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De Caro

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[54] **TRIPLE PURPOSE HEAT SHIELD, LIGHT COLLECTOR AND MOUNT SUPPORT FOR A TUNGSTEN-HALOGEN PROJECTION LAMP**

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[21] Appl. No.: **265,024**

[52] **U.S. Cl.**..... **313/37,** 313/40, 313/113, 313/115, 313/222, 313/271, 313/272, 313/273, 313/315, 313/316, 313/331

[51] **Int. Cl.** **H01j 61/10,** H01j 1/92, H01j 19/46

[58] **Field of Search**..... 313/37, 40, 271, 313/273, 115, 272, 331, 222, 315, 316, 113

[56] **References Cited**

UNITED STATES PATENTS

3,330,984 7/1967 Smith..... 313/272 X

2,400,081 5/1946 Eitel et al. 313/40

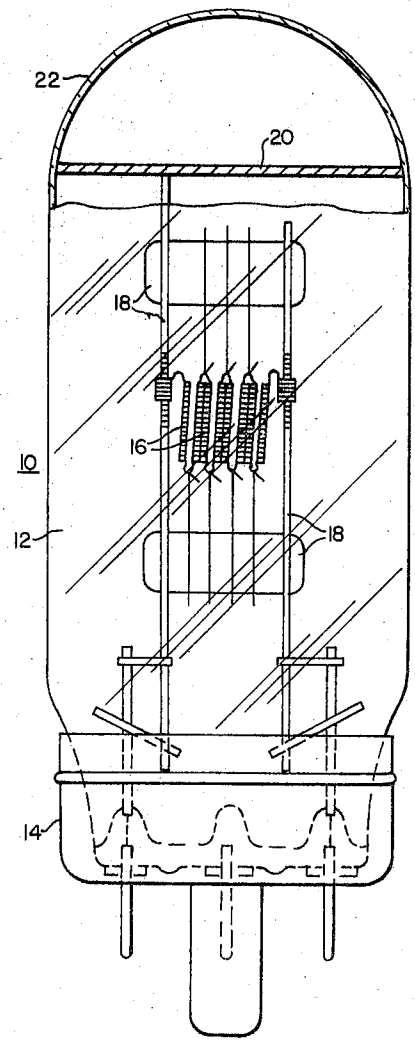
Primary Examiner—Paul A. Sacher

Attorney—A. T. Stratton et al.

[57] **ABSTRACT**

A multi-purpose member used in combination with a tungsten-halogen projection lamp, whereby the multi-purpose member reflects radiation back onto the filament of the projection lamp. The multi-purpose member also serves as a heat shield, a light shield, and a positioning and supporting means for the filament. This combination provides the accomplishment of the several functions at a lower cost than if the functions were provided separately, and also improves the efficiency of the lamp.

5 Claims, 3 Drawing Figures



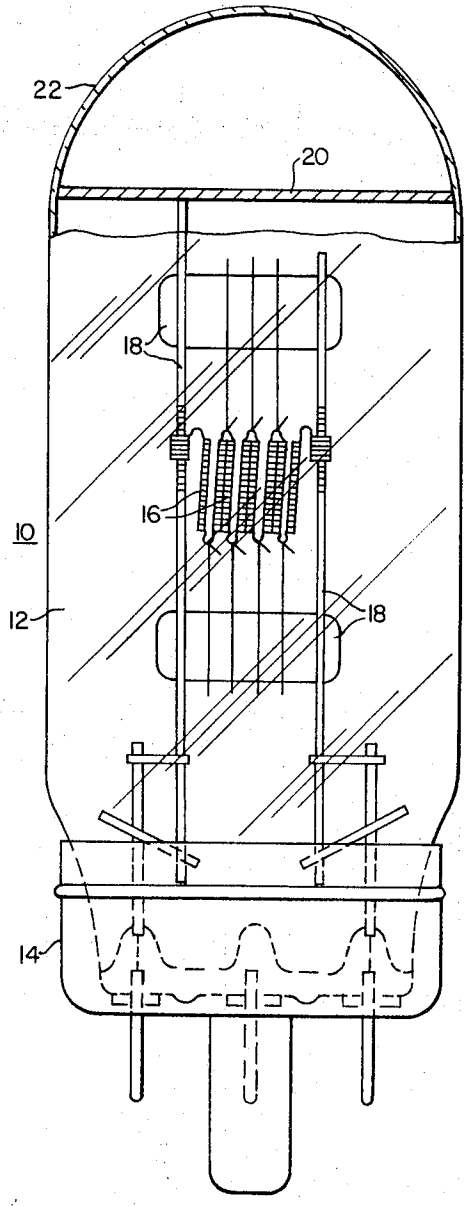


FIG. 1.

