

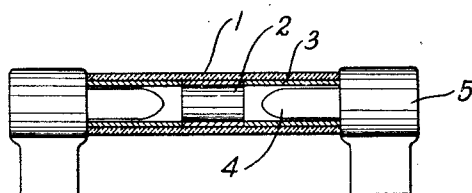
March 21, 1933.

G. BLUMBERG

1,902,613

FUSE

Filed April 28, 1930



Inventor
Gustav Blumberg
Wm. Walter Cowan Atty.

UNITED STATES PATENT OFFICE

GUSTAV BLUMBERG, OF BERLIN-SPANDAU, GERMANY, ASSIGNOR TO SIEMENS & HALSKE AKTIENGESELLSCHAFT, OF WERNERWERK, SIEMENSSTADT, NEAR BERLIN, GERMANY

FUSE

Application filed April 28, 1930, Serial No. 447,847, and in Germany July 22, 1929.

This invention relates in general to fuses for electric circuits, but more in general to fuses that will operate on very weak currents.

5 The known protecting fuses for electric currents usually consists of wires or metal strips, which are tensioned within an insulating body such as glass or porcelain. The inserted fuses then lie either in an insulating tube or they are melted directly into the insulating body. These protecting fuses cannot be used for very weak currents, such as are used in communication systems, because it is technically impossible to construct sufficiently fine metal leaves or wires. The lower limit of current, for which fuses can still be constructed with sufficient accuracy, lies about 0.25 amps. and it is comparatively expensive to construct them for such weak currents, and the blowing of the fuse can be recognized from the outside only by the provision of special arrangements for that purpose.

25 The invention relates to a protecting fuse whereby these defects are removed. The part melted by an excess current consists of a metal coating on the insulating material. By means of a suitable electrolytic process for applying the metal coating, for example a silver mirror, it is possible to construct fuses for very weak currents. If the metal mirror be located on an insulating rod surrounded by glass or be directly applied to the inner wall of a glass tube, it is quite easy to see from the outside when the fuse has blown and the metal mirror therefore has melted. Such metal mirrors can be made very cheaply and what is more important with almost any desired degree of accuracy.

40 One method of carrying out the invention is shown in the drawing. To the inside of a glass tube 1 a silver mirror 2 is applied and joined on both ends to thicker metal coatings 3, which can consist of copper for example. These coatings 3 are connected to the external circuit by means of the caps 5, which are provided with metal plugs 4 inserted in the glass tubes to insure good electrical contact.

Obviously it is possible also to make the metal coatings 2 and 3 of equal thickness, in that case it is only necessary for the metal coating, that is to be melted by the excess current, to comprise a material of lower electrical conductivity than that used for the adjacent coatings at each end. Thus the former can, for example, consist of nickel and the latter of copper.

When an excess current traverses the fuse by way of the caps 5, plugs 4, copper coatings 3, and through the silver coating 2, the silver melts from the glass tube 1, thereby breaking the electric circuit and indicating by removal of the mirror coating from the glass, the fact that the fuse is blown. This is of great advantage where there are a large number of similar fuses mounted side by side on a switchboard.

What I claim is:

1. In an electric fuse, a glass tube, a metal coating comprising a silver mirror applied to the inside surface of said tube, another metal coating comprising a copper mirror applied to the inside surface of said tube and on each end of said silver coating, said copper coating extending an excess current circuit to said silver mirror to melt the same from the surface of said tube.

2. In an electric fuse, a glass tube, a silver coating applied to a section of the inside surface of said tube and adapted to be melted by an excess current, and copper coatings applied to the inside surface of said tube on each end of said silver coating for extending the excess current to said silver coating so as to melt the same from the surface of said tube.

3. In an electric fuse, a glass tube, a metal coating comprising a silver mirror applied to the inside surface of said tube, another metal coating comprising a copper mirror applied to the inside surface of said tube on each end of said silver mirror, said copper mirrors extending an excess electric current to said silver mirror to melt the same from the surface of said glass tube and serve as an indication that said fuse has been blown.

4. In an electric fuse for protecting weak

currents, a glass tube having a silver mirror applied to the inside surface thereof, a copper mirror applied to the inside surface of said glass tube on each side of said silver mirror, said copper mirrors extending an excess current to said silver mirror to melt said silver mirror from the surface of said glass tube and open the circuit of said excess current and at the same time serve as an indication that the fuse is blown.

5. In an electric fuse, a glass tube, a silver coating on a section of the inside surface of said tube adapted to be melted therefrom by an excess current, copper coatings on the inside surface of said tube on each side of said silver coating to carry the current thereto, caps on each end of said glass tube for attaching current carrying conductors to said fuse, and a metal plug attached to each cap and inserted in said tube for providing good electrical contact with said copper coatings.

6. In an electric fuse, a transparent tube, electrodes at each end thereof, a fusible metallic coating deposited on the inner surface of said tube in the form of a ring, said metallic coating rendering the tube opaque as long as the coating is intact, and transparent when the fuse is blown by an excessive current extending between said electrodes.

7. In an electric fuse, a transparent tube, a fusible metallic coating around the inside surface of said tube in the form of a ring, other metallic coatings on the inside surface of said tube in the form of rings engaging each end of said fusible coating for extending an electric current thereto, said fusible coating rendered visible from the outside of said tube as long as it is intact and removed from the inside of the surface of the tube to render the tube transparent when it is blown by an excessive electric current.

In witness whereof, I hereunto subscribe my name this 6th day of February, A. D. 1930.

GUSTAV BLUMBERG.

50

55

60