

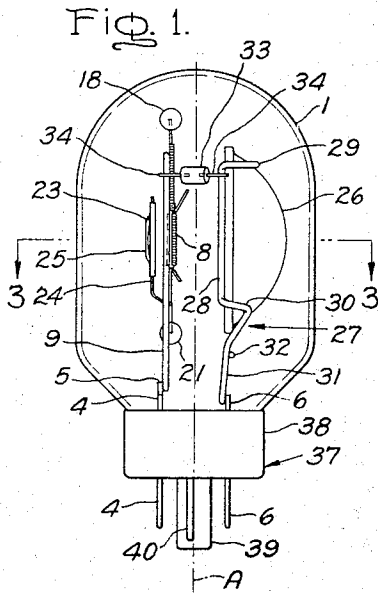
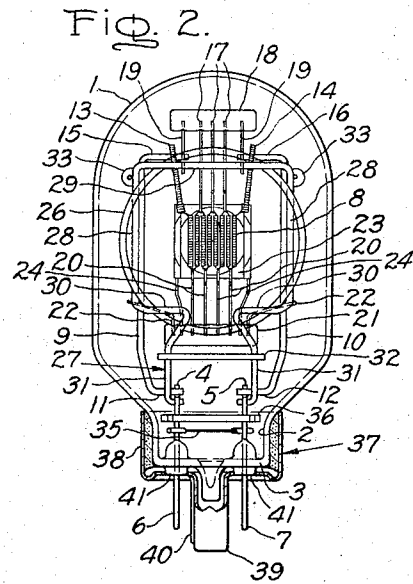
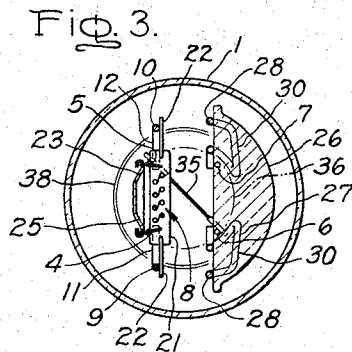
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INTEGRAL LENS AND REFLECTOR PROJECTION LAMP

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INTEGRAL LENS AND REFLECTOR PROJECTION LAMP

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ABSTRACT OF THE DISCLOSURE

In an electric incandescent projection lamp comprising a sealed bulb containing a filament, and a reflector and lens at opposite sides of the filament, a stem at one end of the bulb has four rigid pins projecting therethrough into the bulb and arranged in pairs at opposite sides of the bulb axis. The filament and reflector are supported from a pair of rigid side rods which are secured to one pair of pins and extend longitudinally of the bulb; the lens is supported by a formed wire holder member which is in turn supported from the other pair of pins; and the lens holder and side rods are mechanically interconnected at their remote ends by a brace member for added rigidity and strength.

This invention relates generally to electric incandescent projection lamps, and more particularly to a lamp containing within its sealed bulb both a reflector and a lens at opposite sides of the filament.

It is an object of the invention to provide a novel structural arrangement for firmly supporting the lens element on the one hand, and the filament and reflector elements on the other hand, and for maintaining them in accurate fixed relationship in the bulb.

In accordance with one aspect of the invention, the elements are incorporated in a lamp structure of a type comprising a stem having four rigid pins projecting therethrough into the bulb and arranged in pairs at opposite sides of the bulb axis; the filament and reflector are supported from a pair of rigid side rod or support wire members which are secured to one pair of pins and extend longitudinally of the bulb; the lens is supported by a formed wire holder member which is in turn supported from the other pair of pins; and the said lens holder member and filament support wire members are mechanically interconnected at their remote ends by brace members which provide additional rigidity and strength to the structure.

The invention will best be understood by reference to the following detailed description of a species thereof, and to the drawing wherein:

FIGS. 1, 2 and 3 are, respectively, a side elevation, a front elevation, and a transverse section along the line 3-3 in FIG. 1, of a lamp comprising the invention.

Referring to the drawing, the lamp comprises a tubular gas-filled glass bulb 1 having a cylindrical neck portion 2 (FIG. 2) at the end thereof sealed to a flat circular glass button type stem 3 through which are sealed four rigid wire pins 4, 5, 6 and 7 which are herein referred to as a first pair 4, 5 and the second pair 6, 7 located in respective planes extending longitudinally of and on opposite sides of the bulb axis A (FIG. 1).

