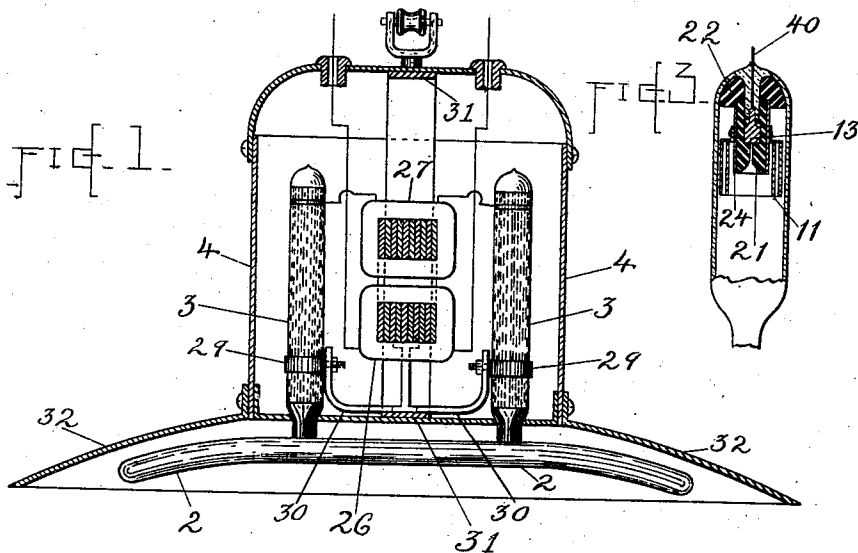


No. 755,307.

PATENTED MAR. 22, 1904.

D. McF. MOORE.
ELECTRIC TUBE LAMP.
APPLICATION FILED FEB. 6, 1903.

NO MODEL.



WITNESSES:

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UNITED STATES PATENT OFFICE.

DANIEL McFARLAN MOORE, OF NEWARK, NEW JERSEY.

ELECTRIC TUBE-LAMP.

SPECIFICATION forming part of Letters Patent No. 755,307, dated March 22, 1904.

Application filed February 6, 1903. Serial No. 142,131. (No model.)

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, have invented certain new and useful Improvements in Electric Tube-Lamps, of which the following is a specification.

My invention relates to those systems of electric lighting employing lamps which consist, essentially, of a tube or receptacle containing any suitable gas—as, for instance, air rarefied or having any desired degree of gaseous tension suitable for the gas employed and proper energy-transferring electrodes, by means of which electric energy may be applied to the gaseous body or column to render the same luminous.

The special object of my invention is to permit the employment of portable lamps of the above general type and at the same time to enable the same to be operated by electric energy of the desired high tension without danger to persons or objects.

To these ends my invention consists, substantially, in a combination of the general character above described, comprising a potential-raising transformer, together with a suitable protective inclosure, all combined, as hereinafter described, so that the high-potential terminals of said transformer and the energy-transferring terminals of said transformer and the energy-transferring terminals of the tube shall be inclosed in a suitable protective inclosure or casing out of danger of contact with external objects, while from said casing projects, respectively, the conductors which carry the low-tension energy to the primary of the transformer and the translucent but harmless portions of the tube supported by its ends and whose gaseous contents are rendered luminous by the high-potential energy from said transformer.

In carrying out my invention I prefer to use a tube the body or main portion of which is curved in any suitable way, so as to decrease the space occupied by the lamp, while the ends of said tube are brought closely together or sufficiently to permit the tube to be sus-

tained by said ends with their conducting or energy-transferring terminals joined to the incased high-potential terminals of the secondary of the transformer. For such terminals I may employ either an exterior cap, sleeve, or envelop of pretty good size, dependent, however, as to size in a large measure upon the potential of the energy applied to the lamp, or I may use internal electrodes suitably connected with the secondary terminals of the transformer by leading-in wires for the lamp, said internal electrodes being of proper size or construction or having the leading-in wires and connections properly protected against the effect of the discharge which tends to seek said leading-in wire, thus permitting in the case of such internal electrode the use of energy of high tension and considerable quantity.

In the accompanying drawings, Figure 1 is a vertical central section of an apparatus embodying my invention. Fig. 2 is a plan of the same, the general shape or conformation of the luminous portion of the tube being indicated in dotted lines. Fig. 3 illustrates in section a form of electrode that may be used when the tube is provided with internal electrodes.

