No. 687,883. Patented Dec. 3, 1901.

P. C. HEWITT.

TERMINAL FOR ELECTRIC VAPOR OR GAS LAMPS.

(Application filed Apr. 18, 1900.)

(No Model.)

Fig. 1

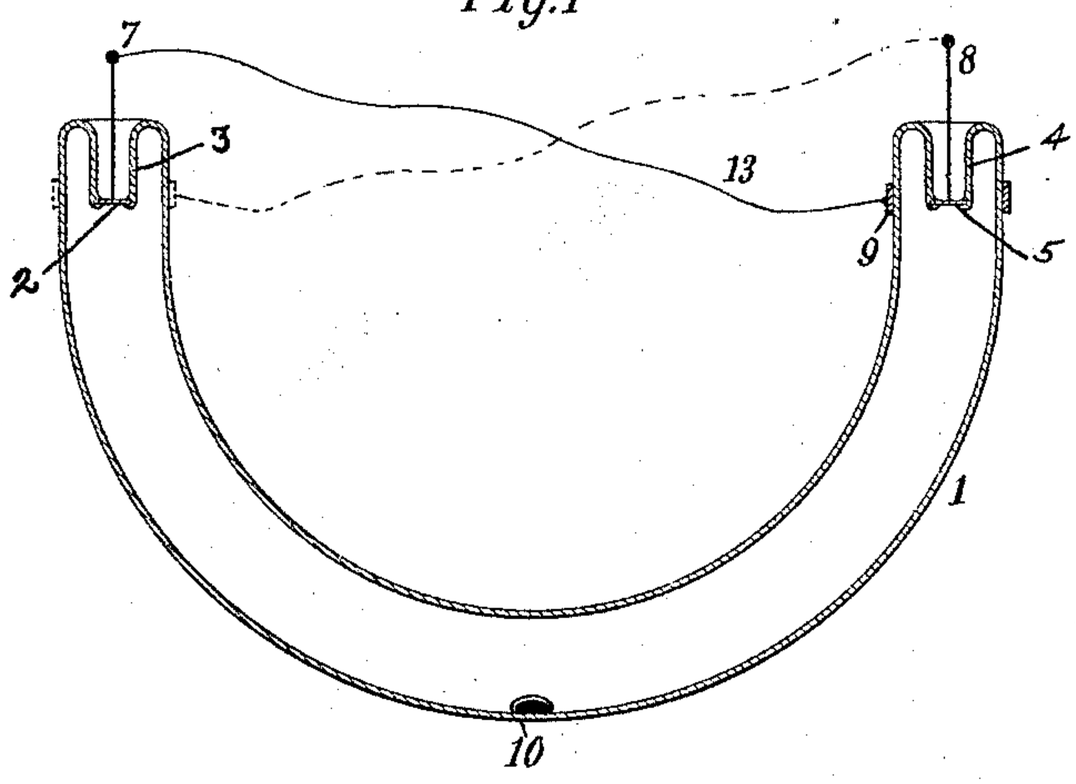


Fig. 5