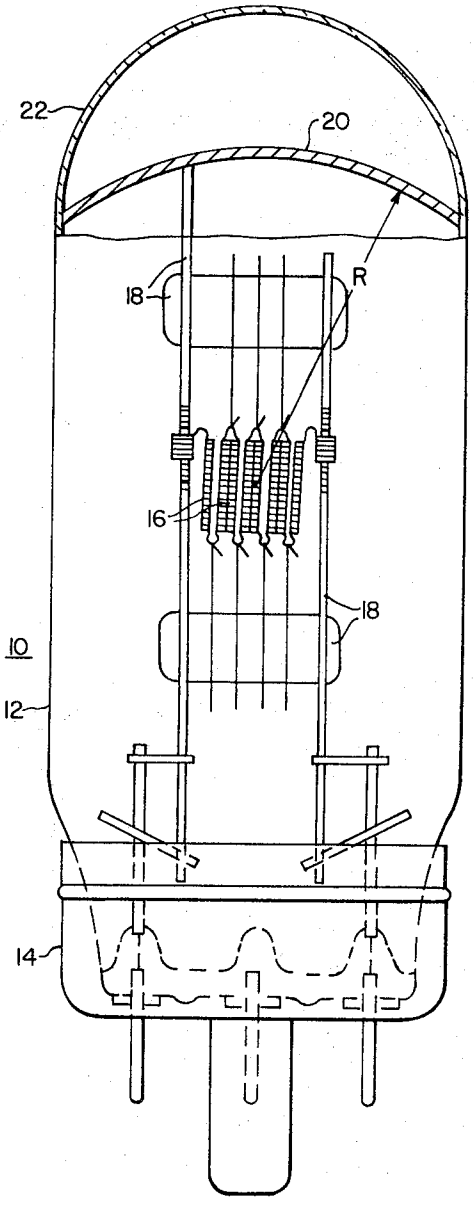


FIG. 3.

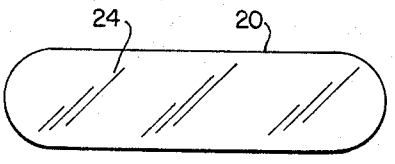


FIG. 2.

TRIPLE PURPOSE HEAT SHIELD, LIGHT COLLECTOR AND MOUNT SUPPORT FOR A TUNGSTEN-HALOGEN PROJECTION LAMP

BACKGROUND OF THE INVENTION

The tungsten-halogen incandescible projection lamp is now well known in the art. Many such lamps use light shields on the dome of the lamp to minimize stray light which might otherwise emit from the projector. One arrangement for providing such light shielding is provided for by covering a portion of the exterior of the envelope with a light absorbing material. One such arrangement is described in Canadian Pat. No. 881,081, issued Sept. 14, 1971, now U.S. Pat. No. 3,667,652 to Noteltiers et al.

Other projection lamps have used a heat shield to prevent overheating of parts outside of the bulb. External ceramic caps have been used, for example, to prevent overheating of projector parts adjacent to the lamp.

Projector lamps have also used reflectors to reflect radiation emitting from the filament. The primary purpose of such reflectors, however, has generally been to reflect light out of the lamp in the desired direction, rather than reflecting radiation back to the filament. In U.S. Pat. No. 3,082,345, issued Mar. 19, 1963, to A. A. Bottone, it was noted that the reflector increased the filament temperature, but the primary purpose of the reflector was still to focus the light output into the lens system of the projector.

Top supports have also been used in projection lamps to provide additional support for the stem (the stem is the general filament support structure and includes the lead-in wires, the bridges and the filament support wires), and more precisely orient the filament. One such arrangement is provided in U.S. Pat. No. 3,496,403, issued Feb. 17, 1970 to J. J. Palermo et al.

SUMMARY OF THE INVENTION

The present invention provides a single member which serves to intercept radiation from the filament both to reflect filament-generated radiation back toward the filament to augment filament operational efficiency, and to minimize any light and heat emission through the dome of the lamp. This multi-purpose metallic member is rigidly mounted between the dome and the stem and has a periphery of such a shape as to provide a close fit of the member into the generally tubular envelope. The configuration of the member together with the rigid mounting of the member restricts movement of the stem relative to the envelope and thereby positions and supports the filament. Preferably, the metal of this metallic member is tungsten or molybdenum.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the invention will be obtained from the exemplary embodiments shown in the accompanying drawings, wherein:

FIG. 1 is an elevational view of a representative embodiment of the projection lamp of the present invention;

