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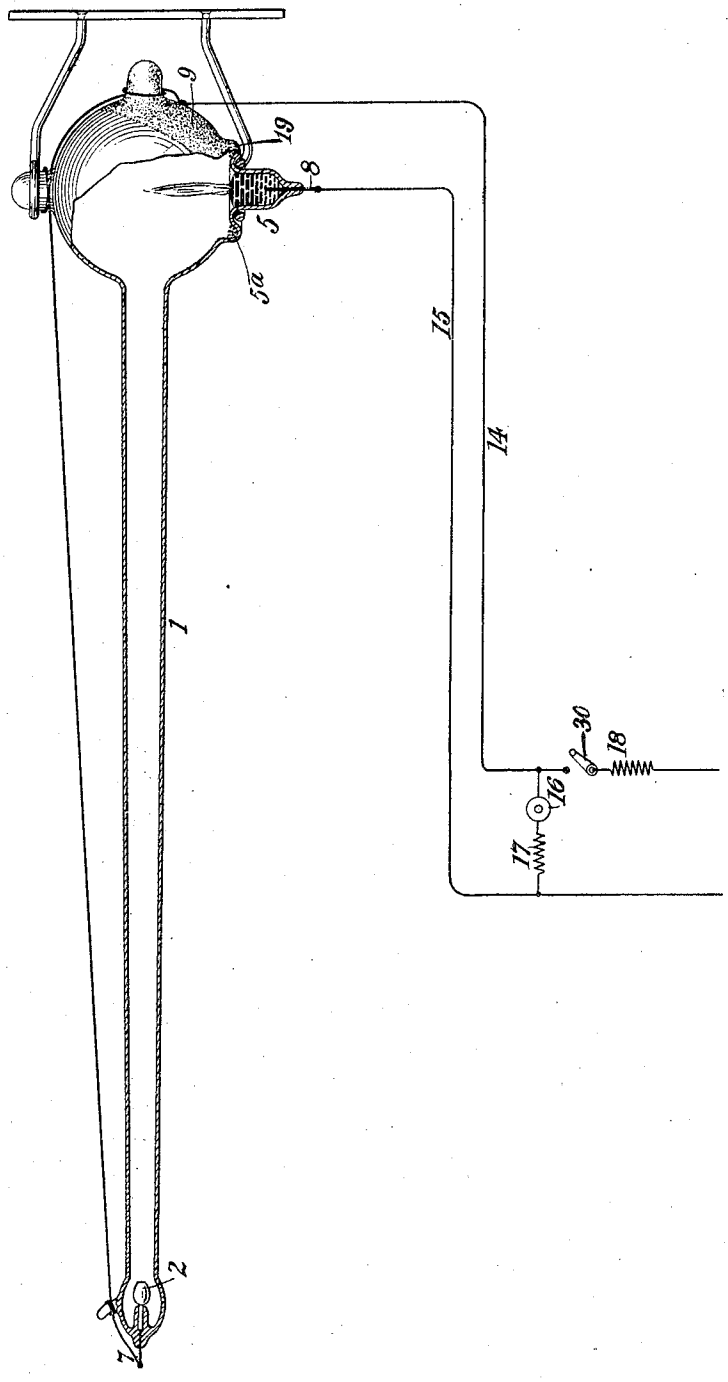
P. C. HEWITT.

GAS OR VAPOR ELECTRIC LAMP.

APPLICATION FILED FEB. 12, 1902.

NO MODEL.



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No. 770,232. Patented September 13, 1904.

UNITED STATES PATENT OFFICE.

PETER COOPER HEWITT, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO COOPER HEWITT ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

GAS OR VAPOR ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 770,232, dated September 13, 1904.

Application filed February 12, 1902. Serial No. 93,762. (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 Gas or Vapor Electric Lamps, of which the following is a specification.

My invention relates to the class of vapor or gas electric lamps described in certain patents heretofore issued to me, such, for instance, as those issued on the 17th day of September, 1901.

As has been explained in certain of the patents issued to me, the greatest resistance to starting appears to be located at or about the negative electrode, and I have employed various means for providing an initial breaking down or removing of this resistance, whereupon current will traverse the lamp under the influence of a lower difference of potential than that normally required for starting it.

The object of my present invention is to provide a means for reducing the initial resistance to starting which appears at or about the negative electrode.