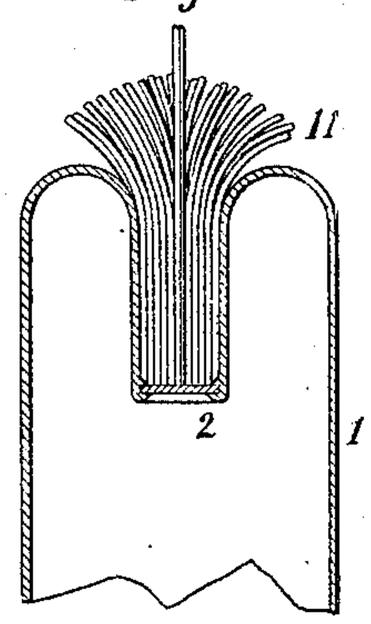


Fig. 2

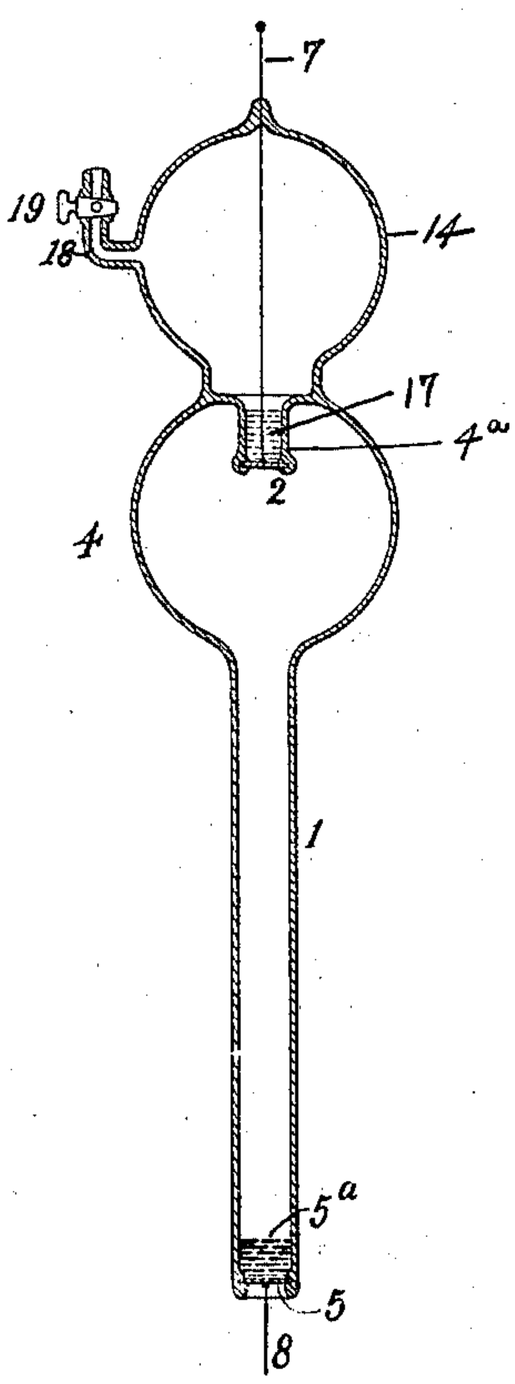


Fig. 3

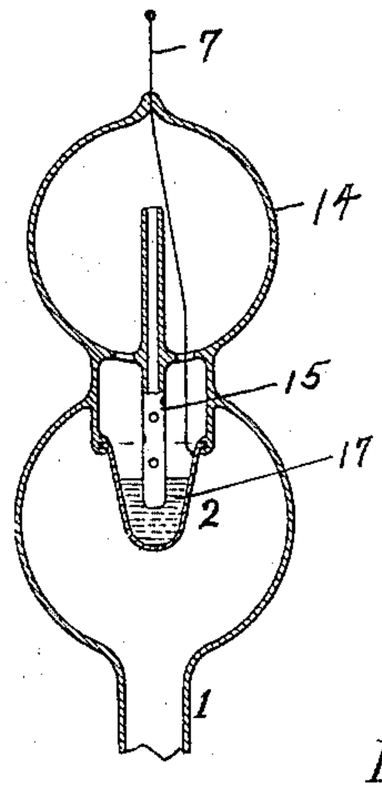


Fig. 4

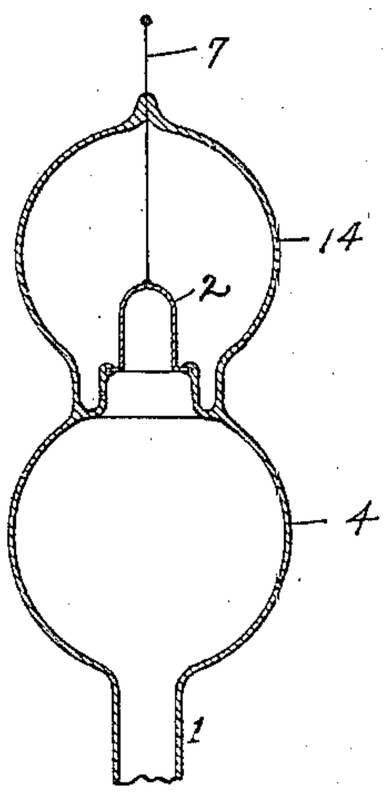
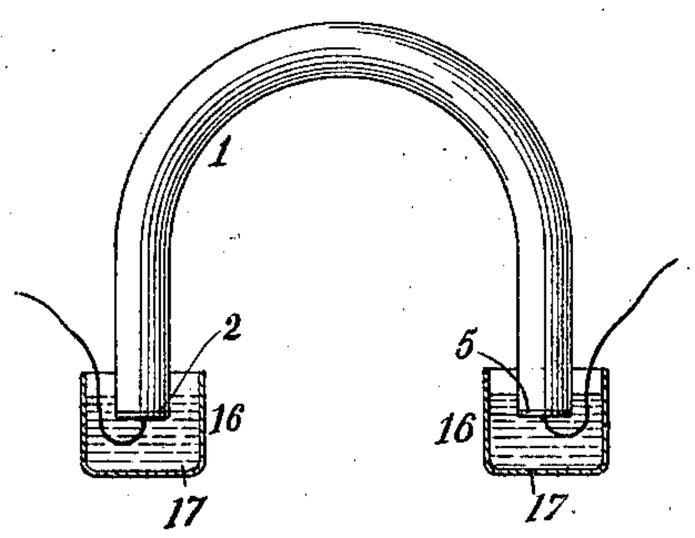


