Feb. 24, 1931. R. C. SMALLEY 1,794,343

FLAT SIDE VACUUM TUBE LIGHT

Filed May 1, 1926

Fig. 2

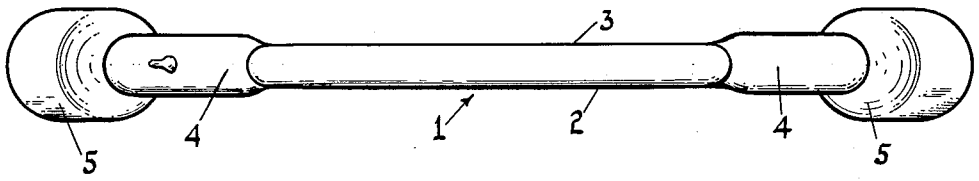


Fig. 1

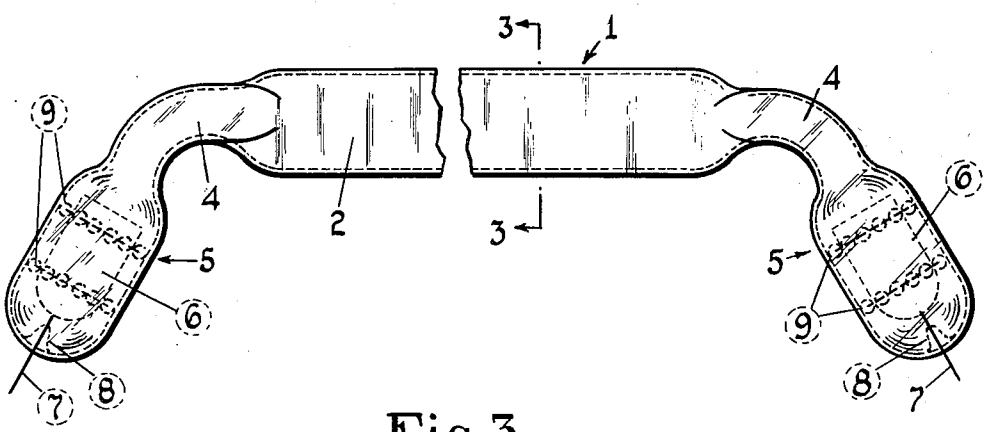
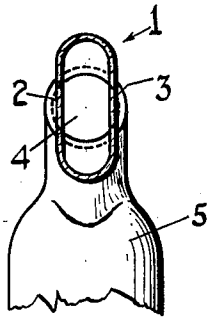


Fig. 3



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UNITED STATES PATENT OFFICE

ROBERT C. SMALLEY, OF ARLINGTON, NEW JERSEY, ASSIGNOR TO CLAUDE NEON LIGHTS INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

FLAT-SIDE VACUUM-TUBE LIGHT

Application filed May 1, 1926. Serial No. 105,893.

This invention relates to vacuum tube lamps and more particularly to lamps of the type wherein a column of more or less rarefied gas is caused to glow and radiate light by the passage of an electric current therethrough and more particularly in which a more or less rarified gas such as neon is used, either with or without additional substances such as mercury vapor, etc.

It is an object of this invention to produce a lamp of the class described which will radiate more light in a desired direction with the same power load than the known types, or conversely, which will radiate the same amount of light in a desired direction with a smaller power load than the known types.

It is a further object of this invention to produce a lamp of the class described which will radiate light to a greater extent in one or two predetermined directions than in other directions.

It is still a further object of this invention to produce a lamp of the class described which shall have a greater illuminating efficiency for a particular class of work than the known types.

Still other objects of this invention will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are particularly pointed out in the appended claims. My invention itself, however, both as to its underlying principles and as to its practical embodiments will best be understood by reference to the specification and accompanying drawing in which:

Figure 1 is a front elevation of a lamp according to my invention;

Figure 2 is a top plan view thereof; and

Figure 3 is a cross section on lines 3—3 of Figure 1.

