

D. McF. MOORE.
ELECTRIC TUBE LAMP.

(Application filed Jan. 2, 1902.)

(No Model.)

Fig. 1.

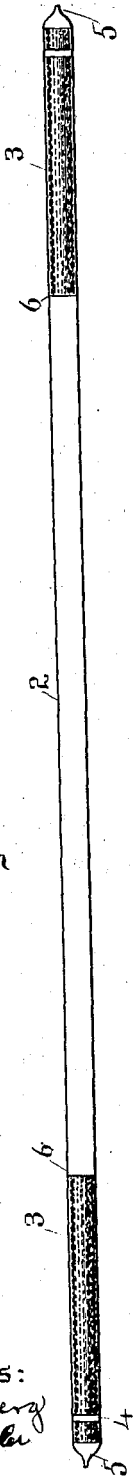


Fig. 2.

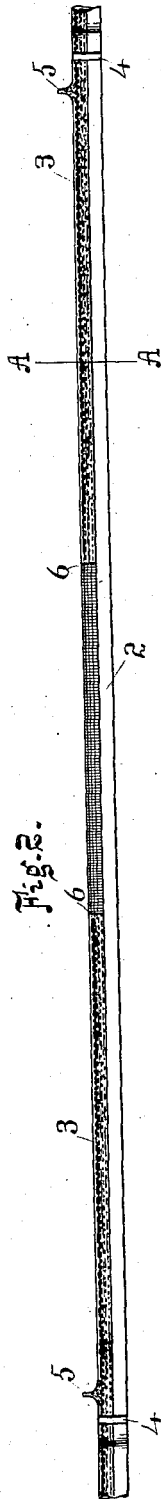
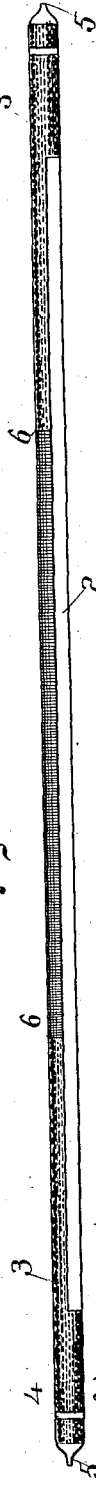


Fig. 3.



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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. 702,319, dated June 10, 1902.

Application filed January 2, 1902. Serial No. 88,007. (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 electric-tube lamps or lamps of the form wherein the light is emitted from a column or body of gas having a suitable degree of rarefaction and contained in a translucent tube or receptacle which is provided with suitable conducting electrodes, caps, or terminals adapted to pass electric energy into and out of the column or body of luminous gas at or near the terminals of the light-giving portion or body thereof. I have heretofore constructed lamps of this character with conducting caps or terminals applied closely to the exterior surface of a translucent tube of glass containing the gaseous light-giving element of the lamp, said caps or terminals being ordinarily of some good conducting material, like carbon or metal, are opaque, and act to shut off the emission of light from the contents of the tube. When tubes seven to eight feet in length are employed, said caps or terminals form a very considerable part of the whole length of the tube and their opacity becomes a very objectionable feature.

The aim of my present invention is to remove this objection, to which end my invention consists in constructing or forming the conducting cap or terminal so that it shall extend only partially around the tube, leaving the gaseous contents free to emit their light-rays through the opposite portion or uncovered part of the tube. Preferably the portion of the tube beneath the cap is in such case provided with a reflecting-surface, so that the lamp shall give through its whole length or through the light-giving portion thereof a practically uniform luminous appearance. To aid further in securing a uniform apparent luminous density over the light-giving portion of the tube I propose to apply to the rear or non-covered surface thereof a reflecting-surface extending practically the whole length of the tube.

Another part of my invention consists in

the peculiar form of cap or terminal composed partially of a cap extending entirely around said tube at or near the end and having an extension toward the opposite end carried only partially around said tube. By this means I obtain a sufficient area of conducting-cap without obscuring the light-column to a prohibitory degree.

Another part of my invention consists in the conformation at the end of the tube designed for use when it is desired to produce an unbroken line of light from a number of tubes placed end to end. This part of my invention consists in making the end of the tube square where it has heretofore been made tapered to provide for the exhausting-nipple and in forming the conducting-cap so that it shall extend only partially around the tube at or near its end instead of extending clear around, as heretofore. In this modification of the form of tube the nipple through which the contents are exhausted or rarefied or through which the desired materials are introduced is placed on the side of the tube.

In the accompanying drawings, Figure 1 is a side elevation of a tube-lamp of the form heretofore employed by me. Fig. 2 is a side elevation of the modified form constituting my present invention. Fig. 3 shows a further modification of my present invention. Fig. 4 is an enlarged cross-section in the line A A, Fig. 2.

Referring to Fig. 1, 2 indicates the translucent tube, containing rarefied gas or vapor and provided at its ends with conducting caps or terminals, which may be of carbon or other suitable material, applied as a paste or paint, or may be otherwise formed. 4 indicates bands or collars of a good conducting metal applied to the caps to form good electrical connection therewith. In this form of lamp the tube terminates in the nipples 5 for the application of the exhaust-pump or for other purposes, at which point or points sealing-off is done. In this form it will be seen that the length of the caps is very large in proportion to the length of the light-giving portion of the luminous gas or vapor which is included between the points 6 6 and that necessarily a large amount of light is lost owing to the opaque nature of the caps 3.

