Dec. 7, 1926. 1,610,077

P. K. DEVERS, JR

ELECTRIC LAMP

Filed June 1, 1923

Fig. 1.

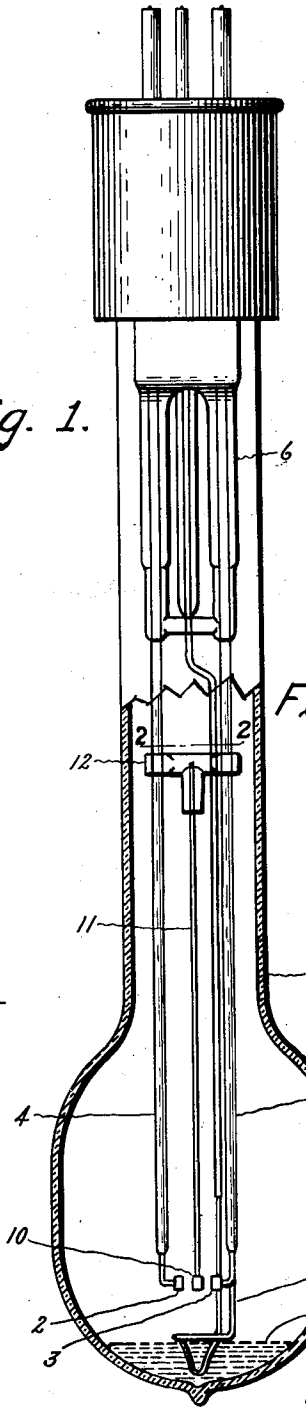


Fig. 2.

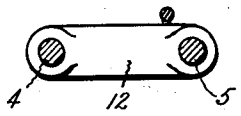
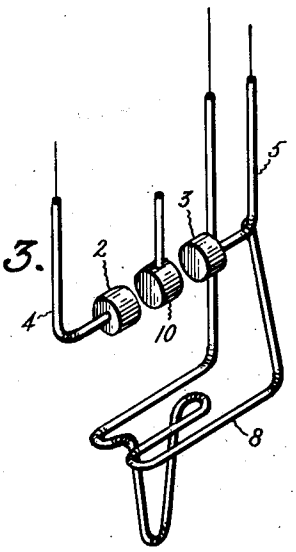


Fig. 3.



Inventor,
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His Attorney.

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UNITED STATES PATENT OFFICE.

PHILIP K. DEVERS, JR., OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC LAMP.

Application filed June 1, 1923. Serial No. 642,840.

The present invention relates to electric arc lamps and its object is to provide a lamp of high efficiency which will emit substantially white light.

My invention relates particularly to arc lamps in which the electrodes are adapted to operate at incandescence in a gas or vapor at substantial pressure. Mercury vapor is one of the most convenient and efficient media for the operation of an arc in a lamp of this character as light is derived at high efficiency from the arc itself as well as from the electrode but as the light from a mercury arc is deficient in rays adjacent the red end of the spectrum the combined light from the incandescent electrodes and the arc become somewhat yellowish-green in color when light from the arc predominates. This condition exists ordinarily when the arc is longer than about one-eighth inch.

In accordance with my invention I have provided a lamp in which the high efficiency of the arc is most completely utilized by providing a refractory body intermediate the electrodes which preferably is capable of radiating light predominant in color adjacent the red end of the spectrum when heated to incandescence by the arc.

The accompanying drawing illustrates an embodiment of my invention, Fig. 1 being a side view and Figs. 2 and 3 somewhat enlarged detail views of the support and the electrodes respectively.

Referring to Fig. 1, the lamp consists of an elongated glass receptacle 1, preferably having a bulbous enlargement at its lower end. The main electrodes 2, 3, preferably consisting of a refractory metal for example, tungsten, are carried at the end of the conductors 4, 5 which are sealed into a stem 6 at the opposite end of the lamp. The portion of these conductors adjacent the electrodes preferably has a reduced diameter to conserve heat at the electrode. The main electrodes consist, in the device illustrated, of cylinders about .125″ in diameter and .090″ in length. Adjacent the electrodes is a pool 7 of mercury, or an amalgam of alkali metal or other suitable vaporizable material. The bulb also preferably contains an inert gas, as for example, argon, neon, nitrogen, or the like, or of a suitable mixture thereof, at a pressure of about a third of an atmosphere. A wire 8 having a loop dipping into the mercury is connected to the conductor 5 at one end while the other end is sealed into the stem. When this wire, which preferably also consists of tungsten, is heated to incandescence ionized vapor is produced and an arc may be started between the main electrode with greater facility, as described in my prior Patent 1,310,067 of July 15, 1919.

Between the electrodes and in direct heating relation to the arc is a refractory body 10 having about the same size as the electrodes and consisting of a material which preferably selectively radiates light near the red end of the spectrum. Zirconium oxide, carbide and silicate and thorium oxide are examples of materials suitable for this purpose. This glower 10 is carried by a stem 11, consisting of tungsten or other suitable refractory material which is anchored at the opposite end in an insulating support 12 carried by the conductors 4, 5.

When an arc is started as described in my prior patent, mercury is vaporized and as the mercury vapor replaces the fixed gas, the arc becomes highly luminous. The glower 10 also becomes heated by the arc, emitting light and becoming electrically conductive. It may be said to function as a neutral electrode. During operation there are virtually two distinct arcs in series, as the heated glower which emits electrons freely does not interfere with the operation of the arc, nor raise the voltage required to maintain a continuous arc of the same total length between tungsten electrodes. For instance, a ½″ mercury arc between tungsten electrodes operating normally would take about 40 amperes with a potential drop of about 25 volts and would give a distinctly yellowish green light. Two ⅛″ mercury arcs in series with the described central electrode would operate with substantially the same terminal electrical characteristics. The combination would emit substantially white light providing the intermediate neutral electrode had been properly chosen and proportioned. The color characteristic of the lamp is very flexible since by varying the lengths of the arcs and the size of the neutral electrode the color can be varied over a wide range.

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

1. An electric lamp comprising the combination of an envelope, electrodes for oper-

ating an electric arc therein, means for supplying mercury vapor to said arc, and a neutral electrode of substantially the size of said electrodes, located in the path of said electric arc, and being capable of selective radiation near the red end of the spectrum.

2. An electric lamp comprising electrodes adapted to operate at incandescence, means for supplying mercury vapor to the space between said electrodes and a body consisting of zirconium oxide located in the path of an arc between said electrodes.

3. An electric lamp comprising electrodes adapted to operate at incandescence, an enclosing envelope, a gas therein inert with respect to said electrode at incandescence, a body of mercury adjacent said electrodes, means for starting an arc between said electrodes and a body of refractory material located directly in the path of said arc intermediate said electrodes, said body having approximately the same size as said electrodes and being capable of radiating light at incandescence predominately near the red end of the spectrum.

In witness whereof, I have hereunto set my hand this 29th day of May, 1923.

PHILIP K. DEVERS, JR.