The filament 8 is of a planar type, herein shown as a biplane type filament composed of a series of coiled tungsten wire segments arranged in side-by-side relation with alternate segments in parallel planes. The said filament 8, which may be of 500 watt, 120 volt rating in a bulb 1 of about 1 3/4 inch diameter, for example, is supported from the first pair of pins 4 and 5 through side rods or filament support wires 9 and 10 which have trans-

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versely extending lower end portions 11 and 12 welded to respective pins 4 and 5. Respective ends of the filament 8 are connected in known manner by spud members 13 and 14 (FIG. 2) to transversely extending upper end portions 15 and 16 of the filament support wires 9 and 10. The bight portions connecting the upper ends of adjacent coiled segments of the filament 8 are supported in hooked lower ends of a plurality of support wires 17 which have their upper ends embedded in a glass rod or bridge 18 which is, in turn, supported from the upper ends 15 and 16 of the side rods 9 and 10 by a pair of support wires 19. Similarly, the bight portions connecting the lower ends of adjacent coiled segments of the filament 8 are supported in hooked upper ends of a plurality of support wires 20 which have their lower ends embedded in a glass rod or bridge 21 which is, in turn, supported from the filament side support rods 9 and 10 by a pair of support wires 22. The filament 8 is thereby supported between and virtually in a common plane containing the side rod support wires 9 and 10 and the pins 4 and 5.

A reflector 23 is located closely adjacent and at the side of the filament 8 away from the bulb axis A. The said reflector is preferably of a substantially flat refractory sheet metal type like that disclosed and claimed in Patent 3,025,424—Wiley et al. It is preferably supported by support wires 24 having their ends embedded in the lower glass bridge 21 whereby it is insulated from both side rod support wires 9 and 10. As illustrated herein the essentially flat reflector 23 is of a square outline slightly larger than the filament 8 and contains a shallow dish concavity 25.

At the opposite side of the bulb axis is the lens member 26 in apposition to the filament 8. The condenser lens 26 shown herein is a plano-convex form for concentrating light projected therethrough from the filament 8 and reflector 23. The lens 26 is supported with its plane surface generally in the plane containing the second pair of pins 6 and 7, by a formed wire holder member 27 which embraces the lens and is supported from said pins 6 and 7. The generally rectangular lens-embracing portion of said wire lens holder 27 comprises a pair of longitudinally extending side portions 28 which engage the back of the lens 26 adjacent its periphery and are joined at their remote or upper ends by a bowed lateral portion 29 which extends across and engages the convex front face of the lens adjacent its periphery. The lower or proximate ends (relative to the pins 6 and 7) of the said side wire portions 28 have opposed lateral extensions 30 (FIGS. 2 and 3) which also engage the front face of the lens 26 and which terminate in longitudinal extensions 31 which terminate in short lateral extensions which are joined, preferably by welding, to the respective pins 6 and 7. It will be understood that in FIG. 2 the pins 4 and 5 are behind pins 6 and 7. To provide additional rigidity to the lens-supporting wire frame, the said longitudinal extensions 31 are preferably tied together by a cross brace wire 32 (FIG. 2) which is welded thereto.

The filament and reflector supporting structure, and the lens supporting frame structure, are securely tied together at their upper ends by suitable brace members, here shown as a pair of glass beads 33 with wire spuds 34 (FIGS. 1 and 2) extending from the ends thereof and connected between each filament supporting side rod 9 and 10 and the opposed side wire portion 28 of the frame member 27.

As illustrated herein, the diagonally opposed pins 5 and 6 are interconnected by a conductor 35 (FIG. 3) which includes a fuse portion. The electric current supply circuit goes from pin 6 through fuse conductor 35, pin 5, side rod filament support 10, spud 14, filament 8, spud 13, side rod filament support 9, and pin 4, whereby said

pins 6 and 4 serve as the current supply terminals. Where-as this fuse location is preferred, it may be located elsewhere if desired, for example, in place of one of the insulating bridge braces 33, 34.

A heat deflecting disc 36 (FIG. 2) is located in the bulb neck over the fuse 35. The said disc is preferably of a heat insulating material which may be a ceramic composition and is provided with notches in its periphery through which extend the pins 4 to 7.

The lamp is also provided with a conventional form of sheet metal base 37 including a shell portion 38 cemented to the bulb neck 2, and an axial indexing tubular portion 39 which is provided with a longitudinal external rib 40. The bottom of the shell portion of the base is provided with apertures for the outwardly protruding portions of individual bosses 41 (FIG. 2) on the glass button stem 3 and in which portions of the pins 4 to 7 are hermetically sealed. The filament 8, reflector 23 and lens 26 are accurately located with respect to each other and with respect to the pins 4—7, as well as with respect to the bottom of the base shell.

In a particular application, the lamp is mounted horizontally with the lens 26 lowermost and the light emerging downward. The proximity reflector 23 in that case protects the upper part of the bulb 1 from filament heat and blackening. The lens 26 is protected from the hot gas convection currents by being below the filament. The incorporation of the proximity reflector 25 and lens 26 within the bulb makes it practicable to operate a lamp of such high intensity (500 watts) without forced cooling. Otherwise an external, and necessarily large, reflector would obstruct the upward flow of air and result in blistering of the part of the lamp bulb above the filament. Similarly, an external, and necessarily larger lens, would obstruct the flow of cool air against the bottom of the bulb and cause it to blister.

