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INCANDESCENT LAMP

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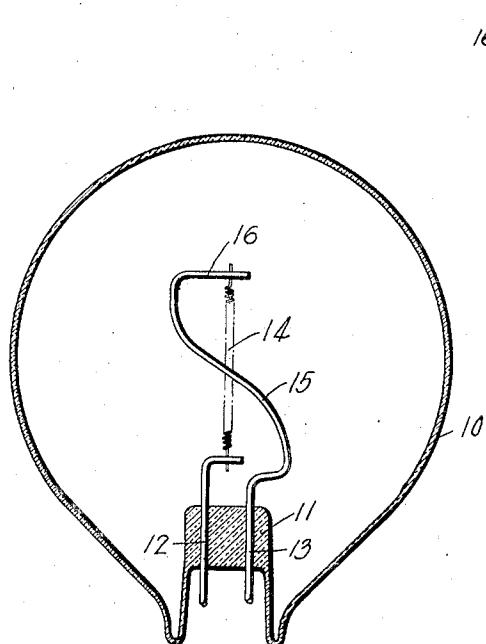


Fig. 1

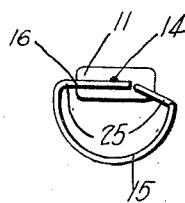


Fig. 3

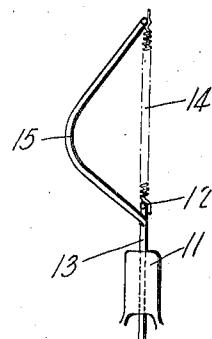


Fig. 2

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## UNITED STATES PATENT OFFICE

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## INCANDESCENT LAMP

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8 Claims. (Cl. 176—16)

This invention relates to incandescent lamps; more specifically to incandescent lamps for use in optical systems, such as, for example, Fresnel lens systems, wherein it is desired that as large a proportion of the total light emitted by the lamp be distributed substantially evenly and horizontally around an axis extending vertically through the base of the lamp.

One of the objects of the invention is to provide a supporting and/or current-conducting means for a filament system of an incandescent lamp which shall permit the desired distribution of light from the filament system. Other objects and advantages will appear as the invention is hereinafter disclosed.

Referring to the drawing, which illustrates what we now consider a preferred form of our invention:

Fig. 1 is an elevation, partly in section, of a part of a lamp embodying one form of our invention.

Fig. 2 is a side elevation of a portion of the structure shown in Fig. 1.

Fig. 3 is a top plan view of a portion of the structure shown in Fig. 1.

The lamp shown in Figs. 1 to 3 comprises a sealed transparent bulb or hollow container 10 of glass or other suitable material, adapted to be secured at its lower end in or to a base (not shown) and having a re-entrant portion 11 through which the current-conductors or wires 12 and 13 are led. It will be understood the wires 12 and 13 are suitably sealed in the glass container so as to make it possible for the container to retain the desired degree of vacuum or gas pressure within it. The lamp comprises a filament system, in this case a vertical filament 14, which when heated by passage of suitable electric current, becomes incandescent and emits light. The particular filament shown is a helical wire of suitable material, such as drawn tungsten or other material; the axis of the filament being vertical when the lamp is used in optical systems of the class referred to above. Such a vertical filament will, when incandescent, emit light radially and horizontally from its axis substantially uniformly.

Heretofore the construction of the supporting and/or current-conveying means have been such as to interfere objectionably with the desired evenness or uniformity of distribution of light emanating from the filament system. This objection has been overcome by our invention.

In the form of our invention now being de-

scribed, the wire 13 is extended upwardly and has a helical portion 15 extending from adjacent the lower end of the filament 14 to the upper end thereof. The supporting element 13—15 has an offset 16 at its upper end to which the upper end of the filament 14 is electrically and mechanically connected. The element 13—15—16, in the form of device shown, serves not only as a supporting element for the upper end of the filament but also as a current-conveying conductor. The lower end of the filament is electrically and mechanically connected to an offset of the wire 12.

Thus it will be understood that the elements 12 and 13—15—16 not only support the filament 14 but serve also to convey electric current to and from the filament.

