper terminal ring **23**. It will be understood that the upper terminal ring **23** is detachably connected to a fitting which forms a part of the dropout fuse assembly. In order to move the conductor **18** through the bore **17** a coil compression spring **24** is employed. It is interposed between the lower end of the conducting tube **22** and a head **25** that is secured on and carried by an extension **26** from the upper end of the conductor **18**.

At its lower end the conductor **18** is restrained against upward movement under the influence of the coil compression spring **24** by a fusible means indicated, generally, at **28**. The fusible means **28** may include a strain wire **29** and a fuse element **30** in parallel relation therewith. The fusible means **28** interconnects the lower arcing end of the conductor **18** with a terminal shown, generally, at **31** at the lower end of the fuse tube **12**. The terminal **31** includes a relatively thick-walled metallic tube **32** which bears against the lower end of the throat **16** and to which the fusible means **28** is connected by a terminal fitting **33**. Extending downwardly from the tube **32** is a conducting tube **34** which is connected at its lower end to the lower end of a lower ferrule **35** by means of rivets **36**.

It will be understood that the conductor **18** in the bore **17** is energized at the potential of the line to which the fuse assembly **11** is connected. When this potential is high with respect to the diameter of the conductor **18**, a corona discharge is likely to take place from the conductor **18**. This causes an undesirable condition tending to corrode the conductor **18** and render the device unsuitable for proper operation to interrupt fault current.

In accordance with the invention of Patent No. 2,877,322 provision is made for preventing the corona discharge from the conductor **18**. For this purpose, as shown in FIGURE 1, after the cakes **14** of arc extinguishing material, the reinforcing ring **15** and the throat **16** have been assembled in place as there illustrated, a semi-conducting water resistant coating **40** is applied over the entire periphery of the bore **17** and throughout its entire length extending through the reinforcing ring **15** and throat **16**. The coating **40** also extends to cover the inner surface of the fuse tube **12** at the upper end for some distance beyond the reinforcing ring **15**. At the lower end the coating **40** extends for some distance over the exposed portion of the fiber liner **13** and below the throat **16**. On the subsequent completion of the assembly of the fuse, as shown in FIGURE 2, the conducting tube **22** at the upper end and conducting tubes **32** and **34** at the lower end make good contact engagement with the coating **40**. In the completed assembly, the semi-conducting coating **40** interconnects the terminals **20** and **31** and provides a semi-conducting path therebetween over the surface of the bore **17**. Since there is a conducting path completely surrounding the movable conductor **18** in the bore **17**, it is fully shielded and no corona discharge takes place therefrom.

As disclosed in Patent No. 2,877,322 the semi-conducting coating **40** may be a colloidal graphite dispersion in a suitable water insoluble carrier, such as alkyd resin. The properties of the coating solution and the nature of the surface of the bore **17** should be such that the semi-conducting coating **40** does not appreciably penetrate this surface of the cakes **14** of boric acid. That is, the porosity and hardness of the bore surface, and the consistency, particle size and carrier of the coating solution should be compatible. The reason for these characteristics is to make the semi-conducting coating **40** readily

available to the arc heat for decomposition and removal thereby, thus permitting recovery of the dielectric properties of the fuse after the arc is extinguished. The resistance of the semi-conducting coating **40** is controlled by the graphite content which can be varied by the use of a suitable aromatic solvent. The semi-conducting coating **40** can be applied to the sub-assembly, as shown in FIGURE 1, by pouring the liquid solution through the fuse housing **10** in a sufficient quantity to insure that all of the surfaces mentioned are thoroughly covered. Also, it can be applied by spraying or brushing. Preferably the resistance of the semi-conducting coating **40** between the terminals **20** and **31** is of the order of from 2 to 20 megohms but this range is not critical.

Since the semi-conducting coating **40** is applied over the surface of the bore **17**, it ordinarily is largely removed on the drawing of an arc when the fusible means **28** blows. Thus, after it has served its purpose of preventing the formation of corona, the semi-conducting coating **40** is destroyed and, as a result, adequate resistance and dielectric strength between the terminals **20** and **31** can be developed with no danger of excessive leakage current flow therebetween due to the presence of a low resistance conducting path.

Not only does the semi-conducting coating **40** prevent the formation of corona but also it serves to prevent the deterioration of the surface of the bore **17**. Since the semi-conducting coating **40**, as described, is water resistant, it prevents damage to the surface of the bore under unusual conditions of moisture accumulation which might result from high humidity and temperature cycling causing condensation or the remote possibility of water leakage into the fuse assembly **10** under particularly severe weather conditions such as a driving rain.

