Nov. 3, 1931. H. G. ANDERSON 1,830,216

FUSE TO PROTECT CURRENT METERS

Filed Sept. 26, 1929

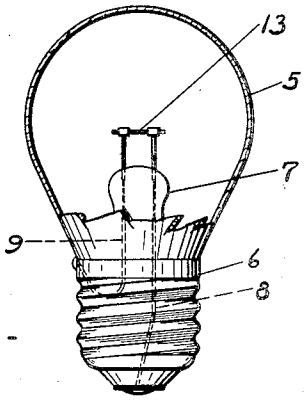


Fig. 1.

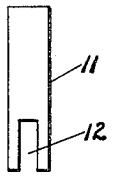


Fig. 2.

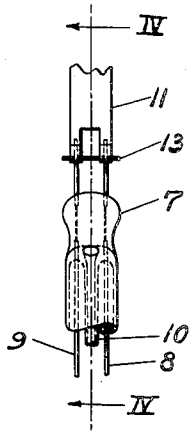


Fig. 3.

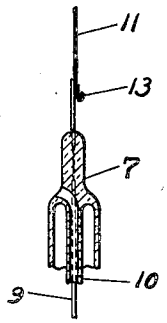


Fig. 4.

INVENTOR
H. G. ANDERSON
BY M. F. Rogers
ATTORNEY

Patented Nov. 3, 1931 1,830,216

UNITED STATES PATENT OFFICE

HOMER G. ANDERSON, OF CALDWELL, NEW JERSEY, ASSIGNOR TO WESTINGHOUSE LAMP COMPANY, A CORPORATION OF PENNSYLVANIA

FUSE TO PROTECT CURRENT METERS

Application filed September 26, 1929. Serial No. 395,251.

My invention relates to a fuse, particularly one which may be used to protect small current meters or like apparatus, which are both delicate and costly, though not limited to this use alone.

Fuses are extensively used in connection with electrical apparatus and house lighting systems to protect the apparatus and users in the event that an excessive current occurs in the circuit employed. In general a wire or ribbon having a low melting point is placed in series in the circuit so that a normal current will be conducted but an excessive current will heat the wire or ribbon to its fusing point thus opening the circuit without damage to the apparatus or the user.

In dealing with very small currents this type of fuse is not adequate since its operating range is neither low nor narrow enough. The low melting point wire or ribbon reduced in cross section will not stand up against vibration, furthermore varying temperature conditions of the air surrounding the same change its fusing point.

It is an object of my invention to provide a fuse which shall function within a narrow operating range.

It is a further object of my invention to provide a fuse which shall protect small current apparatus.

Another object is to simplify, cheapen and improve the manufacture of fuses.

A further object of my invention is to provide a fuse in which the parts are easily visible.

Other objects and advantages will hereinafter appear.

In carrying my invention into effect I provide a fuse in which the severable member is composed of a material susceptible to attack by a gas only when the temperature is raised above a certain point.

The severable member is mounted in an atmosphere of the gas at a relatively low pressure so that it will not be cooled by gas conduction and require more current to bring it up to the temperature at which the gas will cause its breakdown.

My invention will be best understood by reference to the following description taken in connection with the accompanying drawings in which,

Fig. 1 is an elevational view of a fuse constructed in accordance with my invention.

Fig. 2 shows a part employed in the construction of my fuse.

Fig. 3 is a fragmentary elevational view of the part shown in Fig. 2 in assembled relation with other parts.

Fig. 4 is a sectional view taken along line IV—IV of Fig. 3.

As shown in the drawings the fuse comprises an envelope 5 preferably one that is transparent having a base 6 and stem 7, usually employed in lamp construction. The stem 7 has lead wires 8 and 9 sealed in the stem and connected with the base, as well understood in the art, and an exhaust tube 10 fused to the stem 7.

The method of constructing the mount is shown in Figs. 2 to 4 inclusive in which 11 is a ribbon of nickel or other suitable material which has a cut out portion 12 in one end. The width of the cut out portion corresponds to the desired length of the fuse filament. The ends of the ribbon 11 adjacent the cut out portion are folded back and enclose the ends of a filament 13 as shown in Figs. 3 and 4. The filament 13 is laid taut in and across the two folds which are spot welded over the filament. Tungsten is preferably employed in constructing the filament though it is to be understood that other materials may be used. The welded folds are then spot welded to lead wires 8 and 9 and the upper portion of ribbon 11 cut away leaving the filament 13 as the union between the leads.

This mount is then sealed into the envelope 5. The envelope is first exhausted and then filled to a low pressure with oxygen or other suitable gas which will combine with the filament when heated. A low pressure of a gas such as oxygen or other suitable gas will give a sufficient quantity to combine with the filament and burn it out quickly when it is heated by an excessive current through the same. The pressure is kept as low as possible so that the filament will not be cooled by gas conduction and require an undesirably high current to bring it up to the temperature for

burning out. The envelope is then based as shown in Fig. 1.

In operation the tungsten filament in an oxygen atmosphere, for example, is heated by an excessive current passing through the same and oxidization quickly breaks down the filament and opens the circuit. By way of example, a fuse designed to protect a 10 milliampere meter has been made up having a filament of 0.76 mgs. per 200 mm. tungsten wire, 5 mm. in length and mounted in an envelope containing oxygen at a pressure of about 6 mm. of mercury.

While I have illustrated what I now consider to be the preferred embodiment of my invention, it is to be understood that many changes may be effected therein and that my invention is to be limited only by the scope of the appended claims.

What is claimed is:

1. A fuse comprising an envelope containing oxygen at a low pressure and a tungsten filament mounted in said envelope.

2. The method of making a fuse which comprises cutting a strip of a predetermined width from a metal ribbon, folding the ends of the ribbon adjacent the slot formed by removing the strip, laying taut in and across the folds a filament of selected diameter, welding the folds over the filament ends, welding the folds and filament to the lead wires of a stem, cutting off the upper portion of the ribbon, sealing the stem in an envelope, exhausting the envelope, partially filling the envelope with a gas which will break down the filament when heated, sealing off and basing the envelope.

3. An electric fuse comprising an incandescent filament lamp containing a filament comprised of readily oxidizable metal and a rarefied oxygenous atmosphere.

4. An electric fuse comprising an incandescent filament lamp containing a tungsten filament and a rarefied oxygenous atmosphere.

In testimony whereof, I have hereunto subscribed my name this 12th day of September, 1929.

HOMER G. ANDERSON.