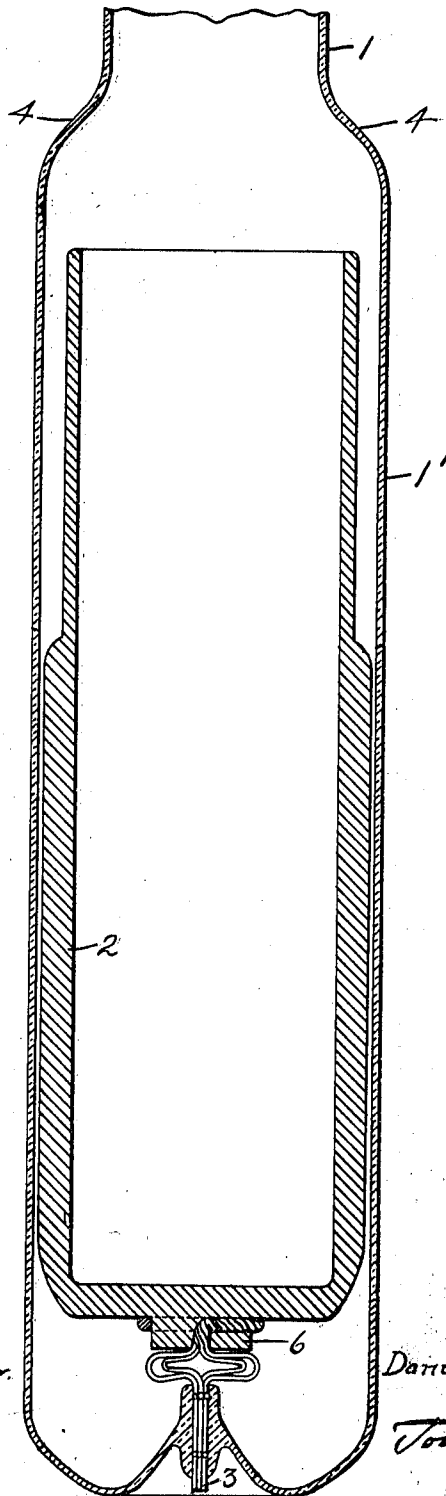


D. McF. MOORE.
TERMINAL FOR GAS AND VAPOR ELECTRIC APPARATUS.
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1,020,110.

Patented Mar. 12, 1912.



WITNESSES:

C. H. Giesbrecht
Lillian Blond

INVENTOR

Daniel McFarlan Moore

BY

Townsend Decker
ATTORNEYS

UNITED STATES PATENT OFFICE.

DANIEL McFARLAN MOORE, OF NEWARK, NEW JERSEY, ASSIGNOR TO MOORE ELECTRICAL CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TERMINAL FOR GAS AND VAPOR ELECTRIC APPARATUS.

1,020,110.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed December 26, 1906. Serial No. 349,548.

To all whom it may concern:

Be it known that I, DANIEL McFARLAN MOORE, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, with post-office address 52 Lawrence street, have invented certain new and useful Improvements in Terminals for Gas and Vapor Electric Apparatus, of which the following is a specification.

My invention relates to that class of gas and vapor electric apparatus in which electric energy is caused to circulate through a body of gas or vapor of any degree of density or tension contained in a closed receiver or receptacle by means of energy-transferring electrodes in direct contact with the body of gas or vapor.

My invention is useful for electric lamps, rectifiers, X-ray apparatus, oscillographs, wireless telegraph transmitters or receivers or for any other devices wherein internal electrodes receive or pass the electric energy from or to a contained gas or vapor which ordinarily is more or less rarefied. My invention, however, is not limited to any degree of rarefaction nor is it limited to any particular form or material for the electrode itself. It is especially useful, however, for that form of apparatus in which the container, receptacle or receiver of the gas consists of a tube as in my vacuum tube lamps.

The objects of my invention are, generally speaking, to afford a firm support for the electrode, to prevent disintegration of the forward edge thereof by concentration of the electric discharge at such forward edge or end and to avoid liability of breakage of the wall of the inclosure through excessive heating by the electrode and electric discharge.

A further object is to avoid the tendency of the discharge to pass over the outside surface of a cup-shaped electrode to the leading-in wires or connections running through the end of the receptacle to the base of the electrode.

To these ends my invention consists broadly in the combination with the electrode, of means for directing the electric discharge past the edge thereof on to the extended plane surfaces to the rear thereof.

My invention consists further in supporting the electrode laterally from the lateral walls of the receptacle.

The invention consists also in the particular form of receptacle whereby the forward edge of the electrode is protected against the electric discharge, and in other features of construction and combinations of parts as hereinafter more particularly described and claimed.

In its principal features the invention forming the subject of the present case is the same as that described in my prior application filed Jan. 5th, 1905, S. N. 239,726 of which application the present application is as to some of its features a continuation. In the present case, however, the forward end of the electrode is shown as of less lateral dimension than the main portion thereof for the purpose to be hereinafter described, whereas in the prior application before referred to, it is of substantially the same lateral dimension as the body of the electrode.

In the accompanying drawings I show in longitudinal section a portion of the gas-containing receptacle with one of its electrodes, the opposite electrode being of similar or any proper construction and serving, with the electrode shown, to pass electric energy through the contained gas or vapor.