Because the semi-conducting coating **40** over the surface of the bore **17** is removed or destroyed when the arc is formed on blowing of the fusible means **28**, there is substantially no interference with the arc interrupting and dielectric properties of the fuse assembly **11**. This follows from the fact that the rapid disintegration or removal of the semi-conducting coating **40** exposes the surface of the bore **17** in the cakes **14** of arc extinguishing material directly to the heat of the arc and the arc extinguishing medium can be evolved therefrom substantially without interference. Since the semi-conducting path has been removed from the greater portion of the distance between the terminals **20** and **31**, the dielectric properties of the fuse assembly **11**, after blowing of the fusible means **28**, approach those of a fuse in which no semi-conducting coating has been used.

Prior to Patent No. 2,877,322, semi-conducting coatings for corona prevention had been applied to the external surface of the fuse tube, such as the external surface of the tube **12**. Also, they had been applied along the joint between the fiber liner, such as the liner **13**, and the inner surface of the insulating fuse tube, such as the fuse tube **12**. However, when such use was made of semi-conducting paths between the terminals of the fuse assembly and since they remained after the fuse operated to clear the circuit, they interfered with the dielectric structure such that the flashover voltage was reduced during the following operation. Also, there was a possibility that excessive leakage current would flow between the terminals of such a fuse construction and tracking would occur following a fault interruption.

When the semi-conducting coating **40** was applied, as described hereinbefore, the fuse assembly **11** was not subject to the foregoing disadvantages. During its steady state operation, the semi-conducting coating **40** serves as an effective corona shield because of its relatively close proximity to the conductor **18**. Its resistance can be considerably less than that of semi-conducting coatings applied over the surface of the fuse tube or between it and the fiber liner. The reason for this is that, when the semi-conducting coating **40** is applied over the sur-

face of the bore **17** and is destroyed when the fuse blows, it does not affect the dielectric properties of the fuse assembly **11** during or following an operation to the point of preventing successful clearing of the circuit, while when the semi-conducting coating was applied otherwise, as described, its influence on the dielectric properties during and following the fuse operation was inversely related to the resistance of such a permanent coating. Since the effectiveness of a corona shield, when the fuse is energized to carry current, is inversely related to its resistance, it is desirable to employ a coating having a minimum of resistance. However, a low resistance corona shield is objectionable from a dielectric standpoint after the fuse has operated to clear the circuit unless it is substantially removed in the fuse operation. As described hereinbefore, when the semi-conducting coating **40** is applied over the surface of the bore **17**, it is removed as a result of the heat of the arc and consequently any objection to the use of a relatively low resistance corona shield is overcome.

While, ordinarily, the semi-conducting coating **40** over the bore **17** is removed by the heat of the arc drawn on blowing of the fusible means **28** to an extent sufficient to provide the desired resistance between the terminals **20** and **31** and after the circuit has been interrupted, there may be some instances, particularly if the fusible means **28** is blown as a result of a relatively low overload accompanied by the release of a relatively small amount of heat energy, when the semi-conducting coating **40** may not be removed to a sufficient extent to provide the desired resistance between the terminals **20** and **31**. It is possible that such relatively small arc heat may restore the resistance to such an extent that there will be no follow current or no leakage current and yet a situation may exist where a break down will take place as a result of the application of a switching or lightning surge to the high voltage line to which the terminals **20** remain connected after the fusible means **28** has blown. In accordance with the present invention provision is made for incorporating with the semi-conducting coating **40** a material that is self-destructive once it is fired as a result of blowing of the fusible means **28**.

For illustrative purposes there is shown at **41** in FIGURE 3 of the drawings a self-destructive conductive shield. While the semi-conducting coating **40** may extend, as previously described, over the inner surface of the upper end of the fuse tube **12** and the inner surface of the lower end of the fiber liner **13** for good contact engagement with the conducting tubes **22** and **34** forming parts of the terminals **20** and **31** and over the surface of the bore **17** through the reinforcing ring **15**, the cakes **14** of solid arc extinguishing material and the throat **16**, the self-destructive conductive shield **41** preferably extends only over the surface of the bore **17**. For example, the self-destructive conductive shield **41** may extend from the upper end of the relatively thick walled metallic tube **52** and into the bore **17** for only a part of length of the bore **17**. The extent that the self-destructive conductive shield **41** extends through the bore **17** is governed by the extent that it is desired to insure removal of the semi-conducting coating **40** to the end that the desired resistance between the terminals **20** and **31** will be restored sufficiently to withstand line voltage as well as expected switching and lightning surges. The self-destructive conductive shield **41** need extend into the bore **17** only to the extent that the lower end of the conductor or rod-like terminal **18** is withdrawn therethrough.

The reason for limiting the use of the self-destructive material in the conductive shield **41** is to reduce to a minimum the amount of energy that is released when its destruction is initiated as a result of the heat generated following blowing of the fusible means **28** and caused by the arc incident thereto or by movement of the conductor **18**.