The said lens 26 may be made of a temperature resistant glass such as the well-known borosilicate glasses or, if even greater heat resistance is desired or needed, the lens may be made of quartz or fused silica or other high temperature glasses.

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

1. An electric projection lamp comprising a tubular glass bulb having a glass stem sealed to the end thereof and at least four wire pin members projecting into the envelope through said stem and arranged in first and second pairs located in respective planes extending longitudinally of and on opposite sides of the bulb axis, filament support wire members connected to and extending longitudinally of the bulb from respective ones of said first pair of wire pins, a filament located between and supported from said filament support wire members, a reflector in said bulb supported from and insulated from said filament support wires and located at the side of said filament away from the bulb axis, a lens member in said bulb in apposition to said filament and at the opposite side thereof from said reflector, a wire frame member embracing said lens and supported from the second pair of wire pin members, brace means mechanically interconnecting said filament support wire members with said wire frame member at the ends thereof remote from said pin members, and means electrically connecting said filament to two of said pin members which serve as current supply conductors.

2. An electric projection lamp comprising a tubular glass bulb having a glass stem sealed to the end thereof and at least four wire pin members projecting into the envelope through said stem and arranged in first and second pairs located in respective planes extending longitudinally of and on opposite sides of the bulb axis, filament support wire members connected to and extending longitudinally of the bulb from respective ones of said first pair of wire pins, a filament located between and supported from said filament support wire members, a

reflector in said bulb supported from and insulated from said filament support wires and located at the side of said filament away from the bulb axis, a lens member in said bulb in apposition to said filament and at the opposite side thereof from said reflector, a wire frame member embracing said lens and supported from the second pair of wire pin members, brace means mechanically interconnecting said filament support wire members with said wire frame member at the ends thereof remote from said pin members, means electrically connecting the ends of said filament to respective said filament support wire members and therethrough to the respective ones of said first pair of pin members, and a fuse wire member electrically connected between one of said first pair of pin members and one of said second pair of pin members.

3. An electric projection lamp comprising a tubular glass bulb having a glass stem sealed to the end thereof and at least four wire pin members projecting into the envelope through said stem and arranged in first and second pairs located in respective planes extending longitudinally of and opposite sides of the bulb axis, filament support wire members connected to and extending longitudinally of the bulb from respective ones of said first pair of wire pins, a filament located between and supported from said filament support wire members, a reflector in said bulb supported from and insulated from said filament support wires and located at the side of said filament away from the bulb axis, a lens member in said bulb in apposition to said filament and at the opposite side thereof from said reflector, a wire frame member embracing said lens and supported from the second pair of wire pin members, said frame member being located virtually in and adjacent the plane including said second pair of pin members and including a generally rectangular portion having longitudinally extending side wire portions engaging the rear face of said lens adjacent its periphery, said side wire portions having their remote ends joined by a bowed lateral portion engaging the front face of said lens, the proximate ends of said side wire portions having opposed lateral extensions also engaging the front face of said lens and terminating in longitudinal extensions joined to respective ones of said second pair of pins, brace means mechanically interconnecting the upper ends of said filament support wire members with the said remote ends of the side wire portions of the said lens-supporting frame member, and means electrically connecting said filament to a pair of said pin members which serve as current supply conductors.

4. An electric projection lamp comprising a tubular glass bulb having a glass stem sealed to the end thereof and at least four wire pin members projecting into the envelope through said stem and arranged in first and second pairs located in respective planes extending longitudinally of and on opposite sides of the bulb axis, filament support wire members connected to and extending longitudinally of the bulb from respective ones of said first pair of wire pins, a filament located between and supported from said filament support wire members, a reflector in said bulb supported from and insulated from said filament support wires and located at the side of said filament away from the bulb axis, a lens member in said bulb in apposition to said filament and at the opposite side thereof from said reflector, a wire frame member embracing said lens and supported from the second pair of wire pin members, said frame member being located virtually in and adjacent the plane including said second pair of pin members and including a generally rectangular portion having longitudinally extending side wire portions engaging the rear face of said lens adjacent its periphery, said side wire portions having their remote ends joined by a bowed lateral portion engaging the front face of said lens, the proximate ends of said side wire

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portions having opposed lateral extensions also engaging the front face of said lens and terminating in longitudinal extensions joined to respective ones of said second pair of pins, brace means mechanically interconnecting the upper ends of said filament support wire members with the said remote ends of the side wire portions of the said lens-supporting frame member, and means electrically connecting said filament to a pair of said pin members which serve as current supply conductors, the last named means including a fuse wire connected across and between diagonally opposed pin members.

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References Cited

UNITED STATES PATENTS

2,277,193	4/1942	Wyss.	
3,025,424	3/1962	Wiley et al.	
3,160,776	12/1964	Cardwell et al.	313—112
3,222,567	12/1965	Smith	313—113 X
3,253,504	5/1966	Vollmer	313—112 X

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