

H. A. KENT & H. G. LACELL.
 MERCURY AND OTHER VAPOR ELECTRIC LAMP.
 APPLICATION FILED DEC. 1, 1908.

939,708.

Patented Nov. 9, 1909.

Fig. 1.

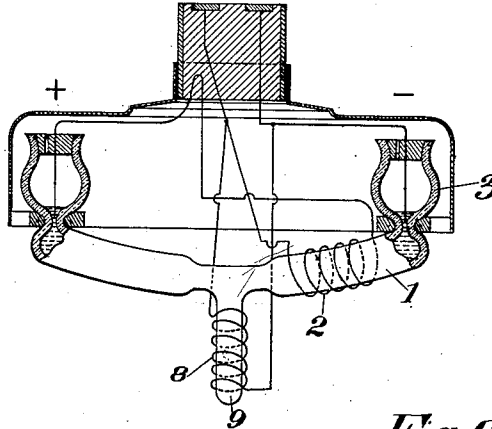


Fig. 2.

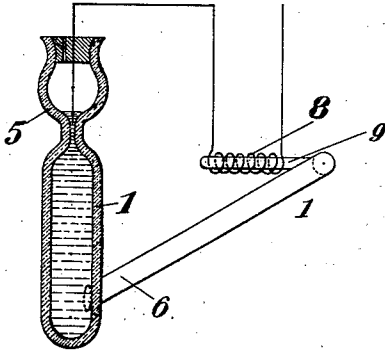


Fig. 4.

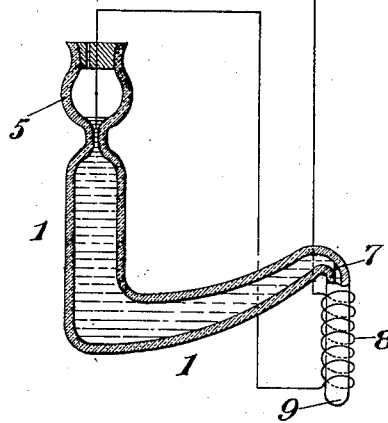


Fig. 3.

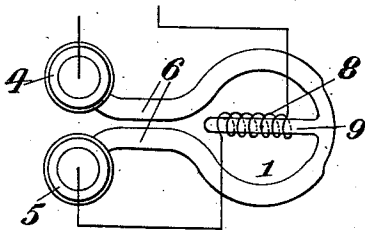
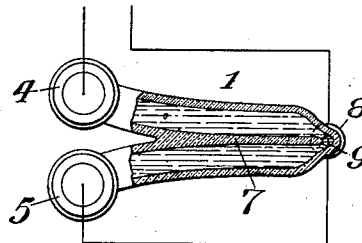


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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MERCURY AND OTHER VAPOR ELECTRIC LAMP.

939,708.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed December 1, 1908. Serial No. 465,483.

To all whom it may concern:

Be it known that we, HENRY ANDREW KENT, a subject of the King of Great Britain and Ireland, of The Poplars, Maidstone Road, Bound's Green, in the county of Middlesex, England, engineer, and HAROLD GEORGE LACELL, a subject of the King of Great Britain and Ireland, of Ardoch, Nether street, Finchley, in the said county of Middlesex, chemist, have invented new and useful Improvements in Mercury and other Vapor Electric Lamps, of which the following is a specification.

This invention relates to electric lamps in which a vaporizable conductive material, such, for instance, as mercury, is vaporized and an arc formed through such vapor.

Although this invention is especially designed for application to lamps such as are described in the specification of our application for Letters Patent No. 456,066 A. D. 1908, it may be applied to other lamps on the aforesaid principle and more particularly to that form of mercury vapor lamp in which the temperature of the vapor of mercury in the arc space approximates what is known as a red heat.

For brevity we will refer to the vaporizable matter used as being mercury, and in describing the invention we will refer to the accompanying drawing, wherein—

Figure 1 is an elevation of a lamp according to this invention, Figs. 2 and 3 are vertical section and plan views respectively of a modified construction, and Figs. 4 and 5 vertical and horizontal sections of another modification.

