Dec. 20, 1938. H. E. ALLEN 2,140,977

INCANDESCENT LAMP

Filed July 16, 1937

Fig. 1.

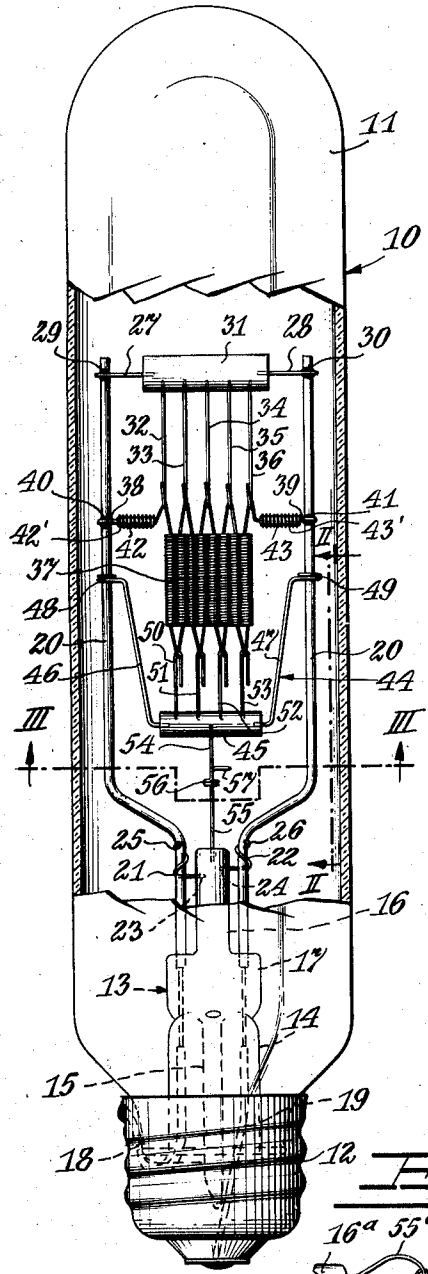


Fig. 2.

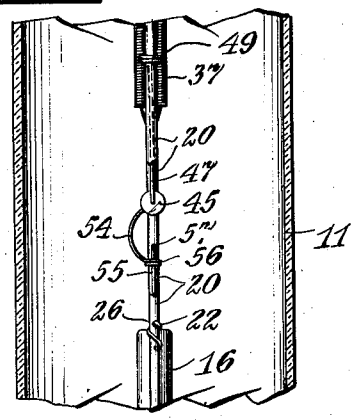


Fig. 4.

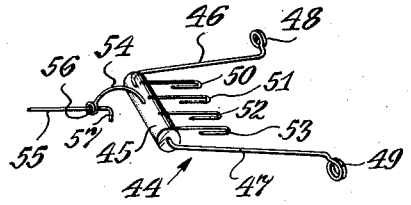


Fig. 3.

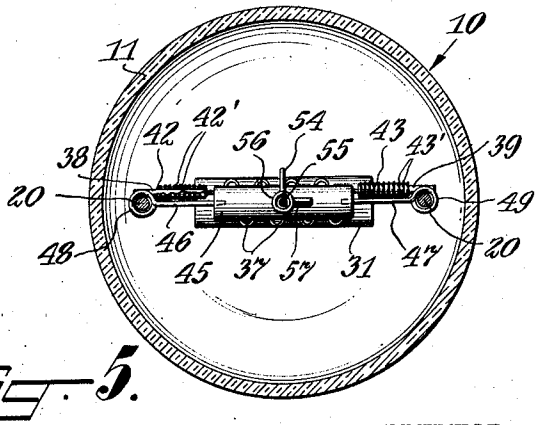
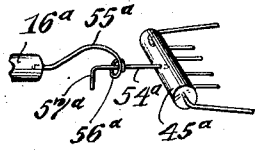


Fig. 5.



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INCANDESCENT LAMP

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Application July 16, 1937, Serial No. 153,918

13 Claims. (Cl. 176—39)

This invention relates to incandescent electric lamps and more particularly to such adapted for projection service and employing coiled filaments as light sources.

The principal object of my invention, generally considered, is the provision of an electric lamp adapted for projection service, and having a coiled filament so mounted therein that strains in said filament due to changes in temperature are substantially eliminated.

Another object of my invention is the elimination of strains due to expansion and contraction of lamp parts, such as the inner leads and supports, to avoid filament distortion which is apt to occur, especially when lamps are subjected to intermittent operation.

