

Nov. 17, 1959

P. B. DAVIS

2,913,615

CATHODE

Filed May 14, 1958

FIG. 1.

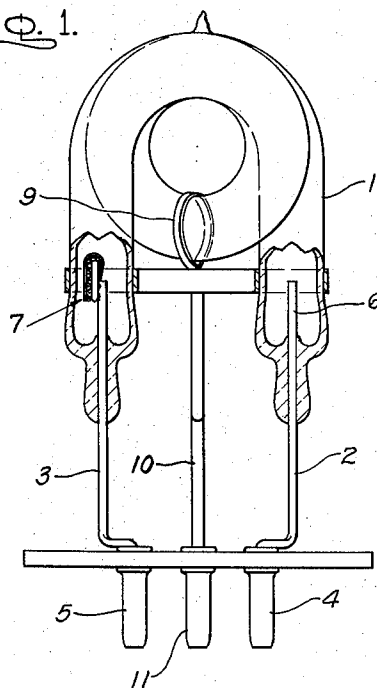


FIG. 2.

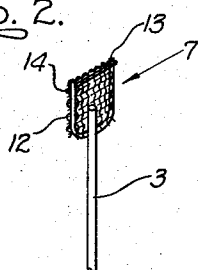


FIG. 3.

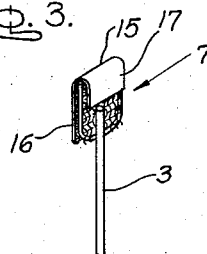
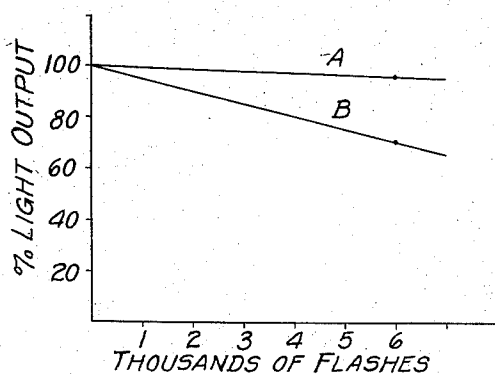


FIG. 4.



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Application May 14, 1958, Serial No. 735,148

4 Claims. (Cl. 313—178)

This invention relates to electric-discharge devices and more particularly to cathodes therefor.

Certain types of tubular gaseous electric discharge lamps, such as the "flashtubes" employed for flash photography, employ an electrode sealed into each end of the tube. One such electrode is an anode, the other such electrode is a cathode of the "cold" type; that is, where substantially no thermionic discharge occurs. Difficulty has been experienced in the maintenance of these lamps during their life due to the blackening on the inside walls of the tube.

An object of the invention is to provide an improved cathode structure which will improve the maintenance and useful life of the flashtube.

A further object of the invention is to provide an improved cathode structure for a flashtube which will minimize blackening on the inside of the flashtube walls.

Briefly stated, the improved cathode structure includes a shield of nickel, placed closely over a cold cathode.

Other objects, advantages and features will be apparent from the specification below taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevation view shown partly in section of a flashtube having a cathode according to the present invention,

Fig. 2 is a perspective view showing a cathode before the addition of the shield,

Fig. 3 is a perspective view showing the cathode having a shield according to the present invention, and

Fig. 4 is a set of curves illustrating the improvement in tube maintenance obtained by the present invention.

Referring to Fig. 1, the lamp or tube comprises a tubular glass envelope 1 herein illustrated as being helical shaped. The ends of the tube are closed and hermetically sealed and have extending therethrough lead-in wires 2, 3 which have their outer ends secured to electrical contacts 4, 5, respectively, and their inner ends forming, or secured to, an anode 6 and a cathode 7, respectively. As illustrated, the inner ends of the lead-in wire 6 functions directly as the anode; however, a separate member, for example, in the form of a wire coil of suitable refractory metal, may be employed as the anode. The tube is filled with a suitable ionizable gas such as xenon. Means are generally provided for initiating a discharge through the tube, and, as herein illustrated, comprise a transparent conducting coating on the discharge portion of the tube, secured to a source of high frequency high voltage current (not shown) through the metal band 9, conductor 10, and electrical contact 11.

According to Fig. 2, a suitable cathode 7 secured to lead-in wire 3 comprises a doubled-over nickel screen member 12 covering a U-shaped nickel stirrup 13 and

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enclosing a rod-shaped body 14 of activating and gettering material which may consist of barium and aluminum compounds and mixtures thereof.

This cathode structure is enclosed by a nickel shield 15 as illustrated in Fig. 3. The shield 15 fits closely over the screen member 12 and rod-shaped body 14 of activating and gettering material, and, as herein illustrated, comprises a doubled-over or U-shaped ribbon or sheet containing the rod of activating material within its folded portion. The U-shaped shield is open at its sides and preferably has one leg 16 longer than the other leg 17. Upon flashing, this permits the arc to discharge around the open sides and below the short leg 17.

Referring to Fig. 4, the light output of a flashtube having a nickel shield according to the present invention is represented by curve A and the light output of a similar flashtube without the nickel shield is represented by curve B. It can be seen that when subjected to the maintenance test, the flashtubes without the nickel shield depreciated at a rate 7 times faster than flashtubes using a nickel shield according to the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electric discharge tube of the type including a tubular envelope, a gas filling therein, and a plurality of electrodes therein including a cold cathode comprising a rod-shaped body of activating material and a metal screen doubled over said rod-shaped body, the improvement comprising a metal shield doubled-over said screen to cover closely said screen and activating material.

2. A cathode structure adapted for use as a cold cathode in a discharge tube comprising a rod-shaped body of activating material, a metal screen doubled over said rod-shaped body, and a U-shaped nickel shield doubled over said screen to cover closely said screen and activating material.

3. An electric discharge device comprising a tubular envelope, a gas filling therein, a plurality of electrodes therein including a cold cathode, said cathode comprising a rod-shaped body of activating material and a metal screen doubled over said rod-shaped body, and a U-shaped metal shield doubled over said screen to cover closely said screen and activating material.

4. An electric discharge flashtube comprising a tubular envelope, a gas filling therein, and a pair of electrodes sealed into opposite ends one of which is a cold cathode, said cathode comprising a wire stirrup having a rod-shaped body of activating material comprising barium and aluminum compounds stretched across the ends thereof, a metal screen doubled over said rod-shaped body and extending over said stirrup, and a U-shaped nickel shield doubled over said screen and closely covering said rod-shaped body and said screen, said shield having a shorter fold on one side than on the other to expose a portion of said screen.

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