In such lamps as hitherto made difficulty has arisen owing to mercury vapor being carried over from the positive, and hotter, electrode, and deposited on the negative, and cooler, electrode, so that, eventually, the whole of the mercury may be distilled from the hotter positive electrode and condensed on the cooler negative electrode, and the lamp become inoperative. We have found that this difficulty is overcome by heating the lamp sufficiently at, or near, the negative electrode to prevent such condensation. This may be done (as shown in Fig. 1 as applied to a lamp made in accordance with our aforesaid application for patent) by winding on the tube 1 of the lamp a heating wire 2 wholly, or principally, at, or near,

the negative electrode end 3 of the lamp. This coil 2 is shown as being in series with the lamp, although it may be in a derived circuit therefrom. Or the said heating can be effected very simply and economically by utilizing the higher temperature of the positive electrode (or of the positive electrode and part of the arc vapor on the positive side) to prevent the condensation of the mercury at the negative electrode. This may be done for example as follows:—The tube 1 of the lamp is made so that the portion where the positive electrode is situated is brought in contact with, or close to, the part at which the negative electrode is situated. Owing to the proximity of these two portions, the heat generated in the positive electrode (or in such electrode and arc vapor on the one side) is conveyed, by conduction and radiation, to the negative electrode, so that it is heated to a higher temperature than that to which it would be heated by conduction from the arc only. In consequence of this heating of the negative electrode, the two electrodes automatically adjust themselves in such a way that (other conditions being the same) the temperature of the two electrodes is the same, and consequently, when once the arc is started through the mercury vapor, there will be no greater tendency for mercury to be lost from the one electrode than from the other.

As the temperature of the arc is higher than that of the electrodes, the temperature of a portion of the negative electrode may be made to exceed that of the positive electrode by heat imparted to it from a part of the arc at the positive end of the arc tube lying alongside a part of the tube containing the negative electrode.

Figs. 2 and 3 show a lamp with the part of the tube in which the arc is formed bent up and the respective electrode portions 4 and 5 and parts at 6 of the tubes in close proximity to each other.

Instead of bending the tube to bring the positive and negative ends into proximity, the lamp may be made, as shown in Figs. 4 and 5, of a tube 1 divided by an internal longitudinal partition 7, extending to near the end of the tube 1 farthest from the electrode portions 4 and 5, the said electrode portions being one on each side of the said partition 7, and the said partition 7 mak-

ing the said tube 1 into what is practically the equivalent of a tube bent back upon itself.

Other ways of accomplishing the same or a substantially similar result will readily suggest themselves and we do not limit ourselves to the arrangements shown and described.

When the lamp is started, the current through the coil 8, which has been used for heating and vaporizing the mercury to start the arc, can be cut off, by a short circuiting device such for instance as by bringing a by-pass wire into one of the cups to such a position that when the mercury rises to any predetermined height in the said cup the mercury makes contact with the said wire and the current enters the mercury in the cup without first passing through the resistance wire, and then the said coil will not be injured by being heated by the arc above the boiling point of mercury at the pressure existing in the interior of the lamp provided that the said coil be wound around such a part of, or branch from the tube, as is not directly heated by the arc when the lamp has been started and is in normal operation. Such a branch from the lamp to receive the coil 8 is shown at 9.

We claim as our invention:

1. In a vapor electric lamp of the type described, means in close proximity to the electrode heated for raising the temperature of said electrode to substantially that of its companion of different polarity whereby the condensation of vapor at the electrode heated is prevented.

2. In a vapor electric lamp of the type described, means in close proximity thereto

for heating the negative electrode to substantially the temperature of the positive electrode whereby the condensation of vapor at the negative electrode is prevented.

3. In a vapor electric lamp of the type described, means in close proximity thereto for heating the negative electrode to substantially the temperature of the positive electrode by heat radiated during the operation of the lamp, substantially as and for the purpose described.

4. In a vapor electric lamp of the type described, means for automatically heating the negative electrode to substantially the temperature of the positive electrode by the heat of a closely juxtaposed portion of the lamp at a higher temperature, substantially as and for the purpose described.

5. In a vapor electric lamp of the type described, a negative electrode and a positive electrode closely juxtaposed to maintain the temperature of said electrodes substantially equal, as and for the purpose described.

6. In a vapor electric lamp of the type described, a negative electrode together with a positive electrode and arc chamber closely juxtaposed to said negative electrode to maintain the temperature of said electrodes substantially equal, as and for the purpose described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY ANDREW KENT.

HAROLD GEORGE LACELL.

Witnesses:

THOS. BRINTON,

WILLIAM GERALD REYNOLDS.