A further object of my invention is the provision of a lamp, particularly adapted for projection service, said lamp having a coiled filament mounted between inner leads which are threaded through loops at the upper ends of a guiding bridge secured to lower portions of said filament, the upper portions of the filament being suspended from an insulator connecting the upper ends of the leads.

A still further object of my invention is the provision of means for eliminating strains due to temperature changes in a lamp having a coiled filament, comprising the employment of a light bridge assembly suspended from the bottom of the filament, having arms extending vertically upwardly or diagonally upwardly and outward and slidable on the leads which support the filament, and a bottom member slidably guided with respect to the stem, in order to prevent tilting when the lamp is operated in a position other than vertical.

Another object of my invention is the provision of braces or tie wires to prevent distortion of the inner supporting leads at a point adjacent or slightly above the stem press.

Other objects and advantages of the invention, relating to the particular arrangement and construction of the various parts, will become apparent as the description proceeds.

Referring to the drawing illustrating my invention:

Fig. 1 is a side elevational view of a projection lamp embodying my invention, with portions of the envelope or bulb broken away to more clearly show the interior construction.

Fig. 2 is a vertical sectional view, on the line II—II of Fig. 1, in the direction of the arrows.

Fig. 3 is a horizontal or transverse sectional view, on the line III—III of Fig. 1, in the direction of the arrows.

Fig. 4 is a detailed perspective view of the floating bridge and associated guide wire illustrated in Figs. 1, 2, and 3.

Fig. 5 is a view corresponding to Fig. 4, but showing another embodiment of said guide.

Referring to the drawing in detail, like parts being designated by like reference characters, and first considering the embodiment of my invention shown in Figs. 1 to 4 inclusive, there is disclosed a lamp 10 comprising an envelope or bulb 11, with a base indicated at 12, and enclosing a mount 13.

The mount of the present embodiment comprises a flare tube 14, sealed to the bulb and provided with an exhaust tube 15, and an arbor or button 16, extending from a press 17. Leading-in conductors 18 and 19 extend through the press from the base 12 and connect with relatively rigid inner supporting leads 20, which may be formed of nickel, or other suitable material, with their normally lower ends imbedded in the press 17.

In order to further rigidify the connection between the inner supporting leads 20 and the press 17, I provide wires 21 and 22, ends of which are imbedded in the arbor 16, as indicated at 23 and 24, and which extend outwardly therefrom and are wound around the leads 20 to which, after one or more turns, they are spot-welded, as indicated at 25 and 26. By using this construction, breakage or distortion is avoided, as the embrittled portions of the wires 21 and 22 (which are desirably formed of molybdenum) which develop during the welding process, are removed from the portions subjected to the direct strain where the wires contact the supporting leads 20.

One reason for this desired rigidification is that these nickel leads 20, regardless of original stiffness, are softened during the stem making process up to a point several millimeters above the press, so that they would be apt to bend easily when subjected to shock. This tying of the leads to the upper portion of the button or arbor 16, in the manner just described, greatly strengthens and rigidifies the construction.

In the present embodiment, the normally upper or free ends of the supporting leads 20, are connected by wires 27 and 28, the outer ends of which are spot-welded thereto, as indicated at 29 and 30, and the inner ends of which are imbedded in an insulating member 31 which may be a piece of glass cane.

Depending from the insulator 31 are a plurality of supporting members 32, 33, 34, 35, and 36, the number depending on how many coil sections the filament 37 is formed with. In the present embodiment, the coil filament 37 comprises eight coil sections which are connected by inter-section loops and staggered, so that four are disposed in one normally vertical plane and four in a normally vertical plane parallel thereto and so spaced that in plan they lie at the vertices of isosceles triangles. The upper

uncoiled portions of the connected sections of filament 37 are draped over the hooked or doubled over lower ends of the members 32, 33, 34, 35, and 36, as illustrated, and the extreme coiled end sections 42 and 43 of said filament forced over connecting members 38 and 39, the outer ends of which are spot-welded to the supporting leads 20, as indicated at 40 and 41. Outer coils 42' and 43' may be screwed over the coiled end portions 42 and 43 for short circuiting the turns thereof to improve the uniformity of rating.

In order to hold the filament 37 in position between the leads 20, and at the same time eliminate strains due to the expansion and contraction of the metal parts in the lamp, I provide a light bridge assembly 44, which may comprise an insulating portion 45 formed of a piece of glass cane, and end wires 46 and 47, the inner ends of which are imbedded in the insulator 45 and the outer ends of which normally extend diagonally or longitudinally outward and are upward and formed with eyes or loops 48 and 49 to receive the supporting leads 20. The eyes or loops 48 and 49 are adjusted so as to slide freely on the leads 20 with the avoidance of binding, even when the bridge device is slightly tilted with respect to said leads.