The material providing the self-destructive effect can be applied in the bore **17** in various fashions. For example, the self-destructive material can be applied as a suspension of particles or a solution which coats the surface of the bore **17** followed by the application of the semi-conducting coating **40**. If desired, the self-destructive material can be combined with colloidal graphite in a single solution and applied to the fuse housing **10**. Such a combined coating preferably is applied only to a portion of the surface of the bore **17** for the reasons above outlined, while the remaining portions of the fuse housing **10** have the semi-conducting coating **40** alone applied thereto. Instead of applying the self-destructive material in solution, such material can be molded or pressed into thin walled cylinders to be telescoped within the bore **17** and provide a liner therefor. The number and extent of such thin walled cylinders depend upon the extent that the semi-conducting coating **40** should be removed after operation of the fuse by blowing of the fusible means **28**. After the thin walled cylinder or cylinders are telescoped within the bore **17**, the semi-conducting coating **40** is applied thereover in the manner previously described.

Instead of limiting the application of the self-destructive material to the portion of the bore **17** where the arc incident to blowing of the fusible means **28** is drawn and extinguished, the self-destructive material can be applied at spaced locations along the bore **17**. Then, depending upon the energy released on blowing of the fusible means **28**, one or more of the sections of self-destructive material can be fired to insure the removal of the corresponding portion of the semi-conducting coating **40**.

It will be understood that the self-destructive conductive shield **41** has reference to any of the several ways in which the self-destructive effect is obtained. As pointed out above, the self-destructive material can underlie the semi-conducting coating **40**. Also it can be mixed therewith and applied accordingly. Further, the self-destructive material, forming the conductive shield **41**, can be applied in the form of one or more thin walled cylinders inserted in the bore **17** and forming either a single liner or a liner having spaced sections with the semi-conducting coating **40** applied thereover. It remains to describe several self-destructive materials that can be used to provide the self-destructive conductive shield **41**.

The suspension of particles for the solution which can be applied as a self-destructive coating to the bore **17** before application of the semi-conducting coating **40** can be formed of nitrocellulose. For this purpose, a commercially available, ½ second nitrocellulose supplied in a dampened condition (dampened with about 30% ethyl alcohol), with a nitrogen content of 11.8 to 12.2% and a viscosity of 3–4 can be used. The viscosity is run using a mixture of 20% nitrocellulose and a solution of 55/25/20 mixture of toluol—ethyl alcohol—85% ethyl acetate. The nitrocellulose is dispersed in a solvent, such as butyl acetate and diluted in toluol in order to give a free-flowing liquid that can be flowed over the surface of the bore **17** through the cakes **14** of boric acid to provide a coating of uniform thickness of nitrocellulose thereover. The extent of application of this coating to the bore **17** is determined by the considerations above outlined. The self-destructive coating of nitrocellulose is allowed to dry. Thereafter the conductive coating **40** is applied in the manner previously described and is air dried. The conductive coating **40** includes graphite powder having approximately 2 micron particle size and it comprises 25% of the solution, a balance of which comprises 1% alkyd resin with the rest being toluol.

Another self-destructive coating that can be used is a gunpowder mixture formed by 15 parts of carbon, 10 parts of sulfur and 75 parts of potassium nitrate. In order to apply the gunpowder mixture, the surface of the bore **17**, or so much thereof as it is desired to provide with the self-destructive coating, is covered with an alkyd

diluted in an aromatic hydrocarbon. Then the gunpowder mixture is brushed or blown over this coating so that a fine, thin layer of self-destructive material overlies the slow drying coating. Thereafter, the semi-conducting coating **40** is applied in the manner above described.

As pointed out above, the semi-conducting coating **40** can be incorporated with the self-destructive material and applied therewith to the extent desired over the surface of the bore **17**. For this purpose the nitrocellulose described above can be combined with powdered graphite and the resulting liquid is applied to the extent desired over the surface of the bore **17**. In this mixture the powdered graphite constitutes about 10%.

The self-destructive material can be provided by one or more thin walled cylinders telescoped within the bore **17** at the lower end and extending therethrough to the desired extent. Such cylinders can be spaced along the bore **17** as above set forth. The cylinder or cylinders can be formed of benzoyl peroxide paste and compressed into the cylinder or cylinders having the requisite dimensions. After the thin walled cylinder or cylinders of benzoyl peroxide paste have been telescoped within the bore **17**, the semi-conducting coating **40** is applied and air dried.

The thin walled cylinder or cylinders also can be formed using 1 to 5 parts of sulfur with 15 to 25 parts of potassium chlorate. Prior to mixing these materials one of them is moistened with water. The mixture in the form of a paste is compressed into the cylindrical formation for insertion in the bore **17** after which the semi-conducting coating **40** is applied in the manner described. The gunpowder mixture described above can be formed into a thin walled cylinder or cylinders by mixing it with from ½ to 5% gum arabic and then compressing the resulting paste like material into cylindrical configurations for insertion in the bore **17**. After this is accomplished, the semi-conducting coating **40** is applied as above described.

