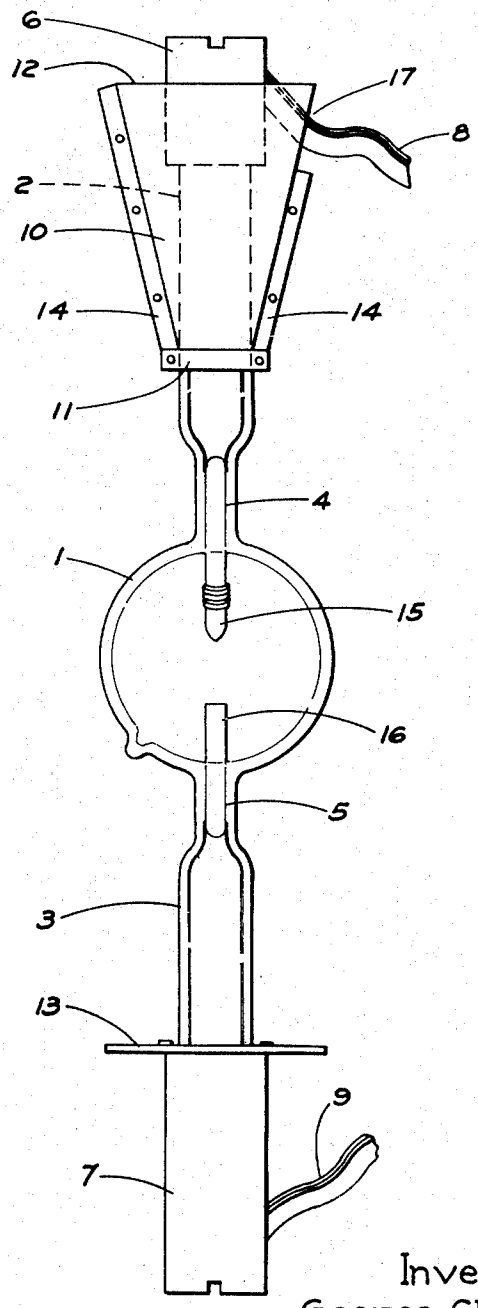
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HIGH-PRESSURE METAL VAPOR ELECTRIC DISCHARGE LAMP

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HIGH-PRESSURE METAL VAPOR ELECTRIC DISCHARGE LAMP

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This invention relates to high pressure metal vapor, such as mercury vapor, electric discharge lamps of the type adapted to operate normally without cooling other than that produced by convection set up by heat from the lamp, and comprising, projecting from the envelope of the lamp, at least one sealing stem carrying one or more electric conductors for supplying the lamp, which sealing stem may be located vertically above the lamp envelope in operation.

The invention relates more particularly, but not exclusively, to projection-type lamps of the type specified, for use in reflecting fittings.

In lamps of the type specified, and especially in projection-type lamps as aforesaid, there is a danger that when the said stem is located above the lamp envelope in operation, the hot air flowing upwards from the envelope under convection may reduce the loss of heat from the stem to such an extent that the conductors carried by it become oxidized, which may lead to breakage of the conductors or cracking of the seal; this danger is accentuated in the case of projection lamps used as aforesaid by virtue of the increased heating of the stem resulting from absorption of heat radiation reflected from the walls of the fitting.

The principal object of this invention is to provide simple means for keeping the stem sufficiently cool to prevent serious oxidation of the conductors carried by it. Further objects and advantages of the invention will appear from the following description thereof, the accompanying drawing and the appended claims.

According to the invention a lamp of the type specified comprises a tapered hollow shield surrounding the said stem, said shield fitting closely round the stem near the envelope of the lamp and the open end of the shield being of considerably greater diameter than the stem and extending near to or beyond the end of the stem remote from the envelope.

Preferably the shield has substantially the shape of a frustum of a right circular cone and is made of metal which is bright at least on its outer surface.

The use of a tapered hollow shield in accordance with the invention diverts the flow of hot air away from the stem and may further promote cooling of the stem by allowing a circulation of cool air within the open end of the shield. Moreover when the lamp is used within a reflecting enclosure as aforesaid the shield intercepts heat radiation which would otherwise be absorbed by the stem and if the outer surface

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of the shield is bright this heat radiation is largely reflected away.

If, as will often be the case, the lamp is adapted to operate with a vertical discharge column substantially collinear with the stem, the shield used in accordance with the invention need provide little disturbance of the distribution of light from the lamp, since it may be arranged to lie substantially wholly in the dead space above the envelope into which space little light is emitted because of the obscuring effects of the upper electrode and the seal between the stem and the envelope.

In the drawing accompanying and forming part of this specification an embodiment of the invention is shown schematically in an elevation of a projection-type lamp of the type specified adapted to be operated vertically in the position shown.

