

(No Model.)

H. LEMP & M. J. WIGHTMAN.
SAFETY CUT-OUT FOR ELECTRICAL APPARATUS.

No. 517,120.

Patented Mar. 27, 1894.

Fig. 1.

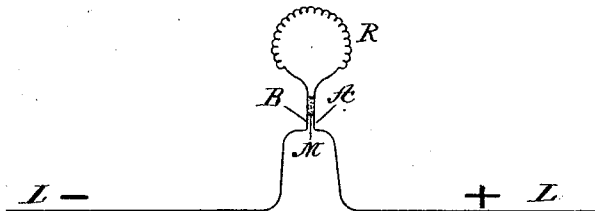


Fig. 3.



Fig. 2.

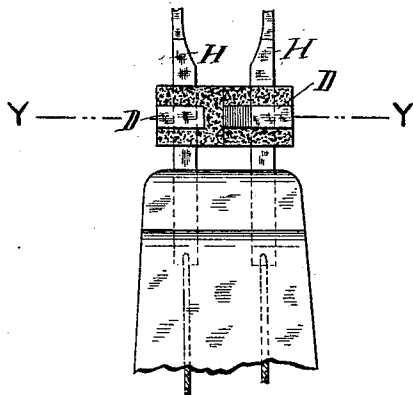


Fig. 5.



Fig. 4.

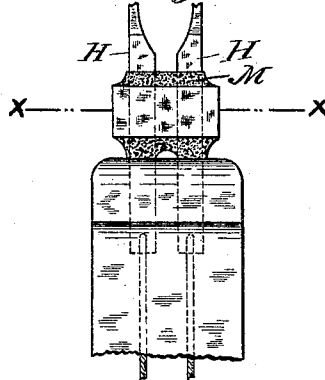
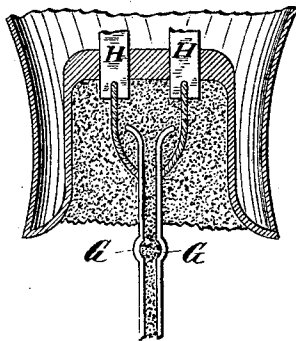


Fig. 6.



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SAFETY CUT-OUT FOR ELECTRICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 517,120, dated March 27, 1894.

Application filed July 31, 1886. Serial No. 209,656. (No model.)

To all whom it may concern:

Be it known that we, HERMANN LEMP and MERLE J. WIGHTMAN, citizens of the United States, and residents of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Safety Cut-Outs for Electrical Apparatus, of which the following is a specification.

Our invention relates to safety cut outs for electrical apparatus and is designed to provide a novel means whereby a short or safety path or branch circuit may be formed around an apparatus in case of rupture of the circuit in such apparatus, or in case of the flow upon such circuit of an abnormally high current calculated to endanger the safety of said device.

Our invention is applicable to electric lamps generally but is more especially designed for that type of lamp ordinarily termed an incandescent lamp.

The invention consists especially in interposing, between the two electrodes of the circuit through which a path is to be established on the occurrence of abnormal conditions, a material which is normally an insulator but which, when exposed to heat, developed either by the so called electric arc or by a high potential current of any kind sufficient in potential to force its way over the space bridged by the said material, will be reduced to a metallic or conducting state thus forming a direct or short circuit over which current may flow.

Our invention consists further in the combination with an electric lamp, of a mass of material that is normally an insulator but becomes a conductor by the action of heat, interposed between the two electrodes of the lamp so as to normally insulate the same from one another, but on a breakage of circuit in the lamp to fuse and be thereby reduced to such a condition as to become a conducting path around the same.

Our invention consists also in the combination with the entering conductors or electrodes for an incandescent lamp, of an interposed mass of material consisting of a substance that is normally an insulator but which, when exposed to very intense heat either by an

electric arc or a high potential current, becomes reduced to a metallic state thus becoming a conductor and short circuiting the current around the lamp.

As a material suitable for the purpose of our invention we have discovered that we may employ a compound of metal oxides or salts and borax, carbonate of soda, or any other salt which facilitates fusion. We have obtained good results from the employment of peroxide of lead and borax, and lead and borax, oxide of copper and silicate of soda, and chlor ammoniate of platinum. These substances can be mixed together and applied in the form of a paste. Under some circumstances they may at the same time serve as a cementing material as will be hereinafter described.

In the accompanying drawings: Figure 1, is a diagram illustrating our invention, and the manner of applying the short circuiting material. Fig. 2, is a side elevation of the parts of an incandescent lamp to which our invention is applied. Fig. 3, is a cross section on the line Y, Y, of Fig. 2. Fig. 4, illustrates another way of applying the material to the entering conductors or electrodes of an incandescent lamp. Fig. 5, is a cross section on the line X, X, of Fig. 4. Fig. 6, is a vertical section of the base of an electric incandescent lamp showing the manner in which the short circuiting material may be employed as the cementing material to hold the conductors leading to the lamp in place.

