May 19, 1931. R. C. SMALLEY 1,806,507

DUPLEX VACUUM TUBE LIGHT

Filed May 1, 1926

Fig 1

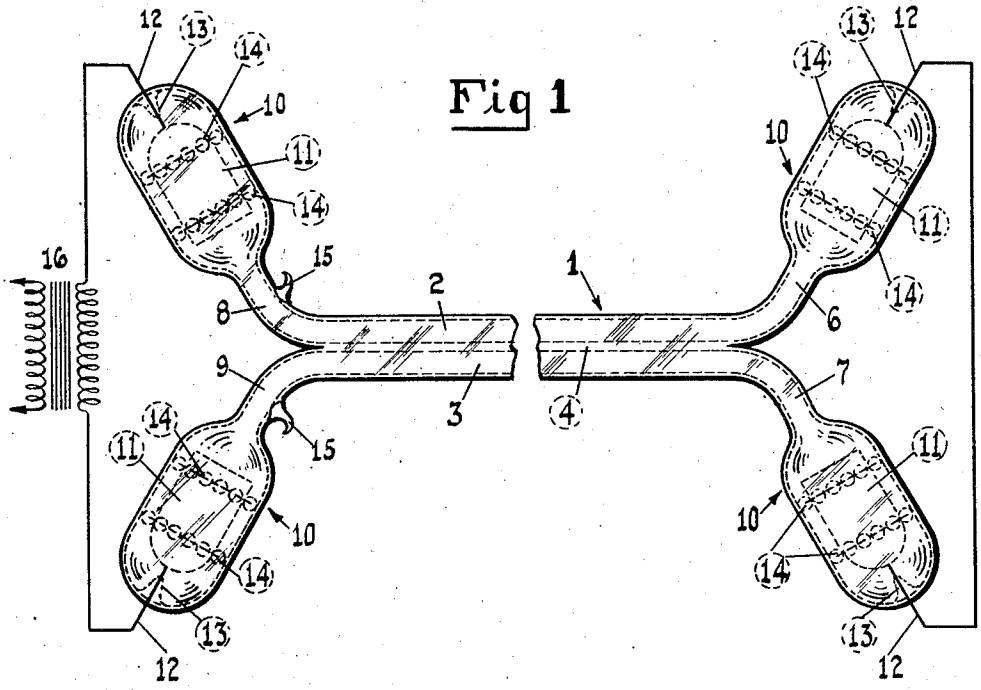


Fig. 3

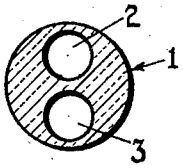
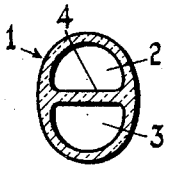


Fig. 2



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UNITED STATES PATENT OFFICE

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DUPLEX VACUUM TUBE LIGHT

Application filed May 1, 1926. Serial No. 105,892.

This invention relates to vacuum tube lamps, that is, lamps in which a column of more or less rarified gas is caused to glow and radiate light by the passage of an electric current therethrough. More particularly it relates to lamps of the class described in which neon at relatively low pressure is used either with or without some additional substance which causes a change in the characteristic of the light radiated.

In accordance with my invention, I provide a pair of separate and independent gaseous conducting paths, but housed within the same envelope or container of transparent material, and in very close physical proximity. The two gaseous conducting paths are so constituted and arranged that they radiate light of contrasting colors. For example, one of the paths may contain neon alone, which as is well known, radiates a brilliant orange colored light, while the other may be constituted by neon with the addition of some substance which changes the color of the light radiated. For example, a small amount of mercury may be added, which will cause the light radiated to be blue in color.

This construction renders possible many novel and striking color effects which would otherwise be difficult and costly if not impossible, to produce. For example, the separate paths may be illuminated alternately and then together, producing very striking changes in color effects at what appears at a little distance to be the same point. Also, if the lamp tubing is bent into the form of a word, it may be so disposed that different letters, portions of letters, or groups of letters have different or changing colors, or even two colors at once. In fact, my structure lends itself admirably to varieties of illumination work, such as advertising signs, carnival illumination, etc.

It is an object of the invention to produce an improved lamp of the class described which shall contain two separate and independent gaseous conducting paths in very close proximity one of which may be so constituted as to differ from the other in the quality of the light radiated thereby.

It is a further object of this invention to provide a pair of lamps of the type described, which will radiate light of different colors from paths very close together, thereby producing striking and novel color effects of high illumination intensity.

It is a further object of this invention to produce a lamp of the class described which shall be simple and economical to manufacture and sturdy of construction.

Still other objects will be apparent from the specification.

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

Figure 1 shows a front elevation of a vacuum tube lamp according to my invention;

Figure 2 shows a cross section thereof; and

Figure 3 shows a cross section of a modified form thereof.

