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INCANDESCENT ELECTRIC LAMP

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*Fig. 1.*

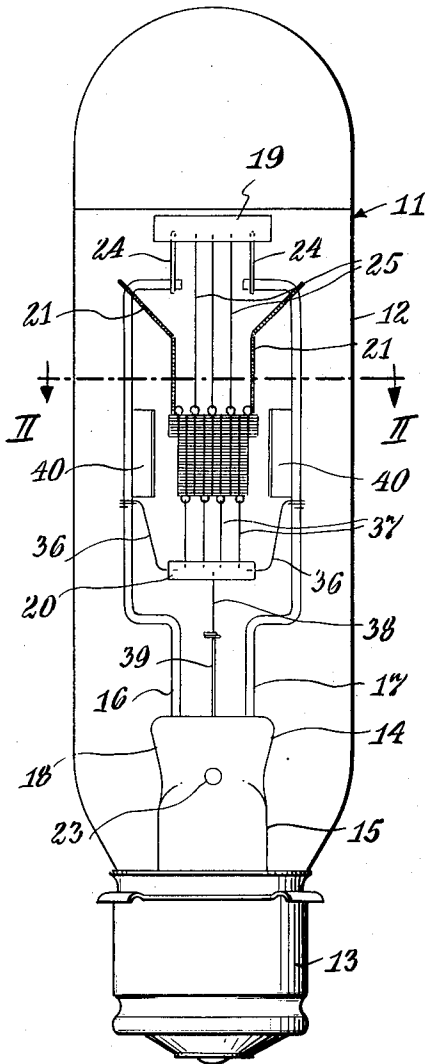


*Fig. 2.*

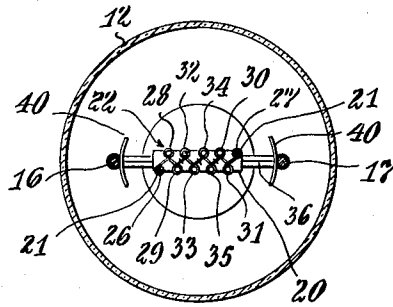
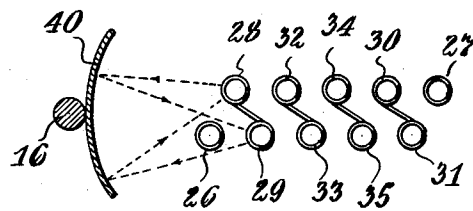


*Fig. 3.*



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## UNITED STATES PATENT OFFICE

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## INCANDESCENT ELECTRIC LAMP

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10 Claims. (Cl. 313-344)

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This invention relates to lamps and, more particularly, to filaments for projection lamps.

The conventional filament for a projection lamp is a biplane ten-section filamentary electrode having the first and last sections for mounting on the stem leads, the second and third and eighth and ninth sections as outer sections, and the remaining four sections as center or inner sections.

During the operation of the projection lamp, the center and outer sections of the filament mutually receive heat from one another. The outer sides of the outer sections are, however, cooled by conduction through and convection currents in the fill gas. Hence, the center sections operate at a higher temperature than the outer sections, thereby giving both non-uniform filament temperature and resultant screen illumination. In addition, the center sections tend to develop hot spots which cause the material of the filament to vaporize and the wire to break, thus ending the life of the lamp. Further, a non-uniform light source is extremely difficult to focus and decreases the resulting screen intensity.

Hence, it has been found advantageous, according to my invention, to mount refractory metal reflectors on the supporting lead wires of the stem in close proximity to the respective outer sections of the filament for the purpose of reflecting heat back to the outside sections, thereby producing a more uniformly heated filament.

In its general aspect, the present invention has the object of overcoming the afore-mentioned disadvantages of the prior art filaments for projection lamps.

Specifically, an object of the present invention is a uniformly heated filament for a projection lamp.

Another and specific object is a uniformly heated filament for a projection lamp which will increase screen intensity and uniformity.

An additional object is a uniformly heated filament for a projection lamp which will facilitate focusing on the screen.

Another object is a uniformly heated filament for a projection lamp which will not produce hot spots in the center section and will give a longer lamp life.

A further object is a biplane continuous coil sectional filament for a projection lamp and refractory metal reflectors mounted on the lead wires of the stem in close proximity to the outer sections of the filament to reflect heat back to the outer sections, thereby producing a more uniformly heated filament.

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Other objects and advantages of the invention will appear to those skilled in the art to which it appertains as the description proceeds, both by direct recitation thereof and by implication from the context.