The noteworthy feature is that by virtue of the helical configuration of the supporting element at 15, the desired uniform distribution of light emanating from the filament 14 radially and horizontally is not seriously disturbed. The radius of the helix 15 is as large as possible, consistent with practical considerations of manufacture, strength and the desired approach to ideal conditions of light distribution as dictated by the particular service to which the lamp is to be put. The angle 25 (see Fig. 3) subtended by the helical portion 15 may be greater or less than that shown depending upon similar factors.

In lamps embodying our invention, the supporting and/or current-conveying means does not objectionably or materially obstruct the light emitted by the filament in any direction. Thus, when looking horizontally toward the vertical filament from any direction, the filament is not totally obscured since the portion 15 does not screen the filament at more than one point, in the preferred form of the invention.

In accordance with the provisions of the patent statutes, we have herein described the principle of operation of our invention, together with the apparatus which we now consider to represent the best embodiments thereof, but we desire to have it understood that the apparatus disclosed is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combinations and relations described, some of these may be altered and others omitted and some of the features of each modification may be embodied in the others without interfering with the more general results outlined, and the invention extends to such use within the scope of the appended claims.

We claim:

1. In a Fresnel lens system for emitting light which, in planes at right angles to a straight line constituting the optical axis of the system, is substantially radially uniform; the combination of an incandescent light source, supporting means connected to said light source at one end thereof, and a rod member connected to said supporting means and to said light source and having a portion extending from one end of said light source to the other end thereof and through a space through which light from the light source may pass in planes perpendicular to said optical axis, the said portion of said rod member being a three-dimensional curve and angularly intersecting all of said last-mentioned planes, to minimize blocking of light emission in said planes.
2. An incandescent lamp comprising in combination, a vertical filament, supporting means connected to said filament at one end thereof, and a current-conducting supporting rod connected to the opposite end of said filament and to said supporting means, the said supporting rod being a three-dimensional curve and being inclined at its intersection with all horizontal planes which lie between the upper and lower ends of the filament.
3. In a Fresnel lens system for emitting light which, in planes at right angles to a straight line constituting the optical axis of the system, is substantially radially uniform; the combination, of an incandescent light source having a support at one end thereof and a supporting member connected to the opposite end of said light source and having a portion extending from one end of said light source to the other end thereof, the said portion of said member being a three-dimensional curve and being inclined with respect to all planes which are perpendicular to the said optical axis and which are intersected by the said portion of said member.
4. An incandescent lamp comprising in combination, a vertical filament, a supporting element connected to said filament at one end thereof, and a second supporting element connected to the opposite end of said filament and terminating adjacent the first mentioned supporting element,

the said second supporting element having a portion which is a three-dimensional curve inclined at its intersection with all horizontal planes which lie between the upper and lower ends of the filament.

5. An incandescent lamp comprising in combination, a vertical filament, a supporting element connected to said filament at one end thereof, and a second supporting element connected to the opposite end of said filament and having a helical portion disposed between a pair of horizontal planes respectively perpendicular to the filament at its ends.

6. An incandescent lamp comprising in combination, a vertical filament, a lead-in wire connected to said filament at one end thereof, and a second lead-in wire connected to the opposite end of said filament, the said second lead-in wire having a helical portion disposed between a pair of horizontal planes respectively perpendicular to the filament at its ends.

7. In a Fresnel lens system for emitting light which, in planes at right angles to a straight line constituting the optical axis of the system, is substantially radially uniform; the combination of an incandescent light source having a support at one end thereof, and a current-conducting member connected to the opposite end of said light source and having a portion extending from one end of said light source to the other end thereof, the said portion of said member being a three-dimensional curve which intersects a plurality of planes in which light is emitted perpendicularly to the said optical axis, and said portion being inclined with respect to all said intersected planes.

8. An incandescent lamp comprising in combination, a vertical filament, a current-conducting supporting element connected to said filament at one end thereof, and a helical current-conducting supporting element connected to the opposite end of said filament, and extending helically within the space between a pair of planes respectively perpendicular to the filament at its ends.

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