Any of these self-destructive materials once fired continue to burn until they are decomposed along with the semi-conducting coating **40** to provide an insulating rather than a conducting path over the surface of the bore **17**. The firing of the self-destructive materials is initiated by the heat resulting from the arc incident to the blowing of the fusible means **28**.

The self-destructive action also can be initiated as the result of mechanical movement of the conductor or rod-like terminal **18**. Such movement can be employed to generate heat as the result of friction in a manner that the head of a match is ignited by striking it on a suitable friction surface. For this purpose an arm **42** extends radially from the arcing end of the conductor or rod-like terminal **18** to have frictional engagement with the self-destructive conductive shield **41**. The arm **42** is used as an alternate to reliance upon the heat of the arc incident to blowing of the fusible means **29** for firing the self-destructive conductive shield formed of any of the materials above described. The arm **42** is sufficiently flexible and there is sufficient clearance so that it can be withdrawn into the bore **17** as the conductor or rod-like terminal **18** moves upwardly therethrough during the circuit interrupting operation.

Since certain further changes can be made in the foregoing constructions and different embodiments of the invention can be made without departing from the spirit and scope thereof, it is intended that all matter shown in the accompanying drawing and described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

What is claimed as new is:

1. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, and a self-destructive semi-conducting shield interconnecting said terminals to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, said self-destructive semi-conducting shield being characterized by continuing to react once it is ignited by the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said shield is destroyed whereby the electrical resistance between said terminals is substantially increased after said fusible means blows.

2. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, and a self-destructive semi-conducting shield over the surface of said bore and interconnecting said terminals to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, said self-destructive semi-conducting shield being characterized by continuing to react once it is ignited by the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said shield is destroyed whereby the electrical resistance between said terminals is substantially increased after said fusible means blows.

3. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, and a self-destructive semi-conducting shield interconnecting said terminals to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, said self-destructive semi-conducting shield being characterized by continuing to react once it is ignited by the heat of the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said shield is destroyed whereby the electrical resistance between said terminals is substantially increased after said fusible means blows.

4. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, and a self-destructive semi-conducting shield interconnecting said terminals to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, said self-destructive semi-conducting shield being characterized by continuing to react once it is ignited by the arc incident to movement of said conductor following blowing of said fusible means for insuring that at least a substantial por-

tion of said shield is destroyed whereby the electrical resistance between said terminals is substantially increased after said fusible means blows.

5. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, means providing a semi-conducting path between said terminals over the surface of said bore to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, and self-destructive means associated with said means providing said semi-conducting path, said self-destructive means being characterized by continuing to react once it is ignited by the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said semi-conducting path between said end terminals is destroyed whereby the electrical resistance therebetween is substantially increased after said fusible means blows.

6. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, means providing a semi-conducting path between said terminals over the surface of said bore to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, and self-destructive means underlying said means providing said semi-conducting path, said self-destructive means being characterized by continuing to react once it is ignited by the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said semi-conducting path between said end terminals is destroyed whereby the electrical resistance therebetween is substantially increased after said fusible means blows.

7. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conducotr to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, means providing a semi-conducting path between said terminals over the surface of said bore to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, and a self-destructive liner in the form of a thin walled cylinder telescoped within said bore and underlying said means providing said semi-conducting path, said self-destructive liner being characterized by continuing to react once it is ignited by the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said semi-conducting path between said end terminals is destroyed whereby the electrical resistance therebetween is substantially increased after said fusible means blows.

8. In a fuse for use on electric power circuits energized at several thousand volts, in combination, a fuse tube of insulating material having a bore intermediate its ends in which an arc can be drawn and extinguished due to the evolution of an arc extinguishing medium therefrom resulting from the heat of the arc, terminals at the ends of said bore, a conductor in said bore connected at one end to one end terminal, fusible means interconnecting the other end of said conductor to the other end terminal, said conductor being movable through said bore on blowing of said fusible means, means providing a semi-conducting path between said terminals over the surface of said bore to electrostatically shield said movable conductor and prevent corona discharge from the surface thereof, and self-destructive means associated with said means providing said semi-conducting path at the end of said movable conductor to which said fusible means is connected and coextensive with said means providing said semi-conducting path for a substantial distance, said self-destructive means being characterized by continuing to react once it is ignited by the arc incident to blowing of said fusible means for insuring that at least a substantial portion of said semi-conducting path between said end terminals is destroyed whereby the electrical resistance therebetween is substantially increased after said fusible means blows.

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