Fig. 6



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UNITED STATES PATENT OFFICE.

PETER COOPER HEWITT, OF NEW YORK, N. Y., ASSIGNOR TO PETER COOPER HEWITT, TRUSTEE, OF NEW YORK, N. Y.

TERMINAL FOR ELECTRIC VAPOR OR GAS LAMPS.

SPECIFICATION forming part of Letters Patent No. 687,883, dated December 3, 1901.

Application filed April 18, 1900. Serial No. 13,292. (No model.)

To all whom it may concern.

Be it known that I, PETER COOPER HEWITT, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Terminals for Electric Vapor or Gas Lamps, of which the following is a specification.

My invention relates generally to the class of apparatus employed for electric lighting, and is especially useful in connection with that class in which an inclosed body of vapor or gas is employed as the light-emitting material.

The object of the invention is to provide convenient and durable leading-in conductors, terminals, or electrodes for the lamp adapted to convey currents of large quantity.

In another application I have described a form of lamp having a conducting vapor or gas which is so organized and proportioned as to become intensely luminous under the influence of considerable electric current having a moderate electromotive force.

My present invention consists in providing for one or both of the electrodes or leading-in conductors of such a lamp a disk, cup, or other suitably-shaped plate, of platinum, iron, or other material, having a relatively large area sealed into the walls of the inclosing chamber of the lamp. The inner surface of the disk may itself constitute an electrode, or, if desired, another body may be connected therewith and form the electrode.

In the accompanying drawings, illustrating the invention, Figure 1 illustrates one form of lamp provided with electrodes manufactured in accordance with the invention, and Figs. 2, 3, 4, 5, and 6 illustrate modifications.

Referring to Fig. 1, the inclosing chamber of the lamp is represented at 1, being in this instance a U-shaped tube. At the upper ends of the arms of this tube are placed the leading-in conductors or the electrodes 2 and 5. I have shown these as consisting of disks or plates of suitable metal, such as platinum, having a coefficient of expansion approximately the same as that of glass; but other conducting materials may be used and the disks may be corrugated. They are sealed into the tubular reentrant ends 3 and 4, thus leaving cup-shaped cavities at the tops of the two arms. These cup-shaped cavities may, if desired, be filled with some cooling fluid—such, for instance, as water or mercury—in case the lamp is to be so used that the heat imparted to the disk would otherwise be sufficient to break the glass. This material being volatile may have a condensing-chamber 14 (see Figs. 2 and 3) inclosing it, which chamber may in turn be exhausted, in which case the current may be led through it by the same leading-in conductors connected with the respective disks 2 and 5. The purpose of exhausting the chamber 14 is to lower the boiling-point of the fluid contained therein, the degree of exhaustion being dependent upon the temperature at which it may be desired that the fluid shall boil. In this way the cooling effect of the chamber may be adjusted. The vapor condensed on the walls returns to its original position. The lamp is provided with a suitable vapor to form a conducting medium when the lamp is in operation—such, for instance, as may be obtained from mercury. In the drawings a small globule of mercury is represented at 10, and when the lamp is in operation more or less of this mercury may be volatilized to afford the requisite density of vapor. In starting the lamp heat may be applied in any convenient manner, or the lamp may be provided in the course of its manufacture with a starting material which will facilitate the passage of the electric current at starting. I usually employ currents of higher potential for starting than are required for operating the lamp, and I have found it advantageous in some cases to surround the lamp at or near the cathode by a conducting material—such, for instance, as a band 9—which in turn is connected by a conductor 13 with the leading-in conductor 7. A similar band may be placed around the electrode 2, as indicated in dotted lines, and connected with the leading-in conductor 8.

