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SURGE LINK

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Fig. 1

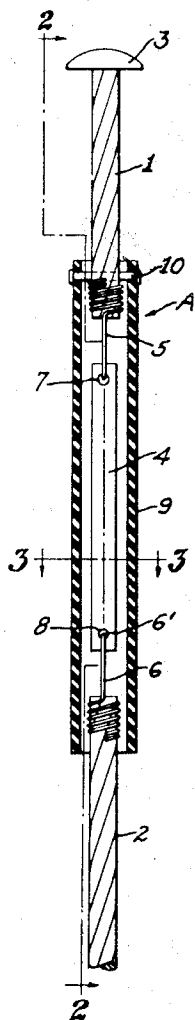


Fig. 2

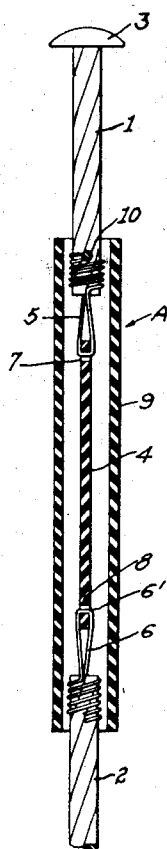


Fig. 4

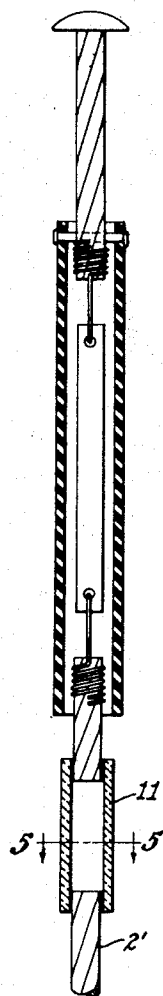


Fig. 5

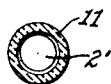


Fig. 3



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SURGE LINK

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9 Claims. (Cl. 200—115)

This invention relates generally to electrical surge devices and more specifically to a device of this type which is adapted to function in a manner to clear a power circuit of voltage surges caused by switching or induced by lightning, the predominant object of the invention being to provide an improved surge device which is in the form of a link that may be installed in standard fuse link cartridges or standard switch mountings now in general use.

Prior to this invention devices known as "lightning arresters" have been produced that were intended to rid a line or electrical circuit of surges caused by switching and lightning which if not diverted to ground might cause damage to line equipment. These devices consisted of air gaps arranged in series with various substances, such as oxidized pellets or crystal formations which possess a valve action, these substances being characterized by the ability to allow the surge current to flow to ground and immediately act as insulator means when the power current attempts to flow through.

Another type of device which has been known for some time is termed a "coordinating gap" consisting of an air gap within a fiber tube, this device being used in exactly the same manner as the so-called lightning arresters with the exception that there is no valve action present in its operation. In the case of the coordinating gap type of device the air gap within the fiber tube provides a short path for the surge current to flow to ground and when the power current attempts to flow, the heat generated by the power arc across the gap causes the wall of the fiber tube to give off a gas which has a tendency to extinguish the arc.

The device of the present invention functions in accordance with the latter expulsion tube principle and the improvement resides in producing the device in the form of a link which may be installed in standard fuse link cartridges or standard switch mountings now in general use.

Fig. 1 is a sectional-elevation of the improved device, the fiber tube thereof being in longitudinal section.

Fig. 2 is a sectional-elevation on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1 but showing the device having an auxiliary strain insulator associated therewith.

Fig. 5 is a section on line 5—5 of Fig. 4.

In the drawing, wherein is shown for the purpose of illustration, merely, two embodiments of the invention A designates the improved device generally. The device A comprises a pair of aligned cables 1 and 2 which serve as link terminals, the inner ends of these cables being spaced apart to provide a gap and the cable 1 being provided at its outer end with a cap or head 3 where this is desired. Arranged in the gap between the inner ends of the cables 1 and 2 is an insulator in the form of a strip of fiber or other suitable material 4, said strip being connected at its opposite ends to the cables 1 and 2 by means of strain wires 5 and 6. As shown clearly in Figs. 1 and 2 the strain wire 5 is passed through an aperture 7 formed in an end portion of the strip 4 and is twisted about the inner end portion of the cable 1. In like manner the strain wire 6 is passed through an aperture 8 formed in the opposite end portion of the strip 4 and is twisted about the inner end portion of the cable 2.

