Feb. 11, 1936. A. G. PEARCE 2,030,392

MANUFACTURE OF ELECTRIC DISCHARE TUBES

Filed July 19, 1934

Fig. 1

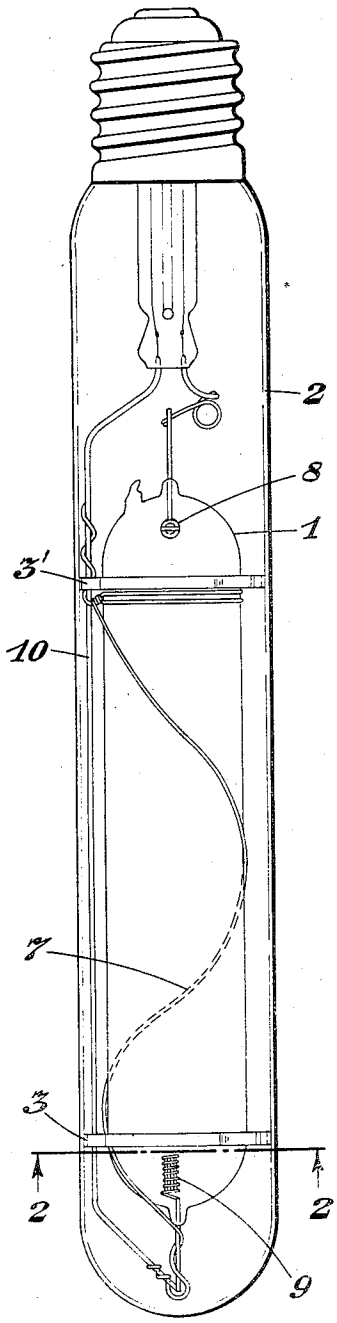


Fig. 2

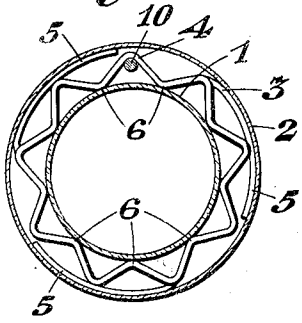


Fig. 3

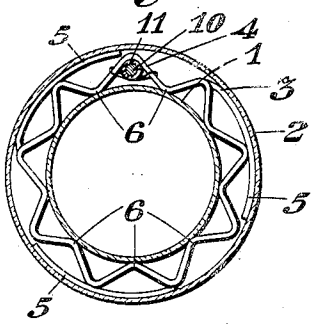


Fig. 4

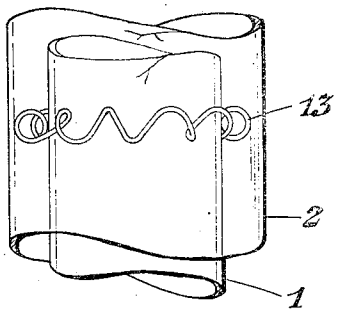
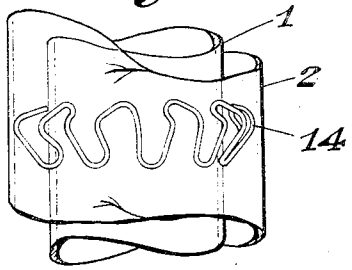


Fig. 5



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MANUFACTURE OF ELECTRIC DISCHARGE TUBES

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Application July 19, 1934, Serial No. 736,082
In Great Britain July 28, 1933

7 Claims. (Cl. 176—122)

This invention relates to the manufacture of electric discharge tubes, and more particularly luminous electric discharge tubes, of the type in which a discharge tube proper is enclosed in an outer envelope, which may be evacuated.

A particular object of the invention is to provide a novel means of supporting a gaseous discharge device within an outer jacket. Other objects and advantages of the invention will appear from the following detailed description or from the drawing.

The invention consists in the new and novel combination of elements hereinafter set forth and claimed.

In lamps which must operate at a relatively high temperature the discharge tube has hitherto usually been supported in an outer envelope by means of rings attached to the leading-in wires. This form of construction is mechanically weak and as a result the tubes are apt to be damaged in transport. The alternative of supporting the discharge tube by members bearing on its body has not been adopted because such supports, being in contact with the body, produce local cooling, which it is one of the objects of the envelope to prevent. I have now found that this difficulty can be overcome by means of supporting members of novel design.