In my experiments I have noted the fact that after the initial negative-electrode resistance has been broken down or removed and during the operation of the lamp the resistance at the negative electrode is modified by certain phenomena which manifest themselves in a physical manner, as by a flame proceeding from the negative electrode. I have found it advantageous to provide means for removing this flame from the direct path of the current between the electrodes, as it contributes practically nothing to the light-giving capacity of the lamp, but may add to its resistance. This negative flame appears to be identical, in a measure at least, in its behavior with "projected matter" as produced in Crookes tubes, which on being reflected from a reflector in the tube takes the form of X-rays or negative rays, which are akin to negative rays emitted by certain substances known as "radio-active" substances, such, for instance, as uranium and radium.

It is well known that the resistance to starting of a spark-gap is reduced by the action of ultra-violet light and also by the action of negative rays, and in this invention I avail myself of this fact by using radio-active material or a source of similar rays in such a location or position as to cause the radiations therefrom to act on the negative electrode and its environment to reduce the resistance thereat. When these materials are so placed as to act upon the negative electrode and its environment, the conditions for reducing the initial negative-electrode resistance are present even before the lamp is connected in an electric circuit, and the lamp is therefore provided in itself with means for reducing such high initial negative-electrode resistance as would exist without such environment.

My invention involves, therefore, the utilization of a source of negative rays in connection with a lamp of the character referred to in such manner and position as to reduce the negative-electrode resistance.

The accompanying drawing is a vertical section of a lamp embodying the general features of my invention, showing also the operating-circuits and the starting apparatus in diagram.

Referring to the drawing, 1 represents the inclosing chamber of the lamp.

2 represents the positive electrode of a continuous-current lamp, which will be described for convenience. This may be of various different materials; but for the present purposes it may be considered to be made of iron or chromium. It is held in its position and connected by means of a leading-in conductor 7, designed to be connected with one side of an electric circuit. The negative electrode is here shown as consisting of a small quantity of mercury, as shown at 5. A conductor 8 leads from this electrode through the wall of the lamp, and means are provided for connecting this conductor with an electric circuit. In the neighborhood of the negative electrode there is placed a quantity of radio-active material, as indicated at 5^a, or other substance capable of emitting the so-called "negative"

rays. This material may be placed in a groove or pocket 19, formed in the glass near the electrode 5.

The lamp is connected in circuit with any suitable source of electricity, the conductors 14 and 15 leading therefrom being shown as connected, respectively, with the conductors 7 and 8. A main switch 30 may be located in one of the main conductors, as 14.

In instances where the radio-active material is insufficient to entirely overcome or remove the initial negative-electrode resistance by reason of the low voltage used it may be desired to provide some means for impressing an initial potential somewhat higher than that of the operating potential of the lamp. For this purpose a quick-break switch 16 is employed for making an electrical connection through a resistance 17 in shunt to the lamp, a reactive coil 18 being connected in the conductor 14 in such position that current flowing through the shunt-circuit will traverse the reactive device. Upon suddenly breaking this shunt-circuit the reactive device will momentarily impress a higher electromotive force upon the terminals of the lamp. In case, however, the radio-active material employed is sufficient to practically remove the initial negative-electrode resistance then the device for impressing the initial higher potential will not be required.

In some cases I have found it useful to provide means for removing the static charge of the lamp. This may be conveniently accomplished by placing a band or coating 9 of conducting material upon the outer surface of the lamp near the negative electrode and connecting this by a separate wire or by a portion of the wire 14, as shown, with the leading-in wire 7. In some cases, however, with the radio-active material this device may not be required.

The rays we have called "negative" rays need not be considered identical in all respects with the so-called "X-rays" nor the projected matter produced in Crookes tubes; but the rays which are useful for the purposes of the present invention are akin to the phenomena mentioned. Such rays may, however, be subdivided into various forms of radiations, and the subdivided forms of radiant energy may be equally available for reducing the negative-electrode resistance as described herein.

In a divisional application, Serial No. 160,883, filed June 10, 1903, claims are made upon the apparatus described herein.

I claim as my invention—

The method of starting a gas or vapor electric apparatus of the character described, which consists in creating by means located within the apparatus a radio-active effect, and applying to the terminals of the apparatus a condition of electrical potential adapted to operate the same.

Signed at New York, in the county of New York and State of New York, this 11th day of February, A. D. 1902.

PETER COOPER HEWITT.

Witnesses:
GEORGE H. STOCKBRIDGE,
WM. H. CAPEL.