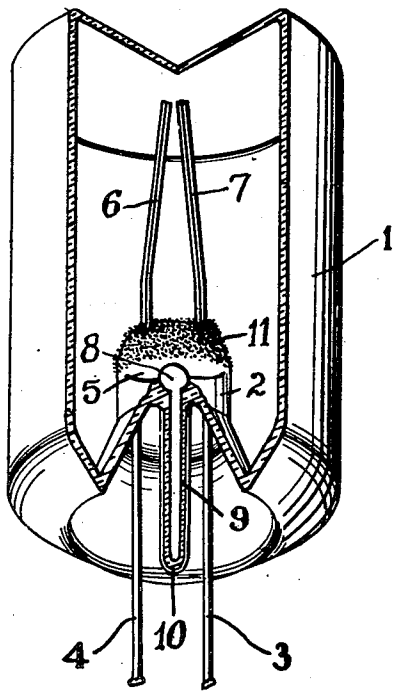
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GLOW RELAY

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GLOW RELAY

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3 Claims. (Cl. 200—113.5)

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This invention relates to glow relays and particularly to such relays for starting electric gaseous discharge lamps.

An object of the invention is a simpler and more reliable glow relay and particularly one in which the ionization conditions remain extremely stable throughout the life of the device. One feature of the invention is the use of a getter material including thorium and a further feature is the use of an electrode of bimetal wire. Still another feature is confining the getter material to the stem press and keeping the electrodes free from it. An advantage of the invention is the uniformity of the delay time of the relay for both inductively and capacitatively ballasted lamps.

Other objects, features and advantages of the invention will be apparent from the accompanying drawing in which the figure is a glow relay according to the invention and partly in section.

In the drawing, a tubular glass bulb 1, has the glass stem 2 sealed to it at one end. Lead-in wires 3 and 4 are sealed through the press 5 of the stem 2 and are welded to the bimetal wire electrodes 6 and 7 inside the press. The bimetal wires extend into the bulb and toward each other some distance into the bulb 1. Their free ends are close together, but spaced a small distance apart. An opening 8 in the stem 2 is in communication with an exhaust tube 9 as is customary in lamp practice. The exhaust tube is sealed off at what is its lower end 10 in the drawing. A getter material 11 is supplied to the outer surface of the stem press between and around the electrodes 6 and 7.

The bulb 1 is filled with an inert gas, for example, argon at 25 mm. pressure. When sufficient voltage is applied to the electrodes an electric discharge will pass through the gas between them, heating them. The bimetal wires will bend on heating causing the two wires to meet near their free ends, short circuiting the tube and extinguishing the discharge. The electrodes will then cool, causing them to separate again and break contact with each other. It has been found that the use of bimetal wire for the electrodes develops a greater torque and more satisfactory breaking action than do bimetal strips for the same purpose.

In order to maintain the ionization conditions constant throughout the rated life of the glow relay, a getter material 11 is applied to the outer surface of stem 2 at the press 5 in a suitable manner. No portion of this getter material is applied to the electrodes themselves.

This getter material may be prepared by mixing approximately 50 gms. of aluminum dust, 50 gms. of zinc dust, and 17 gms. of magnesium metal dust, and ball-milling the mixture in about 500 cc. of alcohol for a period in the region of 96 hours. After ball-milling this mixture, an additional amount of alcohol (approximately 100 cc.) is added to the suspension. This addition is primarily for rinsing out the mill. We then add stearic acid crystals, approximately 2% by weight of the metallic portion of the suspension and mix thoroughly for about 15 min. This getter material is then stored until ready for use. Just before using approximately 7 gms. of thorium metal powder is added. The addition of this thorium is extremely important.

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We have found that the use of this getter material enables the production of the desired heat in the glow discharge to cause speedy initial closure of the bimetallic electrodes.

The use of bimetal wire of substantially rectangular cross-section is much more effective than the use of extremely thin bimetallic strip. We have found that bimetallic wire having a cross section of .015 inch by .030 inch to be extremely successful. The thickness of the wire gives an extremely effective breaking action at the contacts when the relay operates.

The exact nature of the action of the getter coating on the stem is not known, but presumably it acts as a getter which maintains the purity of the gases throughout the life of the lamp. It may also aid in emitting electrons for the starting of the discharge in the glow relay itself, but we have found that the relay works more satisfactorily and maintains its characteristics better when the getter material is kept off the electrodes themselves. The use of coatings or platings of zinc, aluminum and the like on the electrodes has been found by us to harm the characteristics of the tube.

When the starter is first operated, after being exhausted, filled with gas and sealed, arcing may occur across the stem press due to the getter coating thereon. This arcing removes any excess metal from the stem and may deposit it on the nearby glass of the bulb, leaving a coating of separate metal particles insulated from each other by the stearic acid used in the mixture.

This application is in part a continuation of our co-pending application Serial No. 567,630, filed December 11, 1944.

What we claim is:

1. A glow relay comprising a sealed envelope having a stem at one end thereof, lead-in wires sealed through said stem, straight bimetal wire

electrodes extending from said lead wires inside said bulb and terminating with their free ends close together but spaced apart, a gaseous filling in said envelope and a getter material on the press only of said stem inside said envelope, said getter comprising a mixture of aluminum, zinc, magnesium and thorium metal powders.

2. A glow relay comprising a sealed envelope having a stem at one end thereof, lead-in wires sealed through said stem, straight bimetal wire electrodes extending from said lead wires inside said bulb and terminating with their free ends close together but spaced apart, a gaseous filling in said envelope and a getter material on the press only of said stem inside said envelope, said getter comprising approximately 50 parts aluminum dust, 50 parts zinc dust, 17 parts magnesium metal dust and 7 parts thorium.

3. A glow relay comprising a sealed envelope having a stem at one end thereof, lead-in wires sealed through said stem, straight bimetal wire electrodes extending from said lead wires inside said bulb and terminating with their free ends close together but spaced apart, a gaseous filling in said envelope and a getter material on the press only of said stem inside said envelope, said getter comprising a mixture of aluminum, zinc, magnesium, and thorium metal powders with stearic acid.

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