Referring to the accompanying drawing, in which like numerals of reference indicate similar parts throughout:

Fig. 1 is an elevational view of a projection lamp embodying my invention;

Fig. 2 is a transverse sectional view of the lamp of Fig. 1, in the direction of the arrows, along line II-II;

Fig. 3 is a fragmentary sectional view, similar to Fig. 2, but enlarged to show details of my invention.

Referring to the drawing in detail, the reference numeral 11 designates an incandescent electric lamp, such as a projection lamp manufactured for base-down operation, and comprising a vitreous envelope or bulb 12 with an opaque end section, a base 13, and enclosing a mount 14.

This mount 14 comprises a stem 15, leading-in and supporting conductors 16 and 17 extending through the press 18 of stem 15, a top fixed bridge 19, a bottom floating bridge 20, filament leg inserts 21, and a filament 22. The stem 15 is sealed to the bulb and provided with an exhaust tube opening therethrough, as indicated at 23. Leading-in conductors 16 and 17 are bent at right angles outwardly from the axis of the stem a short distance above the press and then vertically upward or parallel to the bulb axis. The upper or free extremities are bent inwardly at right angles and terminate close to the axis of the stem. Connected to the free end portions of conductors 16 and 17 by means of outer support wires 24, is a fixed top insulating bridge 19. This bridge 19 consists of a piece of vitreous cane having embedded therein the upper extremities of wires 24 and of top filament support wires 25. These wires 25 of bridge 19 depend from said bridge and support filament 22 by means of a hook formed in the lower ends of said wires 25.

This biplane sectional filament 22 comprises, in the present embodiment as shown in Fig. 3, ten sections, namely fragmentary terminal sections 26 and 27, outer sections 28, 29, 30 and 31 and center or inner sections 32 and 33, 34, 35. These sections are connected by inter-section loops and staggered, so that five are disposed in one normally vertical plane parallel to that of leading-in conductors 16 and 17 and five in a normally vertical plane parallel thereto and so spaced that in plan they lie at the vertices of

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isosceles triangles. The upper uncoiled portions of the connected sections of filament 22 are draped on the formed hooks of supports 25. The fragmentary terminal sections 26 and 27 of filament 22 are electrically connected to conductors 16 and 17 by means of filament leg inserts 21. Each of these inserts comprises an obliquely L-shaped metallic lead wire over which has been wound a refractory coil which readily screws into the terminal sections of filament 22. The upper end in each insert 21 is secured, as by welding, to the free end of leading-in conductors 16 and 17.

For the purpose of positioning filament 22 between conductors 16 and 17, a floating bottom bridge 20 is provided, free to slide on the lower portions of leading-in conductors 16 and 17 by means of side guide wires 36. This bridge 20 is similar in construction to bridge 19, except that in the present showing there are four lower filament support wires 37 for engaging the lower uncoiled inter-section portions of filament 22 by means of their hooked upper extremities. Depending from the vitreous cane portion of bridge 36, is a bottom guide wire 38 which is free to slide within the outer loop of a spud or dummy lead 39 projecting from press 19.

According to my invention heat reflectors 40, one suitably secured to the inner side of each of the leading-in conductors 16 and 17, as by welding, and symmetrically placed about the outer sections of filament 22, are provided to reflect, for example, as shown in Fig. 3, radiated heat from section 29 into section 30 and vice versa. Some heat is radiated from and absorbed in the terminal sections as, for example, section 26. These reflectors, suitably formed of refractory metal such as molybdenum, are portions of a cylindrical mirror having its center of curvature along the axis of the filament and midway between the centers of the next adjacent outer sections, such as sections 28 and 29 of filament 22. A mirror-like surface is provided on the inside of reflectors 40 by electropolishing them in any desired manner, as by means of a chemical solution. It will be understood that the reflectors 40 may be made of a non-metallic material, such as a ceramic or plastic, suitably coated on the inner reflecting surface at least with a metal such as silver.

Thus it will be seen from the foregoing description that my invention has overcome the aforementioned disadvantages of the prior art filaments for projection lamps. I have provided a biplane sectional filament 22 for an incandescent electric lamp, such as projection lamp 11, with refractory metal reflectors 40 mounted on the leading-in conductors 16 and 17 of the stem 15 in spaced proximity to adjacent outer sections, such as sections 29 and 30 of said filament, to reflect the heat from said outer sections and thereby return it to said outer sections. This produces a substantially uniformly heated filament for a projection lamp which will increase screen intensity and uniformity, and facilitate focusing on the screen.

While a preferred embodiment of my invention has been disclosed, it will be understood that modifications may be made within the spirit and scope of the appended claims.

