Nov. 26, 1946. J. B. J. M. ABADIE 2,411,510

LUMINESCENT LAMP WITH TURBULENT DISCHARGE

Filed Jan. 22, 1940

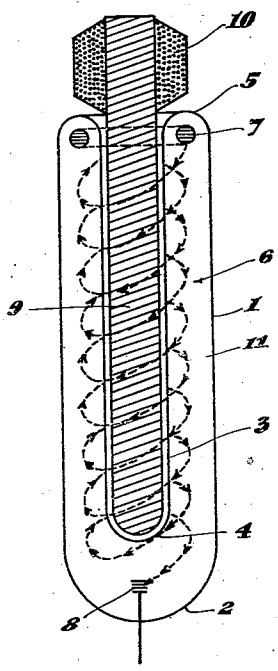


fig. 1

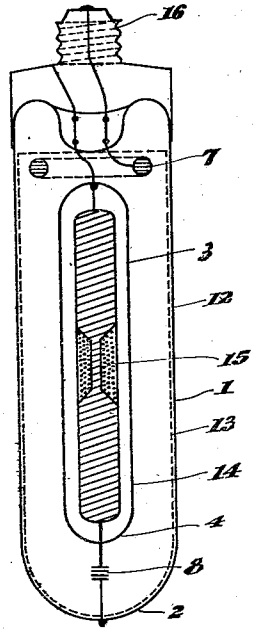


fig. 2

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Patented Nov. 26, 1946

2,411,510

UNITED STATES PATENT OFFICE

2,411,510

LUMINESCENT LAMP WITH TURBULENT DISCHARGE

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Application January 22, 1940, Serial No. 315,017

1 Claim. (Cl. 176—122)

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This invention relates to gaseous discharge tubes which are capable of becoming luminescent.

The purpose of the invention is to provide tubes of such nature, which are shorter in length, and consequently more suitable for use in lighting installations than those which heretofore have been made.

In the past, it has been the practice to make luminescent gaseous discharge tubes as long as possible relative to their diameters, in order that the tubes possess suitable power factor characteristics. However, tubes of such elongated form are not well suited for use in many lighting installations because of their cumbersome shape.

The objective of the present inventor, briefly, has been to provide tubes of shorter length than those which have been made heretofore, but in which the voltage drop in the positive column is of the same, or substantially the same, value as that in a tube of much greater length, filled with the same kind of gas, at the same pressure.

The present invention is principled upon the employment of a magnetic field which is normal to the electric field producing the discharge. The magnetic field serves to increase the length of the path through which the ionic discharge is caused to flow, and as a result, the potential gradient in the tube is increased independently of the length of the tube.

The drawing illustrates typical embodiments of the invention employing this principle. In the drawing:

Figure 1 is a diagrammatic view of a tube having a magnetic field centrally of its axis, and normal, or lateral to the path of the electric discharge.

Figure 2 is a diagrammatic view illustrating a typical modification of the arrangement shown in Figure 1.

The lamp of Figure 1 is of the tubular variety and it comprises an outer transparent envelope 1 having a closed end 2, and an inner tube 3 one of whose ends is closed 4. The open ends of these tubes are joined as at 5, to form a gas chamber indicated generally at 6.

The chamber 6 contains an electrode 7 at the one end encircling the inner tube member 3, and another electrode 8, at the other end. The chamber is filled with gas of a suitable kind, as understood by those skilled in the art, and at a suitable pressure, so that a gaseous discharge is produced when the tube is energized.

For the purpose of producing a magnetic field for increasing the path of the ionic discharge in the gas chamber, a magnetic core 9 is installed within the inner tube 3. This core is energized, or magnetically excited, by a coil 10; the magnetic excitation serves to produce a field indicated generally by the spiral dotted line 11.

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The ionic discharge flowing along the spiral path indicated by the dotted line is turbulent and greatly elongated, while the length of the tube from one end to the other is relatively short.

Another feature of the invention resides in the employment of a choke as heretofore connected in series with the tube. When this arrangement is employed, an increase in the intensity of the magnetic field causes an increase in the elongation of the positive column; as a result, for the same power factor, the value of the choke is or may be diminished. Furthermore, when the choke is in series with the field, it serves to control the negative resistance of the tube.

A further feature of the invention resides in the use of the magnetic field for the purpose of intensifying the electric and ionic friction of the discharge of luminescent substances within the tube, for the purpose of increasing their luminosity. Accordingly, in Figure 2, an outer tube 12, having a lining 13 of a suitable fluorescent or phosphorescent substance on its interior surface, is employed in conjunction with an inner tube 14 containing the choke assembly 15 for producing the magnetic field. The magnetic field is placed within the tube relative to the luminescent lining so as to increase the friction of the discharge of the fluorescent or phosphorescent material. The greater electronic friction imposed upon the luminescent body intensifies the illumination from it.

In the device shown in Figure 2 the outer tube 12 is equipped with a plug 16, and the choke is connected, as shown, within the body of the lamp, the electrodes being illustrated as in Figure 1.

It will be understood by those skilled in the art that other means may be employed for the production of the magnetic field in place of the particular arrangements disclosed.

Having described my invention, I claim:

A gaseous discharge tube containing an ionizable gas and having a pair of electrodes spaced to produce an electronic discharge for ionizing the gas, magnetic means positioned relatively intermediate the electrodes for producing a magnetic field in the path of the electronic discharge and a photoluminescent body contained within the tube, the magnetic field, the electronic field and the photoluminescent body being so related that the magnetic field elongates the path of the electronic discharge and deflects it toward the photoluminescent body to increase the friction of the discharge upon the body.

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