In this embodiment the lamp has a substantially spherical quartz envelope 1 which has two elongated and diametrically opposed quartz sealing stems 2 and 3 projecting therefrom; the stems 2 and 3 carry the lead conductors 4 and 5 for supplying the lamp and stem 2 is arranged to be substantially vertically above stem 3 in operation. Secured over the said stems at their ends are metal bases 6 and 7 respectively, of the type described and claimed in U. S. application Serial No. 662,032, filed April 13, 1946, inventors Nelson and Power, now Patent No. 2,549,328 dated April 17, 1951, said metal bases being adapted to cooperate with supports for locating the lamp in its operating position in a fixture. Through the bases 6 and 7 pass leads 8 and 9 for connecting the lamp to a source of electric power and each of these leads 8 and 9 is connected to a metal band (not shown) welded to the exposed outer ends of the lead conductors 4 and 5 to ensure substantially good electrical connection between the external leads 8 and 9 and the lead conductors 4 and 5. The conductors 4 and 5 are similar to that shown in Fig. 1 of the U. S. application referred to above.

Around the upper stem 2 is fitted, in accordance with this invention, a hollow metal shield 10 having substantially the shape of a frustum of a right circular cone, of which the lower end terminates in a short cylindrical sleeve 11 which fits closely around the stem 2 near to the envelope 1 and of which the open upper end 12 is of considerably greater diameter than the metal base 6 which it surrounds; the greater part of the length of the stem 2 and cap 6 thus lie within the shield 10.

To prevent the envelope 1 from being undesirably cooled by the upwardly rising stream of cold air set up by thermal convection, the cap 7 has secured to it an annular metal baffle disc 13 which lies round the stem 3 and whose plane is substantially perpendicular to the axis of the stem 3.

In this embodiment the shield 10 to formed as a thin walled metal shell in two halves corresponding to the division of the shield by a plane containing its axis; the two haves are provided along their edges with outwardly directed cooperating flanges 14, which are bolted together when the two halves are assembled round the stem 2.

The shield may, of course, be strengthened by securing it at one or more pairs of diametrically opposed points on the circumference of its upper edge 12 to supports, such as stiff metal, extending from the metal cap 6.

The said shield 10 is so dimensioned that it lies substantially wholly in the dead space above the lamp into which little light is emitted owing to the obscuring effect of the upper electrode 15, here shown as a cathode, and the stem 2 with its conductors. Similarly the disc 13 is dimensioned and positioned so as to lie in the dead space below the lamp into which little light is emitted owing to the obscuring effect of the lower electrode 16, shown as an anode, and the stem 3 with its conductors.

In this embodiment the lead 8 is shown emerging through a slit 17 in the side of the shield 10 at the top of the shield; the presence of such a slit 17 does not appreciably impair the efficiency of the shield 10 providing the slit is narrow and not continued into proximity with the stem 2; but in some cases it may be more convenient to take the lead 8 out over the top of the shield 10 so that no such slit 17 is required.

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

1. A high pressure metal vapor electric discharge lamp comprising a vitreous envelope having an outwardly projecting sealing stem provided with an electrical conductor part of which is exposed to the atmosphere at the end of the stem remote from the envelope and is oxidizable at elevated temperatures, said lamp being adapted for mounting with said stem extending vertically upward above the envelope and in the path of heated air rising from the envelope during operation of the lamp, and a tapered hollow open-ended shield surrounding the said sealing stem at the exterior of said lamp and mounted with its smaller end fitting closely around the stem and directed toward the envelope of the lamp and with its larger open end being of considerably greater diameter than the said stem and positioned near the end of the stem remote from the envelope, the tapered wall of said shield being spaced from said stem to deflect heated air arising from said envelope away from said stem and to provide space for the circulation of cooling air about said stem whereby to minimize oxidation of the exposed part of the conductor.

2. A lamp according to claim 1 wherein the said tapered hollow shield has substantially the shape of a frustum of a right circular cone.

3. A lamp according to claim 1 wherein the said tapered hollow shield is of metal and is bright at least on its outer surface.

4. A high pressure metal vapor electric discharge lamp according to claim 1 having a similar sealing stem diametrically opposed to the first, extending vertically downward below the envelope and in the path of cooler air arising toward the envelope during lamp operation, and an annular baffle disc secured around the downwardly extending stem with the plane of the disc being substantially perpendicular to the stem axis to minimize cooling of the envelope by convection currents.

5. A high pressure metal vapor electric discharge lamp comprising a spherical vitreous envelope having sealing stems protruding outwardly therefrom in diametrically opposite directions and adapted for mounting with said stems extending vertically, electrodes supported in said envelope by said stems with the discharge path between said electrodes aligned with said stems, the upper stem being provided with an electrical conductor part of which is exposed to the atmosphere at the end of the stem remote from the envelope and is oxidizable at elevated temperatures and a tapered hollow open-ended shield surrounding the said stem at the exterior of the lamp and mounted with its smaller end fitting closely around the stem and directed toward the envelope and with its larger open end being of considerably greater diameter than the said stem and positioned near the end of the stem remote from the envelope so as to deflect heated air arising from said envelope away from said stem during operation of the lamp to minimize oxidation of the exposed part of the said conductor, and an annular daffled disc secured around the lower stem with the plane of the disc being substantially perpendicular to the stem axis to minimize cooling of the envelope by convection currents.

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