FIG. 2 is a bottom view of the multi-purpose member having a peripheral shape as would be used with a flattened tubular envelope projection lamp; and

FIG. 3 is a front elevational view of a projection lamp incorporating a shaped, rather than a flat, multi-purpose member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The projection lamp **10** comprises an elongated light-transmissive envelope **12** of the generally tubular or oval configuration of internal cross-section, a base assembly **14,** an incandescible filament **16,** a stem **18** extending substantially longitudinally into said envelope, a multi-purpose, metallic, radiation-reflecting (and support) member **20** as provided by the present invention, and an envelope dome **22.** The radiation-reflecting member **20** has a periphery similar in configuration but slightly smaller than the configuration of the internal cross-section of the envelope **12.** Being rigidly mounted on the stem **18** intermediate the filament **16** and the envelope dome **22** and generally transverse to the elongated dimension of the envelope the radiation-reflecting member **20** serves as a heat shield, light shield, reflector to reflect radiation back toward the filament **16,** and supplemental supporting and positioning means for the incandescible filament **16.**

The term internal cross-section, as used herein, means the cross-section of the volume within the envelope, when sectioned transverse to the elongated dimension of the envelope. This would be a horizontal cross-section of the envelope, bounded by the internal surface of the envelope, if the lamp was in a base-down position.

The radiation-reflecting member **20** can be fabricated from any metal or metals which withstand the halogen atmosphere and the approximately 600°C maximum temperature of the reflective metallic member, for example, a platinum-plated radiation-reflecting member **20** can be used, but radiation-reflecting members of a single metal and especially of either tungsten or molybdenum are preferred.

FIG. 2 shows the bottom view of a flat radiation-reflecting member **20** which has a periphery shaped for use in an oval envelope, and a polished finish **24** to increase the reflection of radiation back towards the filament **16.** While the flat configuration of radiation-reflecting member **20** provides slightly lower efficiency than configurations which focus the reflected radiation back onto the filament **16,** the flat configuration provides for ease of fabrication. When the stem **18** is tungsten and the radiation-reflecting member **20** is fabricated from tungsten, the radiation-reflecting member **20** can conveniently be welded to the stem **18.**

FIG. 3 is a front elevational view of a tungsten-halogen projection lamp incorporating a radiation-reflecting member **20** of formed configuration, with its concave side toward the filament to focus the reflected radiation upon the filament. When the envelope **12** has a tubular internal cross-section, the radiation-reflecting member **20** can be a spherical section positioned so as to have the center of the sphere of which it is a section positioned within the incandescible filament **16.** A radiation-reflecting member **20** formed in an elliptical section can also be used.

It is convenient to make the radiation-reflecting member **20** from relatively thin sheet in either the flat or the formed configuration. Tungsten sheet of 0.003 inch thickness, for example, has proven satisfactory.

The radiation-reflecting member **20** can be used with many configurations of tungsten halogen projection lamps, including configurations in which conventional reflectors are used. Such a configuration would have dual reflectors, the radiation-reflecting member **20** of this invention and a conventional reflector which concentrates light into the condensing lens of the projector, such as described in the aforementioned U.S. Pat. No. 3,082,345.

I claim as my invention:

1. In combination with a tungsten-halogen projection lamp of the type having an elongated envelope of predetermined configuration of internal cross-section and terminating in an envelope dome at one end and a base at the other end, and a stem extending generally longitudinally into said envelope and supporting an incandescible filament, the improvement which comprises:

a metallic radiation-reflecting member having a periphery similar in configuration but slightly smaller than the configuration of the internal cross-section of said envelope, said radiation-reflecting member rigidly mounted on said stem intermediate said filament and said envelope dome and generally transverse to the elongated dimension of said envelope, said radiation-reflecting member intercepting radiations from said filament both to minimize any light and heat emission through said dome of said lamp and to reflect filament-generated radiations back toward said filament, the configuration of said radiation-reflecting member together with said rigid mounting of said radiation-reflecting member on said stem restricting movement of said stem relative to said envelope, whereby said radiation-reflecting member serves the multiple functions of heat shield, light shield and radiation-reflector to augment operational efficiency, as well as serving as supporting and positioning means for said filament.

2. The combination of claim **1,** wherein the metal of said radiation-reflecting member is tungsten.

3. The combination of claim **2,** wherein said metal of said radiation-reflecting member is tungsten and a polished finish is provided on said radiation-reflecting member to increase the reflection of radiation back towards said filament.

4. The combination of claim **3,** wherein said radiation-reflecting member is formed to focus said reflected radiation upon said filament.

5. The combination of claim **1,** wherein the metal of said radiation reflecting member is molybdenum.

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