To obviate this objection, I propose to make the caps in the form shown in Fig. 2, where they are shown as extended only partially around the tube, leaving all of the gas or vapor which is rendered luminous free to emit light through the exposed side of the tube or that opposite the caps 3. Inasmuch as the caps 3 are of opaque material, the appearance of the tube or column of light at the parts thereof beneath said caps will appear somewhat different from what it would appear between the terminals 6 6 to said caps. To obviate this objection and to reflect the light from the caps, I propose to provide the tube with a reflecting-surface, applied to the exterior thereof beneath the caps 3, and also between the ends 6 6 of said caps, at which latter part the reflecting-surface is indicated by the shaded portion of the tube. The reflecting-surface extends only partially around the tube and preferably between the points 6 6 only as far around the tube as do the caps 3. The reflecting-surface may be made of any desired material, but is preferably one that will not discolor with heat, but that will adhere readily to glass and will permit a graphite or carbon paste or paint to harden on it without cracking. I have found that a mixture of the zinc sulfate and zinc carbonate of commerce sold and used as a filler for paints and mixed with liquid composed of water two-thirds and silicate of soda one-third serves admirably for the purpose. This paint also has the advantage that it is non-conducting and can therefore be applied to the whole length of the tube without short-circuiting the conducting-caps 3. After the light-reflecting paint is thoroughly dry the graphite or carbon, with a suitable binder to make it stick, is applied over the same to form the caps 3. For these caps the compound sold as core-wash for metal molds will serve. If other reflecting-surface which would be an electrical conductor is employed, it should be omitted from the portion of the tube included between the points 6 6 or should be broken or disconnected at such points from the caps or electrodes 3.

In Fig. 3 a portion of each cap or terminal is shown as extending all the way around the tube and another portion as extending partially around and projecting toward the opposite terminal. This modification also presents decided advantages over the form shown in Fig. 1, since, as will be seen, the length of obscuring cap or terminal is very greatly reduced, although the total area is practically the same.

As shown in Fig. 2, the end of the tube may be made square or rectangular and the sealing-off nipple 5 be placed on the side. This permits the tubes to be abutted directly end to end, as shown in the figure, and permits a continuous line of light to be formed of any desired length from a number of said tubes when they are provided with conducting caps

or terminals 3, extending partially around the tube, as shown in this figure. In this figure one tube of full length is shown and a portion of each of two other tubes abutting with their square ends against the square ends of the tube shown in full length. The cross-line near each end of the figure shows the point of abutment.

What I claim as my invention is—

1. An electric-tube lamp containing a luminous column of gas or vapor and provided with a reflecting-surface extending the whole length of said column, as and for the purpose described.

2. In an electric-tube lamp, a non-conducting reflecting-surface applied over substantially the whole length of the tube, as and for the purpose described.

3. In an electric-tube lamp, a tube having a reflecting-surface beneath its conducting caps or terminals.

4. In an electric-tube lamp, conducting electrodes or terminals on the same side of the tube extending partially around the same.

5. In an electric-tube lamp, conducting electrodes or terminals extending partially around the tube, and paint between the electrode and tube.

6. In an electric-tube lamp, conducting terminals or electrodes extending partially around the lamp and projecting from a terminal completely encircling the same.

7. In an electric-tube lamp, conducting terminals or electrodes extending partially around the lamp projecting and completely encircling the same, and paint between the electrodes and tubes.

8. In an electric-tube lamp, a translucent tube having a square end and an exhaust-nipple applied to the side of the tube, said tube being provided with a conducting cap or terminal extending partially around the same.

9. In an electric-tube lamp, a reflecting-surface consisting of a white paint formed from a composition adapted to adhere to glass and free from discoloration by heating, as and for the purpose described.

10. In an electric-tube lamp of glass, a reflecting-surface of non-conducting material applied to the exterior of the lamp and having superposed upon it a conducting material to form a conducting cap or terminal.

11. In an electric-tube lamp, an exterior reflecting-coating of non-conducting material having a superposed conducting-surface of carbon or similar material as described.

12. In an electric-tube lamp, a conducting cap or terminal superposed upon a reflector applied to said tube, as and for the purpose described.

13. An electric-tube lamp containing a luminous column of gas or vapor and provided with an adherent reflector of non-conducting material applied to its exterior.

14. An electric-tube lamp having a non-

conducting light-reflecting coating of adhesive material.

15. An electric-tube lamp containing a luminous column of gas or vapor and provided with a light-reflecting coating back of the luminous column.

16. An electric-tube lamp containing a luminous column of gas or vapor and provided with a reflector painted upon its exterior.

17. An electric-tube lamp, a coating ap-

plied thereto and extending partially around the same and adapted to form condenser-surfaces and to reflect the light.

Signed at New York city, in the county of New York and State of New York, this 23d day of December, A. D. 1901.

DANIEL MCFARLAN MOORE.

Witnesses:

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