

PATENT SPECIFICATION

418,845

Application Date: July 1, 1933. No. 18,723/33.

Complete Left: May 31, 1934.

Complete Accepted: Nov. 1, 1934.

PROVISIONAL SPECIFICATION.



Improvements relating to Electric Discharge Lamps.

We, SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, of Caxton House, Tothill Street, Westminster, London, S.W.1, a Company registered under British Law, DOBRULUX LIMITED, of 107, New Bond Street, London, W.1, a Company registered under British Law, and JOHN NORMAN ALDINGTON, of Siemens Electric Lamps and Supplies Limited, Dock Road, Preston, Lancashire, a British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to electric discharge lamps of the kind in which a discharge between electrodes causes the glowing of gas contained within the lamp.

In such lamps with a particular disposition and shaping of the electrodes the glow moves regularly or irregularly having an oscillatory or even a rotary motion when the lamp is connected to a supply with steady voltage.

A discharge lamp having a moving glow of this character is described in Patent Specification No. 383,530 and is provided with a dome shaped cathode and a plate shaped anode situated adjacent to the base of the dome.

If such a lamp is supplied with alternating current at the same voltage the intensity of illumination diminishes and generally the glow ceases to move. On this account rectifiers are supplied with lamps to be used on alternating current.

In the present invention an electric discharge lamp intended to have a moving glow is made more suitable for use with a raw alternating current supply by restricting considerably the area of one electrode.

In the case of the lamp described in Specification 383,530 this may be achieved by placing on each side of the plate electrode a mica disc so that only the edge of the plate is exposed.

The plate electrode may be of iron and the dome shaped electrode of aluminium. The leads from the foot of the lamp are preferably coated with a heat resisting coating.

The gas filling is preferably of neon at a pressure of from 10—20 m/m of mercury with or without the addition of a small quantity of hydrogen, helium or argon.

The resistance employed in series with the lamp to limit the current may require to be of a different value to that employed in the case of a lamp fed from a direct current or rectified alternating current supply.

Dated this 30th day of June, 1933.

SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED,
A. M. HICKS,
Secretary,
For Selves and Co-Applicants.

COMPLETE SPECIFICATION.

Improvements relating to Electric Discharge Lamps.

We, SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, of Caxton House, Tothill Street, Westminster, London, S.W.1, a Company registered under British Law, DOBRULUX LIMITED, of 107, New Bond Street, London, W.1, a Company registered under British Law, and JOHN NORMAN ALDINGTON, of Siemens Electric Lamps and Supplies Limited, Dock Road, Preston, Lancashire, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electric discharge lamps of the kind in which a discharge between electrodes causes the glowing of gas contained within the lamp.

In such lamps with a particular disposition and shaping of the electrodes the glow moves regularly or irregularly and has an oscillatory or even a rotary motion when the lamp is connected to a supply with direct voltage.

[Pric

A discharge lamp having a moving glow of this character is described in Patent Specification No. 383,530 and is provided with a dome shaped cathode and a plate shaped anode situated adjacent to the base of the dome and is intended to be used with a direct current supply.

The present invention has in view an improved lamp of the character mentioned which is especially adapted to be used with an alternating current supply, without associating a rectifier with the lamp.

In the present invention an electric discharge lamp intended to have a moving cathode glow is made more suitable for use with raw alternating current supply by restricting considerably the area of one electrode relatively to the other as compared with prior practice.

Accordingly, the lamp of the present invention has symmetrically disposed electrodes slightly spaced from each other by insulating material one of the electrodes being a tapering surface of revolution and its active surface being considerably larger than the active surface of the other. The relative areas should not be less than 3:1 and we find that, preferably, the relation should be of the order of 8:1.

In the case of the lamp referred to above this is achieved by placing on each side of the plate electrode a mica disc so that only the edge or only the edge and a very narrow annulus on the upper side of the plate is exposed.

A lamp constructed in accordance with the principles of the present invention is illustrated in the accompanying drawing, Fig. 1 of which shows a completely assembled lamp, and Fig. 2 of which shows the parts somewhat more diagrammatically.