In Fig. 2 a modification is illustrated in which a straight tubular lamp is provided with the disks 2 and 5 at its respective ends. The disk 2 in this instance forms a portion of a wall of a chamber 4 at the end of the tube 1, being sealed into the end of a reën-

trant tube 4ª. The chamber 4 serves as a cooling and impurity-containing chamber when the lamp is in operation. The electrode 5 at the bottom of the lamp may be supplemented by a quantity of fluid mercury 5ª. A chamber 14 is shown in Fig. 2 as superposed upon the chamber 4. It contains a suitable vaporizable material 17. The chamber 14 may be open to the air through a passage 18, containing a regulating-valve 19. By means of this valve the rate of cooling effected by the chamber 14 may be regulated, since the rate of evaporation of the cooling fluid and its escape to the air may be adjusted, or the passage 18 may be permanently closed when the required degree of exhaustion has been obtained in the chamber 14. This will serve to regulate the current received by the lamp, for within limits the temperature of the lamp determines the current which it will receive under the influence of a constant electromotive force.

Referring to Fig. 3, a modification is illustrated in which the chamber 14 is closed, but is provided with means for causing a circulation of the cooling fluid. In this instance the means consists of a tube 15, extending from a point near the bottom of the chamber to a point in the upper portion of the chamber. Suitable openings are provided near the bottom of the tube, so that the heated fluid may enter the tube and, passing upward, escape at the top, thus causing a continuous circulation. The plate 2 is here shown as projecting inwardly to permit of expansion and contraction without exerting undue tension at the edges where it is sealed and at the same time exposing a large surface. This plate may project into the chamber 14, as indicated in Fig. 4.

In Fig. 5 a modification is illustrated in which the reëntering tube is partially filled with radiating metallic wires 11, which serve in a measure to dissipate the heat from the disk 2.

In Fig. 6 a modification is shown in which the tube 1 is inverted and the ends placed in a suitable receptacle 16, containing cooling material 17.

By the expression "disk or plate" I refer to any suitable form or shape—such, for example, as a cup or tubular form, the lip or flange of which is sealed into the glass.

I claim as my invention—

1. In an electric lamp, an electrode consisting of a platinum or equivalent disk or plate sealed into the wall of the lamp, and mercury superposed thereon.

2. In an electric lamp, an electrode consisting of a disk or plate of metal sealed into the wall thereof, a cooling-chamber surrounding the exposed face of the plate, and a volatilizable fluid hermetically inclosed therein.

3. In an electric lamp having a vapor or gas path, a cooling or heat-radiating chamber exterior to the lamp, for regulating the effective radiation thereof.

4. In an electric lamp having a vapor or gas path, a cooling or heat-radiating chamber exterior to the lamp, a channel leading from the said chamber to the air, and a valve controlling the said channel.

5. An electric illuminating device, consisting of a pair of electrodes, an inclosing chamber and a conducting gas or vapor rendered luminous by the passage of an electric current therethrough, the said electrodes being adapted to conduct currents of considerable quantity, and one or both consisting of a disk or plate of metal sealed into the wall of the inclosing chamber, whereby currents of sufficient quantity to render the vapor luminous can be conducted through the lamp.

6. An electric illuminating device, consisting of a pair of electrodes, an inclosing chamber and a conducting gas or vapor rendered luminous by the passage of an electric current therethrough, the said electrodes being adapted to conduct currents of considerable quantity, and one or both consisting of a disk or plate of metal sealed into the wall of the inclosing chamber, the said disk or disks being located in reëntrant portions of the wall of the lamp, whereby currents of sufficient quantity to render the vapor luminous can be conducted through the lamp.

7. In an electric lamp having two electrodes and an intervening conducting vapor or gas, an electrode consisting of a disk or plate of metal sealed into the wall thereof, and a supplementary heat-radiating device for conducting the heat from said disk or plate.

Signed at New York, in the county of New York and State of New York, this 23d day of March, A. D. 1900.

PETER COOPER HEWITT.

Witnesses:
WM. H. CAPEL,
CHARLES B. HILL.