I claim:

1. An incandescent electric lamp comprising an enclosing envelope and mount; said mount consisting of a stem having extending therefrom leading-in and supporting conductors and a

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dummy lead with a loop on its free end, a fixed top insulated bridge for connecting the free end portions of said conductor supports depending from said bridge, a filament having a plurality of coiled sections comprising terminal sections, outer sections and center sections united by looped portions and connected to said supports, filament leg inserts connected to said terminal sections and said conductors, a bottom floating bridge supported by and below said filament and slidable on said conductors and in said loop of said dummy lead, and a reflector mounted on each of said conductors in spaced proximity to adjacent terminal sections of said filament.

2. An incandescent electric lamp comprising an enclosing envelope and a mount; said mount consisting of a stem having extending therefrom leading-in and supporting conductors and a dummy lead with a loop on its free end, a fixed top insulated bridge for connecting the free end portions of said conductor, supports depending from said bridge, a filament having a plurality of coiled sections comprising terminal sections, outer sections, and center sections united by looped portions and connected to said supports, filament leg inserts connected to said terminal sections and said conductors, a bottom floating bridge supported by and below said filament and slidable on said conductors and in said loop of said dummy lead, and a refractory metal reflector mounted on each of said conductors in spaced proximity to adjacent terminal sections on said filament.

3. An incandescent electric lamp comprising an enclosing envelope and a mount; said mount consisting of a stem having extending therefrom leading-in and supporting conductors and a dummy lead with a loop on its free end, a fixed top insulated bridge for connecting the free end portions of said conductor supports depending from said bridge, a filament having a plurality of coiled sections comprising terminal sections, outer sections and center sections united by looped portions and connected to said supports, filament leg inserts connected to said terminal sections and said conductors, a bottom floating bridge supported by and below said filament and slidable on said conductors and in said loop of said dummy lead, and a reflector mounted on each of said conductors in spaced proximity to adjacent terminal sections of said filament.

4. A mount for an incandescent electric lamp comprising an enclosing envelope and a mount; said mount consisting of a stem having extending therefrom leading-in and supporting conductors and a dummy lead with a loop on its free end, a fixed top insulated bridge for connecting the free end portions of said conductor supports depending from said bridge, a filament having a plurality of coiled sections comprising terminal sections, outer sections and center sections united by looped portions and connected to said supports, filament leg inserts connected to said terminal sections and said conductors, a bottom floating bridge supported by and below said filament and slidable on said conductors and in said loop of said dummy lead, and a reflector mounted on each of said conductors in spaced proximity to adjacent terminal sections of said filament.

5. A mount for an incandescent electric lamp comprising an enclosing envelope and a mount; said mount consisting of a stem having extending therefrom leading-in and supporting conductors and a dummy lead with a loop on its free

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end, a fixed top insulated bridge for connecting the free end portions of said conductor supports depending from said bridge, a filament having a plurality of coiled sections comprising terminal sections, outer sections and center sections united by looped portions and connected to said supports, filament leg inserts connected to said terminal sections and said conductors, a bottom floating bridge supported by and below said filament and slidably on said conductors and in said loop of said dummy lead, and a refractory metal reflector mounted on each of said conductors in spaced proximity to adjacent terminal sections of said filament.

6. A mount for an incandescent electric lamp comprising an enclosing envelope and a mount; said mount consisting of a stem having extending therefrom leading-in and supporting conductors and a dummy lead with a loop on its free end, a fixed top insulated bridge for connecting the free end portions of said conductor supports depending from said bridge, a filament having a plurality of coiled sections comprising terminal sections, outer sections and center sections united by looped portions and connected to said supports, filament leg inserts connected to said terminal sections and said conductors, a bottom

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floating bridge supported by and below said filament and slidably on said conductors and in said loop of said dummy lead, and a cylindrical reflector mounted on each of said conductors in spaced proximity to adjacent terminal sections of said filament.

7. In combination with a biplane sectional filament for an incandescent lamp, a reflector mounted in spaced proximity to the outer sections of said filament.

8. In combination with a biplane sectional filament for an incandescent electric lamp, a refractory metal reflector mounted in spaced proximity to said outer sections of said filament.

9. In combination with a biplane sectional filament for an incandescent electric lamp, a cylindrical mirror refractory metal reflector mounted in spaced proximity to said outer sections of said filament.

10. In combination with a biplane sectional filament for an incandescent lamp, a cylindrical mirror reflector having its center of curvature along the axis of said centers of the next adjacent outer sections of said filament.

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No references cited.