Referring now more particularly to Figure 1, according to my invention, I provide an evacuated container 1 of transparent material such as glass, having a plurality of separate passages therein such as 2 and 3 separated by a wall 4, as shown by Figure 2, or having a pair of passages 2 and 3 as shown in Figure 3, without a definite wall 4. The passageway 2 for instance may lead off into neck portions 6 and 8 which communicate with bulbs 10 each of which is provided with a suitable electrode 11 maintained in position with reference to the wall of bulb 10 by suitable means such for example as strings of glass beads 14 strung on a wire and positioned around the electrodes 11. The electrodes 11 are for example connected to lead in wires 12 passing through a press 13.

The passageway 3, which as above stated is independent of passageway 2, leads in a similar manner to neck portions 7 and 9 which in turn communicate with a bulb 10 having therein an electrode 11 similar to the construction already described. It will thus

be seen that there is provided a pair of independent and separate containers which may be evacuated and then have sealed therein a small amount of gas or vapor. In the form shown the passageway 2 may be evacuated as is well understood in the art and a small amount of neon inserted therein, after which the tube may be sealed as at 15. The passageway 3 may be evacuated and neon placed therein in a similar manner and in addition it may contain a small amount of some substance which will cause a change in the characteristics of the light radiated. For example a small amount of mercury may be placed in the passageway 3 which as is well understood in the art will cause the light radiated to be blue instead of orange.

I consider it unnecessary to describe in detail a method of producing the glass tubing of the shape shown in Figures 2 and 3 as this is within the skill of any glass blower, and moreover, tubing of this sort may be readily obtained in the market. Having obtained a supply of tubing of this type a supply of bulbs 10 will be made up containing the electrodes 11 which will be spliced to the tubing. The splicing may be done as follows: an appropriate length of the tubing 1 will be cut and one end thereof softened in a flame until it is entirely closed. If the other end of one of the passages be closed as for instance by a suitable plug it is possible by blowing in the open passageway while heating the opposite end of the tube to form a small bulb portion on one end of one only of the passageways. This may be manipulated by blowing and heating as will be understood by any glass blower to provide a suitable neck portion such as 6. The plug may now be transferred to the opposite passageway and the same process repeated, whereby an additional neck portion 7 may be formed communicating with the other passageway. After the glass has cooled sufficiently the neck portions 8 and 9 may be formed and finally the bulbs 10 spliced as will be readily understood. The lamps may now be evacuated and filled with neon or with neon and mercury or with any other substance as desired after which they are ready for use.

In Figure 1 I have shown transformer 16 having its secondary connected across two of the bulbs 10. The electrodes 11 at the other end of the tube 1 are connected together so that it will be seen that the two paths are operating in series. It will be clear however, that any connection may be used as desired and that my invention is not limited to any particular connection of tubes. It will also be understood that while I have referred to the use of neon in one tube and neon and mercury in the other tube that I am not limited to the particular elements or combination of elements.

What I claim is:

1. A duplex vacuum tube comprising two elongated paths enclosed by common internal and external walls, each of said paths terminating in electrode chambers, the walls of the electrode chambers of each path being independent of the walls of the corresponding electrode chambers of the other path.

2. A duplex vacuum tube comprising two elongated paths enclosed by common internal and external walls, each of said paths terminating in end portions defining electrode chambers, the walls of the end portions of each path being independent of the walls of the corresponding electrode chambers of the other path, each path containing two internal electrodes and a rare gas.

3. A duplex vacuum tube comprising two elongated paths enclosed by common internal and external walls, each of said paths terminating in electrode chambers, the walls of the electrode chambers of each path being independent of the walls of the corresponding electrode chambers of the other path, each path containing two internal electrodes and a rare gas, and one of the said paths containing a light emitting substance having color characteristics different from that of the light emitting substance in the other path.

4. A gaseous discharge tube device comprising a substantially unitary tube of transparent material capable of being readily worked in the plastic condition, having two passageways longitudinal of the tube, each passageway having two end portions forming respective electrode chambers containing electrodes, the walls of the corresponding electrode chambers of the respective passageways being separate from each other.

5. A gaseous discharge tube device comprising a substantially unitary tube of transparent material capable of being readily worked in the plastic condition, having a plurality of passageways longitudinal of the tube, each passageway having two end portions forming respective electrode chambers containing electrodes, the walls of the electrode chambers of the respective passageways being independent of the walls of the corresponding electrode chambers of the other passageways.

6. A gaseous discharge device comprising a tube of transparent material having internal longitudinal passageways therein, each passageway containing electrodes, the maximum width of the tube walls being of the same order of magnitude as the diameter of the passageways, whereby the tubing may be heated and readily worked while plastic.

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

ROBERT C. SMALLEY.