

No. 851,685.

PATENTED APR. 30, 1907.

D. McF. MOORE.  
VACUUM TUBE LIGHTING.  
APPLICATION FILED NOV. 16, 1905.

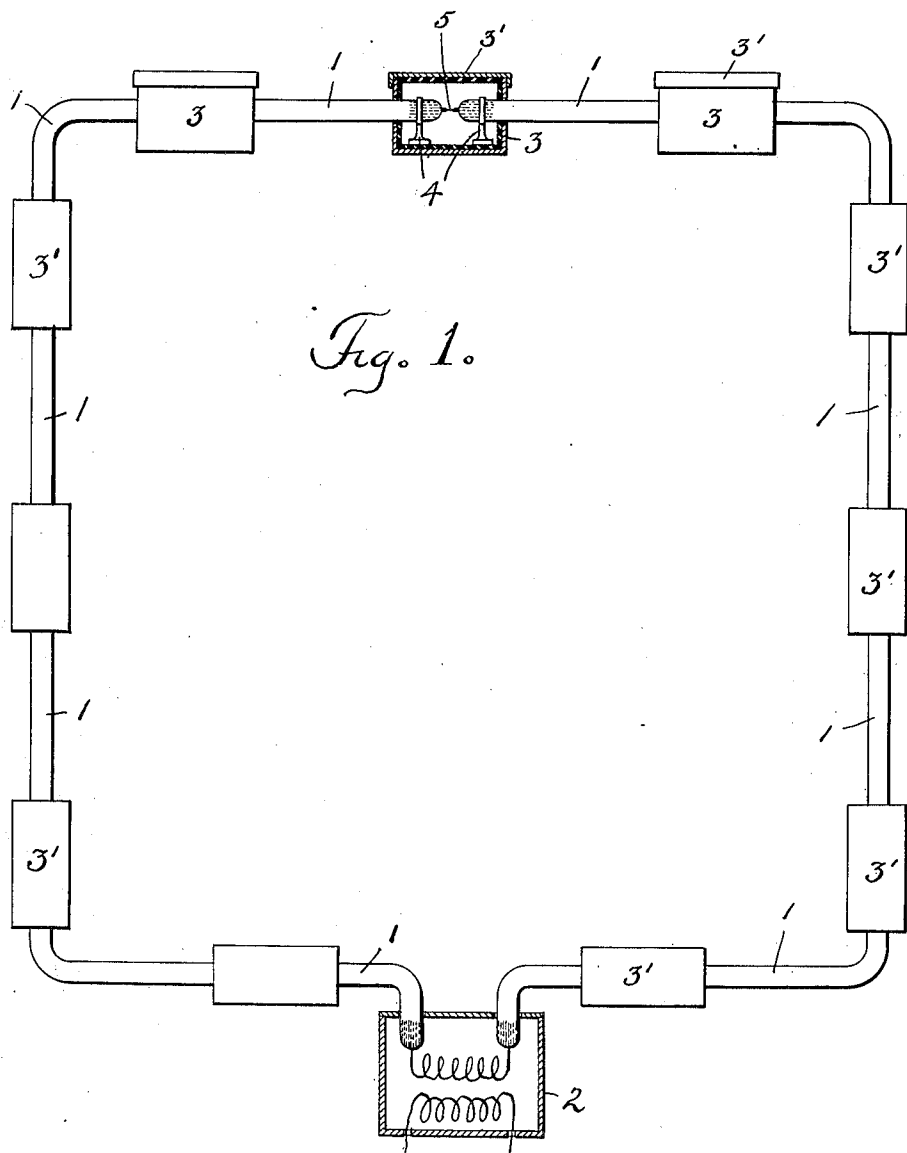
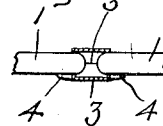


Fig. 1.

Fig. 2.



WITNESSES:  
*C. Y. Yischne Jr.*  
*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 COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## VACUUM-TUBE LIGHTING.

No. 851,885.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed November 16, 1905. Serial No. 287,565.

*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 Vacuum-Tube Lighting, of which the following is a specification.

My invention relates to a system or apparatus for lighting by electricity and has for its primary object to provide a convenient means for lighting by means of vacuum tubes or lamps in which the light is produced by an electrically excited gas or vapor contained in a translucent tube, the terminals of which are provided with proper energy transferring electrodes.

A further object of the invention is to permit the use of the unit tubes of comparatively short length and to operate the same in series by electricity of high potential by which I mean potential such that it would be considered dangerous from the standpoint of fire insurance underwriters.

My invention consists essentially of a system or apparatus comprising a number of unit lighting tubes arranged end to end and having their contiguous energy transferring terminals inclosed in a danger proof or insulating box from which the glass portion of the tube alone projects, the metallic parts being entirely inclosed and protected.