The bridge device 44 is normally suspended from the filament 37 by having members 50, 51, 52, and 53, the lower ends of which are imbedded in the insulator 45 and the upper ends of which are bent to hook over the loops formed between the lower portions of the coiled sections of filament 37.

In order to prevent undesired tilting of the bridge device 44 when the lamp is inclined from its normally vertical base-down position, the insulator 45 is provided with a bottom guide 54 cooperating with a wire 55 extending upwardly from the arbor 16. The member 54 may be provided with an eye or loop 56 in which the wire 55 slides, for guiding the bridge member during a thermal expansion or contraction of the parts, or the construction may be reversed, as illustrated in Fig. 5 with the eye or loop portion 56a provided on the member 55a, extending from the arbor 16a, and the member 54a, which extends from the insulator 45a, being straight. In both instances, however, the straight member is, after assembly, bent-over, as indicated at 57 in Fig. 1 and 57a in Fig. 5, in order to prevent disengagement, leaving, however, ample clearance for the desired amount of expansion and contraction.

The hook portions of the members 50 to 53 inclusive, are desirably so long that even when the lamp is positioned base-up, they would not become disengaged even upon movement of the loop or eyelet 56 into engagement with the bent-over portion 57 of the guiding wire 55. The member 54 is desirably curved, as illustrated in Figs. 2 and 4, to clear the guiding wire 55, except where its eyelet 56 slides therearound.

From the foregoing disclosure it will be seen that I have developed on incandescent lamp, particularly adapted for projection purposes, in which normally upper portions of the coiled filament are supported in a relatively rigid manner, while the normally lower portions carry a light bridge device having side loops, which slide freely on the inner supporting leads, and a lower slidable connection with the arbor of the mount, which prevents tilting of the bridge member and coiled filament. The bridge device is so light that undesired stretching of the filament is avoided, and the loops which slide on the supporting leads are so large and so far removed from the insulating portion of the bridge, by being positioned at the ends of the diagonally, axially or vertically disposed wires, that binding is avoided even if a slight amount of tilting occurs. In this way filament strains, due to expansion and contraction of lamp parts, are avoided, and filament distortion reduced to a minimum, thereby eliminating one source of erratic life and poor lumen maintenance.

It will also be noted that I have provided means for efficiently bracing the inner supporting leads from the arbor of the lamp.

Although preferred embodiments of my invention have 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 interior supporting leads, a coiled filament disposed therebetween, and means supported by and below said filament, and with members extending longitudinally outward and upward to the filament level, and slidable on said leads for eliminating filament strains due to the expansion and contraction of lamp parts, and means extending from an intermediate portion of said slidable means to prevent undesired tilting thereof.

2. An incandescent electric lamp having a mount comprising a flare tube, interior supporting leads extending therefrom, a coiled filament disposed therebetween, and means secured to, and normally disposed below, said filament and formed with extensions slidable on said leads, on opposite sides and at about the same level as the filament, for eliminating filament strains due to the expansion and contraction of lamp parts, and means guidably mounted with respect to said mount and forming a third point of support to prevent undesired tilting of said slidable means.

3. An incandescent electric lamp having a mount comprising a flare tube, interior supporting leads extending therefrom, a filament comprising a plurality of coils with their axes generally parallel and disposed between said leads, means securing one set of inter-section loops between said leads, and means disposed normally below and attached to the other set of intersection loops and formed with guides extended outwardly and in a normally upward direction, and slidable on said leads for holding said filament in place and eliminating strains therein due to expansion and contraction, and means extending in a normally downward direction to form a supplemental guide and prevent undesired tilting of said slidable means.

4. An incandescent electric lamp comprising a mount with a flare tube, interior supporting leads extending from said tube, a filament comprising a plurality of coil sections connected by loop portions and supported from said leads, said filament receiving energy through wires extending from said leads, toward one another, and to which the ends of said filament are connected, and a guiding member comprising an insulator portion, hook portions extending from said insulator portion and connected to the normally lower filament loops, wires extending from the ends of said insulator and with their free end portions slidable on said supporting leads, and a member extending from the side of said insulator portion, in a direction opposite to that of said hook portions, to prevent undesired tilting of said guide member.