According to the invention, an electric discharge lamp of the type specified comprises a plurality of annular metal members supporting the discharge tube proper in the outer envelope, each annular member bearing on the body of the discharge tube only at a plurality of isolated places, the sum of whose lengths measured along the circumference of the discharge tube is much less than the length of that circumference. Preferably the number of annular members is two. The number of isolated places of contact is preferably three or more. The thickness of the metal of the members and the width of the annulus should also be as small as is consistent with mechanical strength, in order to decrease heat conduction from the points of contact.

One embodiment of the invention is shown by way of example in the accompanying drawing in which

Figure 1 is an elevation of the complete lamp,

Figure 2 a section perpendicular to its axis through one of the annular members.

Figure 3 is a similar view to that of Figure 2 showing a modification of the structure of Figures 1 and 2, and

Figures 4 and 5 are fragmentary elevations showing further modifications of the structure of Figure 1.

In this drawing with particular reference to Figs. 1, 2 and 3, 1 is the discharge tube proper, 2 the outer envelope; 3, 3¹ are the annular supporting members of sheet nickel about 0.2 mm. thick; their width is about 3 mm. They are spaced longitudinally by the wire 10 which runs along the whole length of the tube and connects the electrode 9 to the leading-in wire through the pinch seal at the other end. The supporting members 3, 3¹ may be connected directly to 10, as shown in Figs. 1 and 2, or they may be fixed to an insulating tube 11 surrounding and carried by 10, as shown in Fig. 3. In some cases, where the direct connection may lead to blackening of the tube, this alternative construction is preferable.

As shown in Figure 2 each member 3, 3¹ consists of a corrugated portion 4 and arcuate portions 5. Some of the inner apices of the corrugations bear on the tube 1; the number of those that bear on it will adjust itself to be at least three and generally no more than three. The arcuate portions 5, which bear against the outer envelope, are each attached at one end to the outer apex of one of the corrugations, but are free at their other ends; their object is to make the member more resilient and to allow it to adapt itself to envelopes of slightly different diameters and also to allow the corrugated portion 4 to adapt itself to tubes of slightly different diameters.

The wire 7 is part of a starting device in which a conductor at the potential of one electrode is brought into the neighborhood of the other. If the supporting member 3¹ is in the neighborhood of the electrode 8 and connected electrically by the wire 10 to the remote electrode 9, as shown in Figs. 1 and 2, this member by itself may act as one end of the conductor in a starting device of this kind. It is generally advisable, however, to supplement this member 3¹ by the thin wire 7, in electrical connection with 3¹, 9 and 10, wrapped in a single spiral turn around the greater part of the length of the tube and in several turns of a close spiral near the member 3¹; this arrangement is shown in the drawing. If the supporting member 3¹ is insulated from the remote electrode, as in Fig. 3, the wire 7 will be necessary, of course, if a starting device of this kind is required.

Alternative forms of supporting member according to the invention are shown in Figures

4 and 5. In each of these figures only one supporting member and the parts of the inner tube 1 and an outer envelope 2 on which it bears are shown; the remainder of the device being as shown in Fig. 1.

In Figure 4 the supporting member is an annular wire helix 13. In Figure 5 it is an annular wire zig-zag 14, the zig-zag being distorted from a plane so that the central portions bear on the outer envelope and the edges on the inner tube. The supporting members 13 and 14 do not generally require to be held in position longitudinally, although they may be attached to the wire 10 if desired.

While I have described my invention by reference to certain embodiments thereof it is to be understood that various changes, omissions and substitutions, within the scope of the appended claims, may be made therein without departing from the spirit thereof.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a metal member which surrounds said envelope and makes contact therewith only at a plurality of isolated places.

2. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a corrugated metal member which encircles said envelope and makes contact therewith only at the inner apices of the corrugations.

3. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a corrugated metal member which encircles said envelope and makes contact therewith only at isolated points, said members having resilient metal strips affixed thereto which bear upon the inner surface of said jacket.

4. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a wire helix which surrounds said envelope and makes contact therewith only at separated points.

5. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a wire which forms a succession of apices which make contact alternately with said envelope and said jacket, successive points of contact with one of said bodies lying on opposite sides of a plane which passes through the points of contact with the other.

6. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a metal member which surrounds said envelope and makes contact therewith only at isolated points, said member being attached to the lead to one of said inleads.

7. An electric gaseous discharge device comprising a sealed envelope containing a gaseous atmosphere and having electrodes sealed therein, an enclosing heat-conserving jacket for said envelope, and means to support said envelope concentrically within said jacket, said means comprising a metal member which surrounds said envelope and makes contact therewith only at isolated points, said member being attached to the lead to one of said inleads but insulated therefrom.

ARTHUR GEORGE PEARCE.