In carrying out this invention, I propose to employ tubes with energy transferring terminals or electrodes of any desired kind. Such electrodes may accordingly be either caps or sleeves of conducting material applied to the exterior of the tube at or near its end and operating in a well known manner to transfer the energy by electrostatic action. In this case the source of energy would be an alternating or other rapidly varying source. The electrodes might also be internal electrodes, *i. e.* electrodes of suitable character located within the tube so as to be in contact with a gas or vapor of the proper kind, but forming the terminals of leading-in wires sealed in the glass of the lamp and projecting on the exterior of the tube. In this case, as is well understood, the energy might be alternating or other varying energy or might be energy of constant potential and direction.

The individual or unit tubes of the system may be each a straight tube or they may be some or all of them be curved or may, as to their longitudinal axis, follow any desired path.

By the use of my invention, vacuum tube lighting may be employed in any situations where it is desired to have long lines of practically continuous light either for decorative purposes or for the purpose of more thoroughly diffusing or distributing the illumination from any given source of energy or for any given amount of power.

In the accompanying drawings, Figure 1, I have shown my invention principally in a diagrammatic way, by illustrating the same as carried out with tube units, each of which is marked 1. Fig. 2 illustrates a modification in a detail of the system.

The terminal units of the system receive energy by being connected respectively to the opposite terminals of the proper source within a box or casing 2 from which the glass portion of the tube projects after the manner described in my prior patent # 702,320, dated June 10th, 1902. The opposite end of each terminal tube 1 of the system is housed in a protecting box or casing 3; the glass portion of the tube alone is exposed and the inclosure is of such character as to prevent accidental contact of surrounding objects or persons with the electrode or leading-in wire within said casing 3.

A suitable support may be provided upon which the end of the tube may rest as indicated at 4 in the case of one of the boxes and the juxtaposed end of the next unit tube of the series is also located in the same box and projects therefrom in a similar way. The electrodes of such two unit juxtaposed tubes are electrically united by a connection 5 of any suitable character within said box or inclosure 3. The said box or inclosure is preferably of insulating material or is provided with an insulating lining and has by preference a removable cover 3'. The adjoining contiguous ends of the unit tubes of the system are supported and located throughout in similar inclosures to form a connected series of tubes through which the energy flows in series from the source located in the terminal box 2.

As will be seen the units of the system

may be of any desired length. The dimension of the box or inclosure 3 in the direction of the connected series of tubes is preferably made as small as possible so as to take away as little as possible from the visual effect of a continuous line of tube lighting.

The use of tubes with internal electrodes aids in securing this result or effect since there is but little metal exposed at the end of each tube unit and if the ends are brought close together the length of the union 5 between the internal electrodes may be very short. To aid in accomplishing the desired result the supporting fixtures 4 might be located outside the box or inclosure and the protective casing confined simply to the immediate end of the tube so as to fully embrace the connection 5. In this case, as before, the glass portion of the tube would be the only part projecting from the protective inclosure through the opening in the wall of the inclosure, at which it is desirable that the opening should fit rather closely around the tube. This modification in detail of the system is illustrated in Fig. 2. The connection between the contiguous ends of the tube units in the inclosure 3 might be obviously made by metallic fixtures or the projecting ends of the leading-in wires might be directly secured together, which latter is for some reasons the preferred manner of connecting up the unit sections.

What I claim as my invention is:

1. In a system of lighting by vacuum lamps, a series of unit tubes, assembled end to end with their contiguous ends inclosed in danger proof boxes or casings, and having the electrodes of such contiguous ends elec-

trically united to form a practically continuous tubing of light.

2. The combination substantially as described of a multiplicity of unit vacuum tube lamps, each consisting of a tube provided with internal electrodes, said unit tubes being arranged end to end with their electrodes electrically connected in a danger-proof box or casing and having the terminal tubes of the system of unit tubes connected respectively to opposite terminals of a source of energy, as and for the purpose described.

3. In a system of electric lighting, the combination substantially as described, of a series of vacuum tube lamps, provided with internal electrodes, said tubes being arranged in series end to end with their leading-in wires connected together, an insulated protective inclosure for the contiguous ends of a unit tube of a system and from which the glass portion of the tubing alone projects and means external to said casing for supporting the tube.

4. In a system of vacuum tube lighting, a connected series of unit tubes having the electrodes of contiguous ends joined in a protective inclosure so as to form said unit tubes into one effective lighting tube, the exposed part of which is of glass only.

Signed at New York in the county of New York and State of New York this 10th day of November, A. D. 1905.

DANIEL McFARLAN MOORE.

Witnesses:

C. F. TISCHNER, Jr.,  
LILLIAN BLOND.