Lead wires *d* and *g* extend through glass tube *b* and through the pinch *b1*. The pinch *b1* has an extension *b3* through which the wire *d* passes, and which serves as a support for mica discs *r1* and *r2*, for the electrode disc *o* which may be of iron, and for the mica disc *p*. Connected to the upper end of wire *d* is a small threaded metal rod *d1* which carries a dome shaped electrode *m*. The dome shaped electrode may be made of aluminium and is secured to the threaded end of rod *d1* in such manner as to rest upon, or very close to, mica disc *p*. Lead *g* may be connected in any convenient manner to electrode *o*. Mica disc *r1* should be of such size as completely to cover the underside of electrode *o* and mica disc *p* should be of such size as to leave exposed only the edge and, it may be, also a narrow annular ring, on the upper side of electrode *o*. The parts,

particularly the dome and annular exposed surface of electrode *o* should be symmetrically mounted relatively to each other. Leads *d* and *g* where they are not protected by the glass tube etc., should be coated with an insulating and heat resisting material.

The gas filling is preferably of neon at a pressure of from 10 to 20 milli-metres of mercury with or without the addition of a small quantity of hydrogen, helium or argon.

It has been found that with a ratio of the area of the dome to that of the exposed part of the disc electrode of not less than 3:1 a satisfactory glow can be obtained on alternating current. With increasing ratio the boundaries of the glow become more defined and a more definite movement is produced. The preferred ratio is about 8:1.

The current density should not exceed 1 milli-ampere a square centimetre of the cross sectional area of the glow. If it does exceed this amount, pitting of the dome may occur, and a cessation of the movement of the column may follow.

The resistance, shown as *i* in Fig. 2, employed in series with the lamp for the limitation of the current may require to be of different, generally lower, value from that employed in lamps fed from a direct current or rectified alternating current source.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A cathode glow electric discharge lamp having the electrodes disposed symmetrically about the virtual axis of rotation of the glowing layer and spaced apart at a small distance with thin solid insulation, one at least of the electrodes being a tapering surface of revolution and being as to its active surface of considerably greater area as hereinbefore set out than the active surface of the other whereby the discharge is caused to oscillate or gyrate over the surface of the larger electrode when the lamp is connected to an alternating source of supply.

2. A cathode glow electric discharge lamp having an electrode of dome shape and an electrode of annular form having an internal diameter not less than the diameter of the base of the dome, the two electrodes being co-axially mounted and spaced apart at a small distance with thin solid insulation, and in which the ratio of the area of the dome to that of the annulus is of the order of 8:1 whereby the discharge is caused to oscillate or gyrate over the surface of the larger elec-

70

75

80

85

90

95

100

105

110

115

120

125

130

trode when the lamp is connected to an alternating source of supply.

3. A cathode glow electric discharge lamp suitable for use on an alternating
5 source of supply constructed substantially as described with reference to the accompanying drawing.

Dated this 31st day of May, 1934.

SIEMENS ELECTRIC LAMPS AND
SUPPLIES LIMITED,

A. M. HICKS,

Secretary,

For Selves and Co-Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934.

Fig. 1.

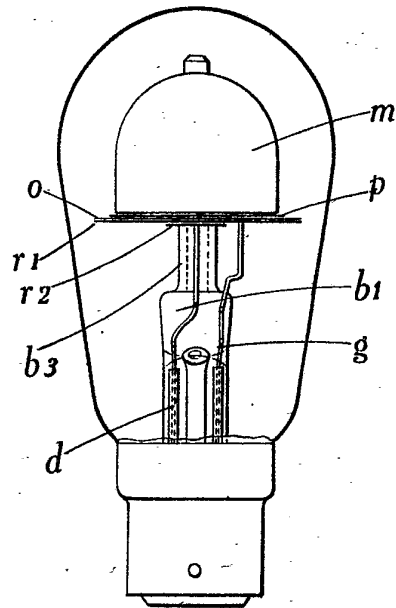
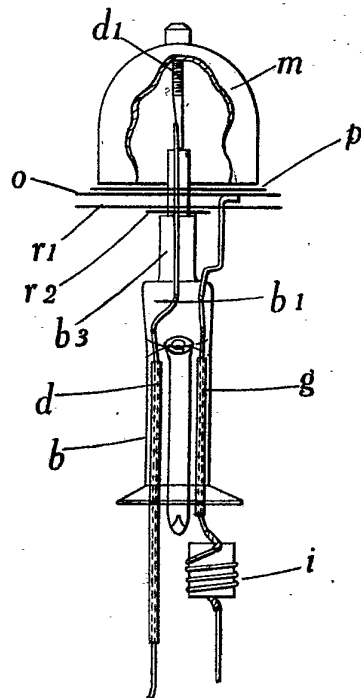


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]