The tube shown is of the form which may be described generally as curved, or as a tube of a form which returns upon itself, so as to bring the ends thereof into proximity to one another. The body of the tube, or that which contains the gas furnishing the effective illuminating portion of the lamp, is indicated at 2, and starting from one of the ends of said tube is of a form which curves outwardly from said end and back through the space between said end and the opposite end and then by a reverse curve around to said opposite end. It will be understood, however, that the curved portion of the tube between said ends may be greatly varied and said curve might be a continuous spiral. Preferably the curved portion lies practically in one general plane, while the ends of said tube project in a direction which may be described generally as transverse to the plane in which the major or illuminating portion of

the tube is located. Said ends 3 are mounted and supported within the casing 4 in any desired way. The metallic terminals of said tube when it is in place are located entirely within the suitable protective cabinet or casing 4 and are in connection with the secondary terminals of a transformer of any desired character, which secondary terminals are also within said casing. The primary of said transformer (indicated at 26) has its terminals of comparatively low potential led out through said casing and connected with suitable supply-wires. The secondary of the transformer is indicated by the numeral 27, and the transformer is properly supported by the frame or hanger 31 or in any other suitable way. In the present instance I have shown energy-transferring terminals for the tube, comprising conducting caps or sleeves applied to the exterior of the glass inclosure and consisting, if desired, of graphite applied as a paste and allowed to harden. Said coating is also provided with a suitable ring or sleeve of conducting material, to which the supply-wire is properly connected.

Other forms or kind of exterior electrode might be used as energy-transferring terminals or the electrodes might be internal electrodes. Also said electrodes might be of proper character to operate each as a positive or negative electrode, so as to adapt the lamp for use with alternating currents, or said electrodes might be so constructed as to permit the use of the lamp with continuous currents only, in which case, however, the transformer should be of such character as to deliver a continuous current from its secondary.

The parts which support the tube are shown in the drawings as consisting of suitable clamps or yokes 29, carried by brackets 30, which are secured to the frame 31.

The vertical portions of the tube, or, in other words, the ends thereof, are received in the clamps 29, and the tube is supported thereby as a whole and in proper position beneath a shade or reflector 32, which latter may, however, be used or not, as desired.

The casing which incloses the tube-terminals and transformer may have hinged doors or sides adapted to open back, as shown by the dotted lines, Fig. 2, to give access for the purpose of removing the tube from the fixture or for the purpose of permitting the connections to be made readily with the terminals of the secondary. As will be obvious, however, to electricians, the apparatus may be otherwise constructed and so formed that the connection will be automatically established by insertion of the ends of the tube into the danger-proof box.

By the use of my invention it will be obvious that the energy required for producing light in the tube may be supplied thereto without danger to persons or objects and that the tube,

transformer, and other associated parts combined as described constitute as a whole a lamp that may be used and handled as a portable lamp having all the practical characteristics of an arc-lamp of the usual type.

Instead of using a tube with exterior electrodes I may use one having interior electrodes, which should, however, be preferably of proper character to permit the lamp to be used with alternating currents. Such a form is shown in Fig. 3, wherein leading-in wire is shown projecting into the tube through a suitable glass stem and as terminating in a block or piece of metal 13, around which and in immediate union or contact with it is a mass 21, of lime or other oxid, such as oxid of magnesium or a mixture of such an oxid. In the mass 21 is a narrow or constricted opening, as shown, which receives the discharge when the electrode is at any instant the negative electrode of the tube and the walls of which opening become highly heated. 22 is a jacket of soft lime, which protects the base of the stem or leading-in wire from electric discharge. The mass 21 is incased in a tube 24, of metal, which reinforces the same and which also serves for the attachment of cups or tubes 11, which constitute the positive portion of the electrode operating as the positive electrode in conjunction with the negative electrode at the opposite end of the tube, consisting of the similar mass of lime 21.

It will be understood that the part 21 of the electrode is constructed with special reference to the use of said electrode as the negative and the part 11 with special reference to the use of the electrode as a positive electrode, so that, in effect, each end of the tube would have a composite electrode adapting said electrode to be either a positive or a negative, and thereby permitting the lamp to be readily operated by alternating currents.

What I claim as my invention is—

1. A portable electric-lighting device comprising a transformer, an inclosure, a tube containing a gas adapted to be rendered luminous and means supported by the portable structure carrying the transformer for supporting the tube, said transformer and the tube-terminals being inclosed while the portion of the tube used for lighting extends through the walls of the inclosure.

2. In an improved electric-lighting system employing a gas adapted to be rendered luminous by electric energy, the combination substantially as described of a tube of glass containing said gas or gases and returning upon itself to bring its ends into proximity, a transformer, and a suitable box to inclose the same as well as the tube-terminals and tube ends which support the tube.

3. A portable electric-lighting device comprising a transformer, a translucent tube containing a gas adapted to be rendered luminous

by the current from said transformer, a holder
for supporting said tube and transformer with
the ends of the tube connected to the trans-
former and an inclosure for the transformer
5 and ends of said tube, as and for the purpose
described.

Signed at New York, in the county of New

York and State of New York, this 16th day of
January, A. D. 1903.

DANIEL McFARLAN MOORE.

Witnesses:

J. GALLWITZ,
E. L. LAWLER.