Lamps of the class described are most generally used, and find their greatest utility in advertising signs rather than in general illumination and such signs are generally observable only from the front. It follows therefore that when a lamp of the class described which radiates light equally or substantially so in all directions is used a large proportion of the light is radiated at angles which caused it to be practically lost. For instance in an advertising sign, substantially the only useful light is that which is radiated in the direction normal to the eye of the observer or within a few degrees thereof. The light which is radiated in a direction substantially perpendicular to this direction is of practically no utility and is in effect, a dead loss.

In order to minimize the radiation in undesired directions and to increase the proportion of light radiated in the desired direction, I have found that the evacuated envelope which contains the rarefied gas should have cross-sectional dimensions which are a minimum in the direction desired to radiate light and a maximum in the direction which it is desired to minimize radiation of light. In other words, instead of using a tube or container of circular cross section, I utilize a container which is substantially flattened to provide a column of rarified gas of maximum width and minimum depth.

Referring now more particularly to Figure 1, 1 represents a container or envelope having subs antially parallel sides 2 and 3 and terminating in cylindrical neck portions 4 communicating with bulbs 5 containing suitable electrodes 6 carried on lead-in wires 7 passing through a press 8. The electrodes 6 may if desired be maintained in position with reference to the bulb 5 by suitable strings of glass beads 9 strung on wire and positioned around the electrodes.

In the construction of a lamp according to my invention, care must be taken in forming the container to avoid a structure which is not self-supporting. It is of course well known that atmospheric pressure is approximately fifteen pounds per square inch, where-

as the gaseous pressure within a lamp of the type described is a very small fraction of this pressure. Therefore, the walls of the lamp are constantly under pressure from the exterior and if it is attempted to utilize a tube which is too wide and too shallow, the envelope will not be sufficiently strong to sustain the pressure against it and the tube will be likely to collapse either while being exhausted, or in use. I have found that best results are obtained when circular tubing is flattened to such an extent that its maximum dimension is substantially twice its diameter before flattening and this tubing I have found will satisfactorily sustain the air pressure to which it is subjected, and will likewise satisfactorily sustain the strains incidental to the usual mounting and usage.

When the container is shaped as described the gaseous column of course takes the shape of the container, with the result that a large proportion of the light radiated from the lamp is radiated in a direction normal to the walls 2 and 3 and very little of it is radiated in a direction parallel to these walls. For example, I have found that the intensity of illumination of a lamp according to my invention is 27.9 horizontal candle power per foot in a direction normal to the walls 2 and 3 whereas the intensity of illumination of a lamp having substantially the same cross-sectional area, but circular, is only 16.5 horizontal candle power per foot under the same conditions. In other words, there is an increase in intensity of illumination in two directions of nearly 100 per cent, accompanied, of course, by a diminution of intensity in directions parallel to walls 2 and 3.

While I have shown and described a particular form of my invention which should be understood that the same is not limited to the precise form shown but that modifications and changes may be made as will be apparent to those skilled in the art without departing from the scope of my invention.

It is clear that in use the lamp will be arranged with its maximum cross-sectional directional dimension extending normal to the direction of desired maximum light intensity.

What I claim is:

1. A luminescent tube comprising in combination, a transparent envelope having flattened walls of uniform width throughout and internal axes of which one is substantially longer than the other, internal electrodes and a filling of rare gas, whereby a long life luminescent tube is provided capable of emitting more light in a direction normal to said longer axis than in the direction normal to the shorter axis.

2. A luminescent tube comprising in combination, a transparent envelope having flattened walls of uniform width throughout and internal axes of which one is substantially longer than the other, internal electrodes and a filling of neon gas, whereby a long life luminescent tube is provided capable of emitting more light in a direction normal to said longer axis than in the direction normal to the shorter axis, and bearing to a circular luminescent tube of the same cross-sectional area, a ratio of potential illuminating intensity in the direction normal to said longer axis of approximately two to one.

In testimony whereof, I have hereunto set my hand this 29th day of April, 1926.

ROBERT C. SMALLEY.