The main portion of the receptacle 1 between the electrodes is of any desired length and is here shown as consisting of tubing such as at present customarily employed in my system of vacuum tube lighting. The end portion 1' of the receptacle contains the electrode 2 which latter, in the preferred form of my invention, is of cylindrical form, is also preferably hollow and is also preferably closed at its rear end where connection is made with the leading-in wire 3 by loose or flexible connection as will be presently described. The electrode 2 is of any material but I preferably employ graphite or carbon properly treated so as to be as free as possible from occluded gases. The end portion 1' of the receptacle is preferably tubular also cylindrical in form and the main portion of the electrode 2 fits rather snugly therein so as to be supported by a side wall of the receptacle when the tube is placed in horizontal position and to further be prevented from moving about freely within the tube during transportation with consequent danger of breakage of the tube.

In the drawings, the space between the electrode and wall of the tube is shown as a

little exaggerated in order to better illustrate the construction.

At 4 there is a contraction in the receptacle forming preferably a shoulder or offset between the enlarged portion 1' and the main portion 1 of the receptacle thereby directing the electric discharge on to the plane surfaces within the hollow electrode 2 and past the forward edge thereof, which edge or portion is, as shown, located out of the direct line of the discharge passing through the main portion 1 in the general direction of its longitudinal axis. The shoulder or offset 4, by means of which the discharge is thus directed, constitutes in effect a shield for the forward edge of the electrode against the passage of the electric discharge directly thereto since said edge is, as shown, located in the line of the offset, its internal dimensions laterally being, as shown, somewhat greater than the diameter of the receptacle at the contracted portion thereof through which the discharge reaches the electrode.

Inasmuch as the main body of the electrode 2 fits rather snugly within the side walls of the electrode-containing portion 1', the discharge cannot pass freely around the outside of the electrode and attack the connections at the base of the cup. The discharge passing into the hollow electrode is prevented from reaching the connections, owing to the fact that the rear end of the hollow electrode is closed. The outside dimensions of the forward portion of the electrode are, as shown, somewhat less than those of the containing portion 1' of the tube, thus keeping the forward portion, which is the portion liable to be more highly heated, out of contact with the wall of the tube and thereby preventing breakage of the same from the heat of the electrode or from the electric discharge when the tube is made of fragile material like glass. The leading-in wire 3 may be of a number of strands which, within the receptacle, are spread out, form a cushion or spring and pass together into a longitudinal hole in a stud 6 at the base of the electrode 2 and then out through the lateral opening for attachment to the outer surfaces of the stud. This manner of connecting the electrode and the leading-in wire is not claimed herein, but is claimed in my prior application before referred to.

By directing the discharge past the forward edge of the hollow electrode and into the interior thereof, it is caused to distribute itself over the inner surfaces and localization of heating effects in the electrode may be, to a large extent, diminished. Since the base of the electrode is closed while the electrode itself fills the bore of the tubular receptacle 1', it is obvious that the liability of the discharge to reach the leading-in wires or connections is also practically eliminated.

What I claim as my invention is:

1. In apparatus of the character described, the combination with a gas or vapor containing receptacle, of an electrode supported laterally from the side wall of the receptacle and having its forward end of lesser lateral dimensions to increase the space between the same and the side wall.

2. In an apparatus of the character described and having a gas or vapor containing receptacle, an electrode fitted into the receptacle so as to be supported laterally by the side wall and having its forward portion separated from the side wall by a free space, as and for the purpose described.

3. In apparatus of the character described, the combination with an energy-transferring electrode, of means for shielding the forward edge thereof from the direct attack of the electric discharge.

4. In a vacuum tube lamp, the combination with an internal electrode, of a shoulder or offset interposed between the forward end of the electrode and the main portion of the tube, the forward end of the electrode being located just to the rear of said obstruction whereby localization of the discharge and undue heating at such forward end is prevented.

5. In a vacuum tube lamp, a tube having its light-giving and electrode holding portions of different diameters to form a shoulder or off set in combination with an electrode whose forward edge is located immediately behind the shoulder or off-set, joining the said portions of the tube.

6. In a vacuum tube lamp, a tubular gas-containing receptacle having an enlarged end section and a tubular electrode mounted in said end section with its forward edge at the rear of the offset between the main portion of the tube and such end section and out of the direct path of the electric discharge.

7. In a vacuum tube lamp, the combination with a tubular electrode, of means for directing the electric discharge into the interior thereof.

8. In an internal electrode vacuum tube lamp, an internal electrode combined with means for directing the electric discharge past the forward end thereof to surfaces, the plane of which is parallel with the tubular axis of the lamp.

9. In a vacuum tube lamp, the combination of a tubular electrode fitted into the end section of the gas-containing receptacle and having its forward portion of reduced dimensions laterally to prevent contact with the said wall of the receptacle, combined with means for directing the electric discharge past the forward edge and on to the interior surfaces of the electrode.

10. In an apparatus of the character described, the combination with a gas-containing receptacle, and an electrode having plane

discharge-receiving surfaces extended in the direction of the axis of the receptacle means for directing the electric discharge past the forward edge of the electrode on to such plane surfaces.

11. In an apparatus of the character described, the combination of a hollow electrode and means for directing the electric discharge past the edge of and on to the interior surfaces of such hollow electrode.

12. In an apparatus of the character described, an electrode having a closed rear

end and a gas-containing receptacle whose electrode holding portion is filled by the electrode to protect electric connections to the base of the electrode from the electric discharge.

Signed at New York, in the county of New York and State of New York, this 7th day of December, A. D. 1906.

DANIEL McFARLAN MOORE.

Witnesses:

C. F. TISCHNER, Jr.,

LILLIAN BLOND.