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ELECTRIC DISCHARGE LAMP

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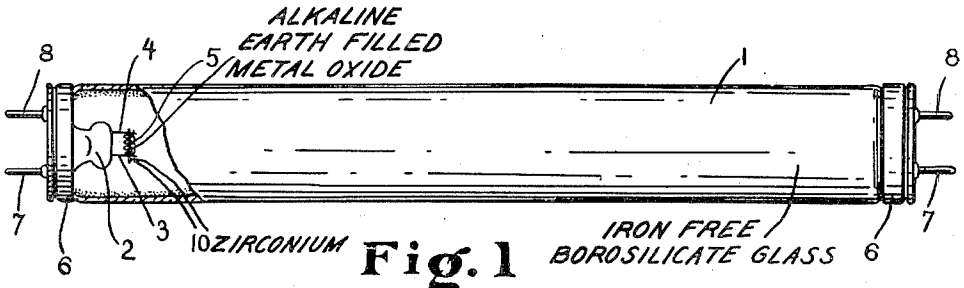


Fig. 1

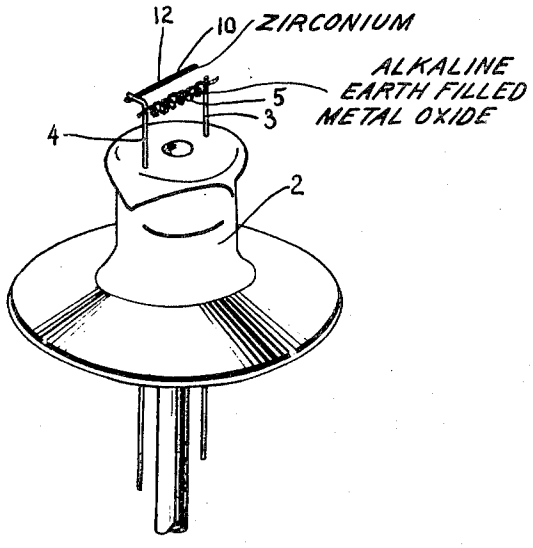


Fig. 2

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ELECTRIC DISCHARGE LAMP

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2 Claims. (Cl. 176—122)

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This invention relates to electric discharge devices in general and in particular to such devices in which the discharge produces ultraviolet radiations.

Such devices are generally enclosed in an envelope of glass, quartz or the like, which is blackened or otherwise diminished in its ultraviolet or visible transparency during life by the action of the discharge, especially when mercury vapor is present in the lamp. This action is particularly rapid when the device is operated in ambient temperatures near, at or below freezing, such as the ambient temperature of a refrigerator in which ultraviolet lamps may be used for their germicidal effect.

A feature of the invention is an auxiliary electrode of zirconium metal in close proximity to a thermionic electrode.

Other features, advantages and objects of the invention will be apparent from the following specification, taken in connection with the accompanying specification, in which:

Figure 1 is a partly sectional view of a device according to the invention; and

Figure 2 is a view of the electrode structure of said device in more detail.

In Figure 1, the tubular glass envelope 1 is sealed at both ends to stems such as 2, through which lead-in wires 3, 4 extend to support a thermionic electrode 5, which may comprise a coiled coil of tungsten wire, coated for example with one or more of the alkaline earth oxides in the usual manner to secure copious electron emission, for example as described in Lowry Patent 2,258,158, issued October 7, 1941. The lamp is filled with an inert gas at low pressure, say argon at 3 mm. of mercury pressure, for example, and contains a small quantity of mercury to insure the presence of mercury vapor during operation of the device. A base 6 is cemented or otherwise attached to each end of the lamp, and carries the contact pins 7, 8 attached respectively to lead-in wires 3, 4 for electrical contact. The base 6 is of insulating material, at least in the vicinity of the pins 7, 8 to insulate the same. If the lamp is to emit ultraviolet radiations the envelope 1 should be of a material pervious thereto, for example a substantially iron-free borosilicate glass.

The zirconium metal auxiliary electrode 10, preferably comprises a wire 12, extending parallel to the main longitudinal axis of the electrode coil 5 and connected to the lead-in wire 4. This wire 12 will act as an anode during alternate half cycles, if the lamp is operated on alternating current, and will consequently become heated, thereby increasing the effectiveness of the zirconium. This zirconium wire may be, for example, 0.01 inch in diameter.

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The effectiveness of these zirconium auxiliary electrodes is shown by the following table, for lamps operated with 32° F. ambient temperature:

	Per cent of Initial Output			
	0 Hours	100 Hours	300 Hours	500 Hours
No Zirconium	100	61.4	44.6	33.7
0.01 inch Zirconium	100	73.1	66.2	57.8

The above was for a single 9 mm. long zirconium auxiliary electrode at each main electrode, with a lamp current of 300 milliamperes, and a main electrode of the type shown in Lowry Patent 2,258,158. The effectiveness of the zirconium is obvious; it nearly doubled the output at 500 hours.

What I claim is:

1. An electric gaseous discharge device comprising an envelope, a gas filling therein, a pair of electrodes therein, a coating of an oxide of an alkaline earth metal on each of said electrodes, and a pair of zirconium metal auxiliary electrodes, each of said auxiliary electrodes being spaced from one of said coated electrodes but in close proximity thereto and connected to one end thereof.

2. An electric gaseous discharge device comprising an envelope of substantially iron-free borosilicate glass, a filling of inert gas at low pressure therein, a small quantity of mercury therein, a pair of coiled wire electrodes therein, a coating of an oxide of at least one of the alkaline earth metals on each of said electrodes, and a pair of zirconium metal auxiliary electrodes, each of said auxiliary electrodes being electrically connected to one end of each of said coiled wire electrodes and extending parallel and in close proximity thereto, but spaced therefrom.

FRANCIS T. O'HEARN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,172,968	De Boer	Sept. 12, 1939
2,298,239	Stirnkorb	Oct. 6, 1942
2,321,910	Hays	June 15, 1943
2,334,631	Johnson	Nov. 16, 1943

FOREIGN PATENTS

Number	Country	Date
879,352	France	Nov. 19, 1942