5. An incandescent electric lamp comprising a mount with a flare tube and an arbor, interior supporting leads extending from said tube, a filament comprising a plurality of coil sections connected by loop portions and supported from said leads, said filament receiving energy through wires extending from said leads, toward one another, and to which the ends of said filament are connected, and a guiding member comprising an insulator portion, hook portions extending from said insulator portion and connected to the normally lower filament loops, and wires extending from the ends of said insulator and with their free end portions slidable on said supporting leads, said insulator having a depending guide member slidably associated with a wire upstanding from said arbor.

6. An incandescent electric lamp comprising a mount with a flare tube and an arbor, interior supporting leads extending from said tube, a filament comprising a plurality of coil sections with their axes disposed generally parallel, said sections being connected by loop portions and supported from said leads by wires depending from an insulator tied to the ends of said leads, with the lower portions thereof hooked under the normally upper filament loops, said filament receiving energy from said leads through wires extending toward one another and fitting into coiled end sections of said filament, and a guiding bridge member comprising an insulator portion, hook portions extending from said insulator portion and received in the normally lower filament loops, wires extending from the ends of said insulator and formed with eyes at their ends slidable on said supporting leads, said insulator having a depending guide member slidably associated with a wire upstanding from said arbor.

7. An incandescent electric lamp comprising a mount with a flare tube and an arbor, interior supporting leads extending from said tube, a filament comprising a plurality of coil sections connected by loop portions and supported from said leads, said filament receiving energy from said leads by having their ends connected thereto, and a guiding member comprising an insulator portion, wires extending therefrom and connected to the normally lower filament loops, other wires extending from the ends of said insulator and slidable on said supporting leads, the connection of said leads to said flare tube being rigidified by wires extending outwardly from said arbor, wound around said leads with one or more turns, and having their free ends welded thereto.

8. An incandescent electric lamp comprising a mount with a flare tube and an arbor, interior supporting leads extending from said tube, a filament comprising a plurality of coil sections with their axes disposed generally parallel and arranged in two generally parallel planes, said sections being connected by loop portions and supported from said leads by wires depending from an insulator tied to the ends of said leads, with the lower portions thereof hooked under the normally upper filament loops, said filament receiving energy from said leads through wires extending toward one another and fitting into coiled end sections of said filament, and a guiding bridge member comprising an insulator portion, hooked portions extending from said insulator portion and received in the normally lower filament loops, wires extending in a normally upward direction from the ends of said insulator, and having eyes at their free ends through which said supporting leads pass, said insulator having a depending guide wire slidably associated with a wire normally upstanding from said arbor, and wires extending outwardly from said arbor, wound around said leads with one or more turns, and having their free ends welded thereto.

9. An incandescent electric lamp comprising a mount with a flare tube and an arbor, interior supporting leads extending from said tube, a filament supported between and receiving energy from said leads, and wires extending outwardly from said arbor, wound around said leads with one or more turns, and having their free ends welded thereto.

10. A filament guiding member comprising a piece of glass cane with a plurality of hooks extending laterally from one side and a guide wire extending in the opposite direction therefrom, the ends of said cane being provided with wires extending therefrom and having guiding loops at their free ends.

11. An incandescent electric lamp comprising interior supporting leads extending from a flare tube, a filament formed as a plurality of coil groups disposed between said leads and generally parallel to one another, the adjacent ends of said groups being connected by loops, a member connecting the free ends of said supporting leads, hooks depending from said member and supporting the upper loop and end portions of said filament, means connecting said end portions and leads, and a slidable guide member suspended from the lower loops of said filament, said guide member comprising a body portion, hooks extending from the sides thereof, and engaging said loops, and portions extending from the ends of said body portion, continued upwardly along the sides of said filament, and slidably engaging said leads, and means extending downwardly therefrom and slidably associated with said flare tube for preventing tilting of said guide member.

12. An incandescent electric lamp comprising a flare tube, leads extending upwardly therefrom, a filament positioned between said leads, said filament comprising a plurality of coil groups with their axes generally parallel and corresponding adjacent ends connected by loops, means comprising an insulator with wires extending from the ends thereof and tying together the free ends of said supporting leads, hooks extending from the lower side of said insulator and engaging the upper loop portions of said filament, and a sliding bridge member supported from the lower loops of said filament, said bridge member comprising an insulator with hooks extending upwardly from a side thereof and engaging the lower filament loops, wires extending outwardly and upwardly and slidably engaging said leads on opposite sides of said filament, and means depending from a side of said bridge insulator and slidably associated with said flare tube.

13. A filament guide member comprising an insulator body portion with a plurality of hooks extending laterally from one side, a guide wire extending laterally from the other side, and a wire extending axially from each end and laterally in the same general direction as the hooks, and provided at its end with a guiding loop.

HOWARD E. ALLEN.