Referring to Fig. 1, L, indicates the conductor or circuit over which current flows from any source to a working resistance R, consisting of the filament of an incandescent lamp, the carbon of an electric arc lamp, or any other apparatus. A, B, indicate portions of the conductor or circuit forming respectively positive and negative poles and brought into any desired proximity suitable for the practice of the invention. The poles A, B, are preferably located near the working resistance R, but might be at any desired distance from the same. Interposed between the poles A, B, is a mass of material indicated at M, which is normally an insulator, or is sufficiently insulating in its quality

to prevent the current from passing in short circuit from A to B, and to therefore cause the current to flow in the normal way so long as there is circuit for it through the working resistance R. On rupture of circuit however through the working resistance R, the current forces its way across the space between the electrodes A, B, and in so doing fuses or reduces the material so as to reduce it to a metallic state, thus making a conductor of it. The current which fuses such material might be an electric arc current in some cases, as for instance in the case of an incandescent lamp where the electrodes A, B, may consist of the entering conductors of the lamp and may be arranged in such proximity that the electric arc traveling down the conductors on rupture of the filaments will finally strike the mass of material M, and reduce it to a metallic state.

In Fig. 2, the entering conductors of an incandescent lamp are indicated at H, H. The two poles of the circuit are formed of two strips of pliable conducting material D, D, one of which is wrapped around and is in contact with one of the entering conductors H, while the other is wrapped around and is in contact with the other entering conductor. Each strip D, is carried around the opposite conductor H, but is normally insulated therefrom and from the other strip D, by an interposed mass of the copper compound before specified, or of other materials adapted to operate in the same way. On rupture of the filament of the lamp the electric arc passing downward finally envelops the conductors or poles D, and the interposed mass of material, thus fusing the latter and forming the short circuit as before described.

In Fig. 4, the conductors H, are brought sufficiently near together to constitute the poles A, B, across which the current may force its way, or between which an electric arc may exist including or passing over the mass of normally insulated compound. The compound is indicated at M, as before, and is enveloped in a wrapping of asbestos or other material.

The two conductors of the lamp forming the poles A, B, of Fig. 5, consist of sheet metal brought into close proximity as indicated.

In Fig. 6, the entering conductors of the lamp are connected to supply conductors in the hollow neck of the lamp globe, and the supply conductors with the strips G, G, conveying current thereto, are anchored in the mass of the compound. The strips G, G, which consist of flat plates of metal adapted to be slipped into a spring switch of the kind described in another application filed by us are separated normally from one another by the compound. In case of rupture of the filament of the lamp, the high potential current of the circuit on which the lamp is employed will force its way across the interval between the conductors or poles of the circuit and through

or over the compound thus reducing the same to a metallic or conducting state.

The invention is better adapted to application to incandescent lamps designed for employment on electric arc or high potential circuits, than to incandescent lamps supplied in multiple arc from low tension circuits.

It will be obvious that the principle of our invention is not confined in its applications and that it is adaptable to any kind of electrical apparatus where it is desirable to form a short circuit or safety circuit in case of rupture of the current through the apparatus itself, or in case of the access to the circuit of an abnormally high current tension from the same source or from another source, and sufficient in amount to endanger the devices in the normal circuit.

We do not claim broadly the interposition between two poles of a circuit of a substance of such composition that it is normally an insulator but which on an extra stress of current simply furnishes a temporary bridge for such current for the purpose of establishing an arc between said poles and which is then immediately fused or volatilized leaving the formation of a permanent bridge dependent upon the fusion of said poles.

What we claim as our invention is—

1. In a safety cut-out, the combination with two poles of the circuit, of an interposed mass of material consisting of a substance which is normally an insulator but which, by heat, produced by a current passing thereover is reduced to a metallic or conducting state and forms a permanent bridge between said poles, as and for the purpose described.

2. In an incandescent electric lamp, entering conductors connected with or themselves forming poles of the circuit that are in close proximity in combination with a separating mass of material which is normally an insulator but which fuses under the action of an electric current and becomes decomposed to such an extent as to form a permanent cut-out between the lamp conductors.

3. In a safety or shunt cut-out device for electric apparatus, the combination with the two poles or conductors A, B, arranged in proximity to one another, of an interposed compound forming normally an insulator but adapted to be fused under the action of the electric current passing from one electrode to the other, and thereby decomposed to such an extent as to form a conducting bridge between the lamp conductors, as and for the purpose described.

Signed at Hartford, in the county of Hartford and State of Connecticut, this 1st day of July, A. D. 1886.

HERMANN LEMP.
MERLE J. WIGHTMAN.

Witnesses:

OLOF OFFREN,
OSCAR URBAN.