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E. GERMER
ELECTRIC DISCHARGE DEVICE
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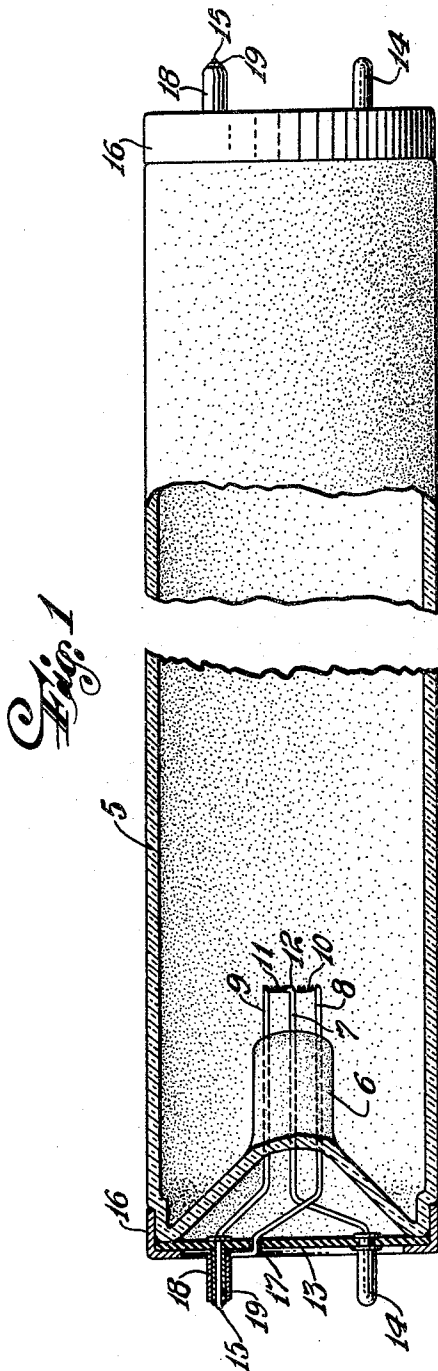


Fig. 4

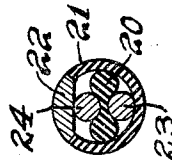


Fig. 3

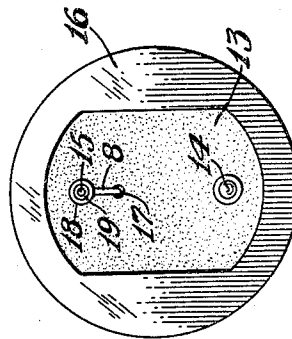
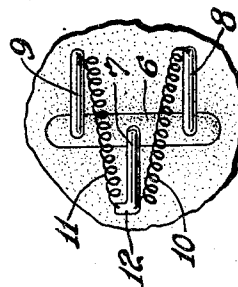


Fig. 2



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ELECTRIC DISCHARGE DEVICE

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3 Claims. (Cl. 313—212)

This invention relates to electric discharge devices and is concerned in particular with arrangements for electrodes and terminals in such devices.

Electric discharge devices fail during operation usually because of failure of the electrodes or of a lead-in conductor connecting an electrode to a contact terminal of the device. The electrodes may become broken or when activated electrodes are used they may in time become inactivated, whereby the device can no longer function in the manner for which it was designed.

It is a general object of the invention to provide an electric discharge device having a substantially longer useful life than devices of such type manufactured heretofore. Another object is to provide a discharge device having the above stated advantage and yet is simple in construction and inexpensive to manufacture. A further object of the invention is to construct the new device in a manner whereby it may be employed in conjunction with already existing auxiliary equipment such as lamp sockets, reflectors, etc., without requiring alteration of such auxiliary equipment. Further objects and various advantages will appear from the following detailed description, taken in connection with the accompanying drawing in which:

Fig. 1 is a view, partly in section, of a discharge device constructed according to the invention,

Fig. 2 is an end view of the electrode structure of the device illustrated in Fig. 1,

Fig. 3 is an end view of the device shown in Fig. 1, and

Fig. 4 is a cross-sectional view of a modified terminal pin for a device constructed according to the invention.

Like numerals designate corresponding parts throughout the several views of the drawing.

Broadly stated, the invention resides in the provision in a vapor discharge device of a plurality of electrodes and connecting them to the contact terminals of the device in a suitable manner, whereby upon failure of one electrode, or of a lead-in conductor, another electrode may be readily connected to the source of current and the device again be used as before the failure.

Referring now to Fig. 1 of said drawing, there is illustrated a lamp, constructed in accordance with the invention, having an envelope 5 of light transmissive material. If the lamp is designed to emit ultra-violet rays, its envelope is formed of quartz or other ultra-violet transmissive material as is well understood by those skilled in the art. The lamp may be of the known fluorescent type, i. e. it may have a coating of fluorescent material on its inner surface for converting invisible radiations to visible light. The lamp is preferably filled with rare gas and contains a small amount of mercury or other vaporizable metal. Each end of the tubular envelope 5 is closed by a flared seal-stem 6 in known fashion.

Stem 6 has three lead-in conductors 7, 8 and 9 vacuum tightly sealed therein for supporting the two electrodes 10 and 11 within the envelope. The center conductor 7 is provided with a head 12 on its inner end which may be suitably formed by bending the end of the wire 7 as

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shown in the drawing. Electrode 10 is fastened to the end of wire conductor 8 and to the head 12 while electrode 11 is connected between head 12 and conductor 9. The head 12 separates the two electrodes so that heat from one of them will not be directly conducted to the other during operation of the lamp. Electrodes 10 and 11 may be of the known activated or non-activated types depending on the use for which the lamp is designed.