The device A includes a tube 9 which is formed of fiber or other suitable material and encloses the strip 4, the strain wires and inner end portions of the cables 1 and 2. The tube 9 may be secured in place in any suitable and convenient manner as, for instance, by means of a transversely extended pin 10 which passes through an opening formed through the cable 1 and through oppositely located openings formed in the wall of the tube.

Either the strip 4 or the tube 9 is made of horn fiber or other suitable material which is characterized by the ability to give off gas when subjected to the heat of an electric arc which gas has a tendency to extinguish the arc. Also if desired both the strip 4 and the tube 9 may be made of such material. When the strip only is made of the gas-releasing material the tube is formed of ordinary insulating material, and likewise when the tube is formed of gas-releasing material the strip is formed of ordinary insulating material.

When, in the use of the device of the present invention, surge currents of relatively low values arc over between the strain wires 5 and 6, the surge will be carried to ground. However, if the power current flows through this path, the power arc will melt the strain wire 6 at the point designated by the reference character 6' thereby causing the link to open mechanically. Also the heat generated within the tube by the power arc causes the fiber strip 4 and/or the wall of the tube 9 to give off a gas which has a tendency to extinguish the arc. If the improved device dis-

closed herein is installed in a fuse holder designed to trip out when the fuse blows, the cartridge with which the device is associated will trip out when melting of the strain wire 6 causes the link to open just as in the case of a fuse link of a trip-out type of cutout.

In order to prevent leakage of current along the fiber strip 4 in damp weather, or in case moisture should get into the link from condensation, it may be desirable to install an auxiliary strain insulator 11 in series with the fiber gap as shown in Fig. 4. This strain insulator may be in the form of a sleeve formed of glass, porcelain, or any suitable non-absorbative ceramic material, adjacent end portions of the cable 2' being extended into opposite ends of the sleeve and suitably secured in place therein to provide a gap within the sleeve.

I claim:

1. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an element disposed in said gap, and strain wires for connecting said element to said flexible conductors, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in an interposed relation with respect to said strain wires, said element being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc.

2. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an element in strip form disposed in said gap, and strain wires for connecting said element to said flexible conductors, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in an interposed relation with respect to said strain wires, said element being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc.

3. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an element disposed in said gap, strain wires for connecting said element to said flexible conductors, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in an interposed relation with respect to said strain wires, said element being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc, and a tubular protective member which encloses said element, and said strain wires.

4. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an element disposed in said gap, strain wires for connecting said element to said flexible con-

ductors, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in an interposed relation with respect to said strain wires, said element being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc, a tubular protective member which encloses said element, and said strain wires, and means for securing said protective member in place.

5. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an insulating member disposed in said gap, strain wires for connecting said insulating member to said flexible conductors, and a tubular member which encloses said gap, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in interposed relation with respect to said strain wires, said tubular member being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc.

6. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an insulating member disposed in said gap, strain wires for connecting said insulating member to said flexible conductors, and a tubular member which encloses said gap, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in interposed relation with respect to said strain wires, said insulating member and said tubular member being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc.

7. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an insulating member disposed in said gap, strain wires for connecting said insulating member to said flexible conductors, a tubular member which encloses said gap, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said elements in interposed relation with respect to said strain wires, said tubular member being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc, and means for securing said tubular member in place.

8. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an insulating member disposed in said gap, strain wires for connecting said insulating member to said flexible conductors, a tubular member which encloses said gap, said strain wires being formed

of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in interposed relation with respect to said strain wires, said tubular member being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc, and a strain insulator associated with one of said flexible conductors and arranged in series with the gap between said flexible conductors.

9. A surge link comprising flexible conductors providing link terminals which are spaced apart at their inner ends to provide a gap therebetween, an insulating member disposed in said gap, strain wires for connecting said insulating member to

said flexible conductors, a tubular member which encloses said gap, said strain wires being formed of electrical conducting material and being attached to opposite ends of said element and to the adjacent inner ends of the flexible conductors in electrical connection with said flexible conductors so as to dispose said element in interposed relation with respect to said strain wires, said tubular member being formed of material characterized by the ability to give off gas when subjected to the heat of an electric arc which has a tendency to extinguish said electric arc, and a strain insulator associated with one of said flexible conductors and providing a gap in said conductor which is arranged in series with the gap between said flexible conductors.

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