June 26, 1928. 1,675,229

F. SKAUPY

ELECTRIC INCANDESCENT LAMP

Filed Oct. 13, 1922

Fig. 1.

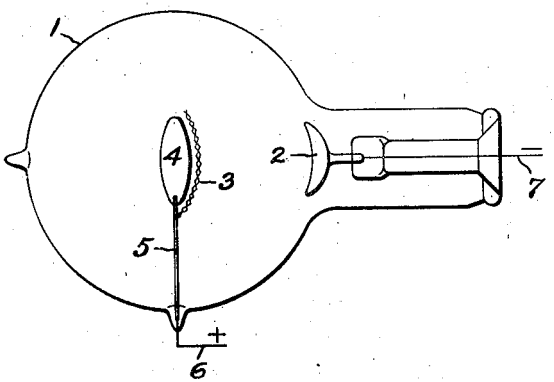


Fig. 2.

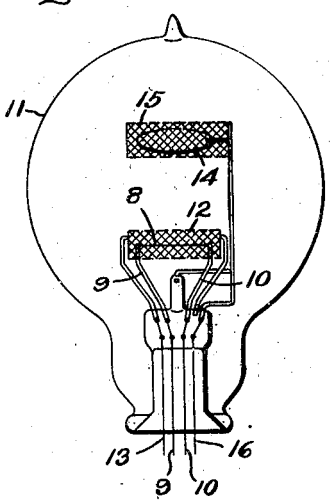
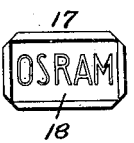


Fig. 3.



Inventor:
Franz Skaupy,
by Alexander S. Lunt
His Attorney.

Patented June 26, 1928. 1,675,229

UNITED STATES PATENT OFFICE.

FRANZ SKAUPY, OF BERLIN, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC INCANDESCENT LAMP.

Application filed October 13, 1922, Serial No. 594,362, and in Germany October 19, 1921.

My present invention comprises an incandescent lamp of high efficiency and improved characteristics, in which light is emitted by selective radiation.

In accordance with one of the features of my invention, selective transparent radiators are heated by impact or bombardment with electrons to a temperature at which efficient light emission occurs.

My invention includes certain novel structural features in incandescent lamps, as, for example, the provision of a positively charged netting interposed between the transparent radiator and the cathode.

The above and other features of my invention will be set forth with greater particularity in the accompanying drawings.

For a better understanding of my invention, reference may be had to the following description, taken in connection with the accompanying drawings, in which Figure 1 illustrates a lamp having a selective radiator and operating by virtue of gas ionization; Fig. 2 illustrates a lamp operable independently of gas ionization: and Fig. 3 is a detail view of a modified radiator.

The lamp shown in Fig. 1 comprises a sealed bulb 1 containing a rarified gas for example, argon or other rare gas, and provided with a concave cathode 2 of the type used in X-ray tubes. The anode 3 is constituted of a netting of conductive material which is firm or rigid enough to support itself. The radiator 4 is supported upon the anode stem 5 in such manner as to interpose the reticulated anode 3 between the cathode and the radiator. The radiator 4 consists of a refractory, transparent or translucent material, as, for example, thorium oxide, a surface layer of which preferably is provided with a content of cerium dioxide. Other refractory, transparent materials may be used, for example rare earth oxide and boron nitride. The cerium dioxide acts as a coloring agent, which increases the selectivity of the radiator for a desired range of radiation. Other coloring agents may be used, for example chromium oxide. Thin metallically colored bodies, as, for example, titanium nitride, may be applied upon the surface of the radiator, or dissolved in a surface layer, or, indeed, in the radiator as a whole. Preferably, the radiator consists of a single crystal, or of a few crystals.

When a suitable potential is applied to the conductors 6, 7, electrons emitted by ion bombardment from the cathode travel to the anode, but in large part pass through the spaces in the lattice anode, strike the radiator, cause it to emit light at high efficiency, and then return to the anode 3.

In Fig. 2, my invention has been shown as embodied in a lamp containing a filamentary cathode 8 connected to leading-in conductors 9, 10 whereby a current for heating the cathode to incandescence may be supplied. The space in the bulb 11 in this case is evacuated to such degree that gas ionization is substantially absent during the operation of the lamp. To reduce space charge, the cathode 8 is surrounded by a netting or grid 12 carried by a leading-in conductor 13. The grid 12 preferably surrounds the cathode as an enclosure or cage and is positively charged during operation. The positive potential of the grid ordinarily will be much less than the positive potential of the anode. The radiator 14 is surrounded by a reticulated anode 15, both radiator and anode being carrried by a conductor 16. The operation of the device of Fig. 2 is similar to the device described in connection with Fig. 1.

Various modifications of my invention will suggest themselves. One modification is shown in Fig. 3, which illustrates a plate-shaped anode having a conductive frame 17 containing a transparent plate 18, on the surface of which a symbol, represented by the word "Osram", has been applied by means of tungsten powder or other suitable black body radiator. As a black body radiates more light of a certain wave length than a transparent body per unit of surface, the metallic coating as represented by the word "Osram" will appear brighter at high temperature than the rest of the radiator.

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

1. An electric lamp comprising an envelope, a refractory transparent body therein, means for subjecting said body to electron bombardment and a conductor closely associated with said transparent body and connected to receive electrons reflected therefrom.

2. An electric lamp comprising an envelope, an electron-emitting cathode, a lattice shaped anode and a radiator comprising refractory, transparent material located in line with the electron stream from said cathode

which passes through the spaces in said anode.

3. In an electronic discharge device, the provision of a target constituted of a refractory transparent body.

4. In an electronic discharge lamp, the provision of a lighting body, which is subject to electron bombardment, constituted of one or more crystals of thorium oxide.

5. An electron lamp comprising a sealed evacuated envelope, the cathode adapted to operate at incandescence, a grid electrode surrounding said cathode, a reticulated anode and a light-emitting body mounted in said bulb in line with the electron stream, which passes during the operation of said device from said cathode through spaces in said anode, said radiator consisting of transparent material capable of selective radiation when subjected to electron bombardment.

In witness whereof, I have hereunto set my hand this 26th day of September, 1922.

FRANZ SKAUPY.