A plate 13 of electrically non-conductive material and having two terminal pins 14 and 15 attached, is held on the envelope by means of a flanged sleeve 16. The center conductor 7 is electrically connected to the pin 14 while the pin 15 is electrically connected to conductor 9. Conductor 8 passes through a hole 17 in the plate 13 and is connected to a metal sleeve 18 around the pin 15, metal sleeve 18 being insulated from pin 15 by a layer 19 of paper or other suitable insulation material. In order that the diameter of the combined layers comprising pin 15, insulation layer 19 and metal sleeve 18 may not be excessively greater than the diameter of terminal pin 14, the pin 15 may be made to have a diameter that is smaller than that of the pin 14, whereby the lamp will readily fit into sockets of common construction.

As is best shown in Fig. 2, each of the electrodes 10 and 11, may be located nearer to the axis of the tubular envelope by bending the inner portion of the center conductor 7 out of the plane of the conductors 8 and 9 whereby the electrodes 10 and 11 lie substantially side by side, rather than in an end to end relation.

When the lamp, illustrated in Fig. 1, is connected into an electric circuit, current will pass between the terminal pin 14 and the metal sleeve 18 on the terminal pin 15, through the lead-in conductor 7, electrode 10 and lead-in conductor 8, whereby the electrode 10 will become heated and in a short time will cause an arc to form between it and an electrode located in the opposite end of the lamp, all as is well understood by those skilled in the art.

When the electrode 10 fails for any reason as by being burned out or by becoming inactivated, if originally activated, it may be easily disconnected from the electric circuit by merely cutting the portion of conductor 8 that extends out through the hole 17 in the end plate 13. Electrode 11 may then be energized by removing the sleeve 18 and the layer 19 of insulating material to expose the terminal pin 15 to which the electrode is connected through the lead-in conductor 9.

Referring now to the modification illustrated in Fig. 4, in place of the terminal pin 15, there may be provided a terminal comprising a center member 20 of electrically non-conductive material covered by a ring 21 having an electrically conductive portion 22. The lead-in conductors 23 and 24 corresponding to the conductors 8 and 9 shown in the embodiment of Fig. 1 extend along the length of the center member 20 and are held in place by being fitted into a groove on each side of the member 20. Electrical contact is made with either of the conductors 23 or 24 by turning the ring 21 so that its electrically conductive portion 22 will be positioned against one of the conductors, depending on which of the electrodes is to be energized.

The invention is also adapted for use in devices employing self-heated electrodes. Such devices require only one terminal pin in each end thereof connected by a single lead-in conductor to an electrode. In a device of this type constructed according to the invention, two or more electrodes may be positioned within the envelope, each supported on its own lead-in conductor, there being, of course, no contact between the various electrodes. The outer ends of the several lead-in conductors may then be connected to a single composite terminal in the manner illustrated in Figs. 1 and 4.

While I have described the invention more specifically with reference to a mercury or other vapor lamp, which may be a low pressure lamp, e. g. a germicidal or fluorescent lamp, or a high pressure lamp, it will be noted that the invention is equally applicable to other types of electric discharge devices having a gaseous or metal vapor filling, or both.

The foregoing disclosure is to be regarded as descriptive and illustrative only and not as restrictive or limitative of the invention, of which obviously an embodiment may be constructed without departing from the general scope herein indicated and denoted in the appended claims.

What I claim is:

1. An electric discharge device having an envelope of vitreous material and containing a rare gas filling, three lead-in conductors vacuum tightly sealed in said envelope and passing through said envelope, two electrodes, said electrodes bridging the inner ends of each of said conductors, the outer end of two of said conductors being connected to a first projection supported on and outside of said envelope, the outer end of the third conductor being connected to a second projection supported on the outside of said envelope, said projections being adapted for connection into an electric circuit for energizing said device, said first projection including an electrically non-conductive member maintaining the outer ends of said two conductors out of electrical contact with each other and a movable member embracing the outer ends of said two conductors, said movable member comprising an electrically conductive portion selectively engageable with either of said two conductors.

2. An electric discharge lamp having a tubular envelope of vitreous material and containing a rare gas filling and a small quantity of vaporizable metal, three lead-in conductors vacuum tightly sealed in at least one end of said envelope whereby said conductors have a portion extending outside of said envelope and a portion extending inside of said envelope, two electrodes within said envelope, first and second projections supported outside of and on said end of said envelope, said electrodes bridging the inner ends of said conductors, the outer end of two of said conductors being connected to said first

projection, the outer end of the third conductor being connected to said second projection, said projections being adapted for connection into an electrical circuit for energizing said lamp, said first projection including an electrically non-conductive member maintaining the outer ends of said two conductors out of electrical contact with each other and a movable member embracing the outer ends of said two conductors, said movable member comprising an electrically conductive portion selectively engageable with either of said two conductors.

3. An electric discharge lamp having a tubular envelope of vitreous material and a filling of rare gas, at least one electrode in one end of said envelope, at least two electrodes in the other end of said envelope, the electrode in said one end being spaced from the electrodes in said other end for supporting an arc therebetween, at least three lead-in conductors tightly sealed in said other end, one of said conductors being connected to each of said two electrodes, the others of said conductors being each connected to one of said two electrodes, first and second terminal pins mounted on said other end of said envelope, one of said conductors being connected to the second pin, the others of said conductors being connected to the first pin, said first pin including insulating means maintaining said other conductors out of electrical contact with each other and a movable member embracing the outer ends of said other conductors, said movable member comprising an electrically conductive portion selectively engageable with one of said other conductors.

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