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PROJECTION LAMP WITH A WIRE SCREEN FOR BLACKENING PREVENTION

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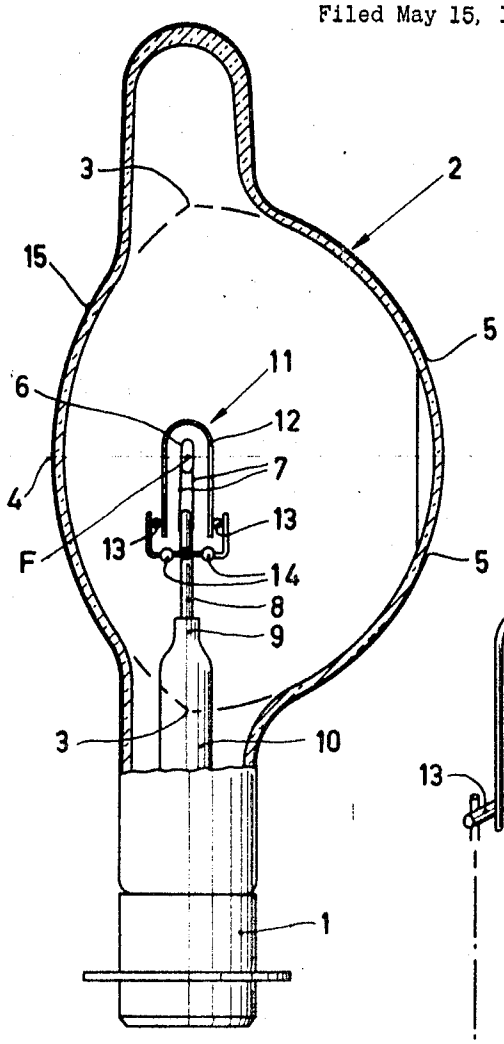

FIG. 1

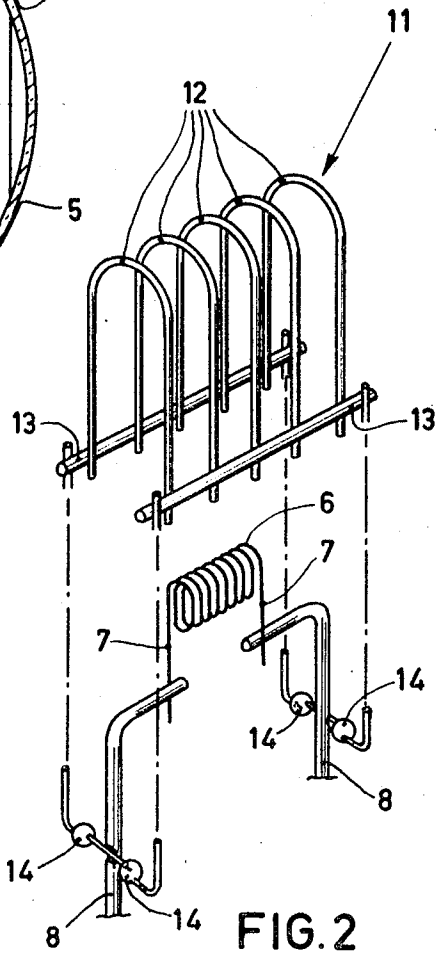

FIG. 2

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PROJECTION LAMP WITH A WIRE SCREEN FOR BLACKENING PREVENTION

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U.S. Cl. 313—113 7 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a projection lamp having an elliptic condenser mirror, a filament located in the area of the focus of the mirror and a screen substantially surrounding the filament for the purpose of reducing the blackening on the inside walls of the lamp. The screen is formed of a plurality of spaced wire loops which are supported by at least one stay wire mounted on a current-supply wire.

It is known to use for projection purposes a projection lamp co-operating with an elliptic condenser mirror. The compact filament in the lamp bulb is then usually arranged at or in the vicinity of a focus of the mirror. Owing to the co-operation of the condenser mirror with the filament, the filament is projected at the second focus of the elliptic mirror. The film gate of the associated film projector or the transparency, slide or diapositive to be projected is then arranged at or in the vicinity of the second focus.

It is also known to arrange in the bulb of a projection lamp a screen intended to reduce the degree of blackening of the lamp bulb. In general, however, there is a tendency to arrange the elements of the screen with respect to the filament so that they are situated outside the projection beam emitted by the filament. Otherwise, the intended uniform brightness of illumination of the film gate or of the transparency could get partly lost due to the shadow effect of these screen elements. However, this implies that in general the screen elements cannot be arranged at the most favourable areas with respect to the filament.

If, however, such a screen is used in the aforesaid combination of a projection lamp and an elliptic condenser mirror, in which the compact filament in the lamp bulb is arranged at or in the vicinity of a focus of the mirror, it is a surprise to find that the aforementioned limitation of the choice of arrangement of the screen elements with respect to the filament no longer exists. The present invention relates to the above combination which is characterized in that a screen surrounding the filament and consisting of wire is arranged in the bulb. In this combination the screen elements are disposed between the filament and the condenser mirror and also between the filament and the film gate or transparency to be illuminated. The presence of these screen elements at these areas does not give rise to a disturbing shadow effect.

This is probably due to the fact that the parts of the elliptic condenser mirror spaced from the filament by different distances, each form an image at or in the vicinity of the second focus of the condenser mirror these images have different dimensions and are moreover differently orientated with respect to the mirror axis. Thus, a conglomerate of images of the filament is formed at this second focus, these images being intermingled so that the shadow effect in an image originating from the screen

wires is neutralized by the bright parts of the other images.

According to the invention, one is able to achieve not only a very uniform illumination of the film gate or of the transparency, but also a greater light output of the lamp by reducing the degree of blackening of the lamp bulb.

An advantageous embodiment of the combination in accordance with the invention is characterized in that the screen has substantially parallel extending wire loops secured to one or more stay wires, and the shape of these wire loops is so adapted to that of the filament that the distance from a wire loop to the adjacent part of the filament is less than 5 mm. Experiments have shown that the degree of blackening of the lamp bulb is considerably reduced by this step.

This also applies to a further advantageous embodiment of the combination according to the invention in which the helically wound filament has flattened cross-sections and which is characterized in that the wire loops of the screen arranged along said cross-sections are also flattened.

In a further embodiment of the invention, a suitable lamp construction is obtained if the stay wires of the screen are secured to the current-supply wires of the filament with the interposition of thermally insulating bodies such as glass beads.

Although the combination according to the invention may be constituted by a projection lamp and a condenser mirror structurally separated therefrom and arranged outside said lamp, it is recommendable according to a further embodiment of the invention that the projection lamp intended to be used in the said combination is constructed so that the elliptic condenser mirror forms part of the lamp. The mirror may be arranged inside the lamp bulb as a self-supporting structural part or, what is generally simpler, it may be provided on the wall of the bulb, for which purpose the part of the bulb wall must have the required elliptic shape.

The invention is of particular advantage if the elliptic condenser mirror applied to the bulb is a so-called mirror. Such a cold-light mirror has the advantage that the light rays it collects are reflected in the prescribed direction and that the collected heat is conducted to the outside. Such a cold-light mirror, which is generally called an interference mirror, loses its favourable properties, however, if evaporated material of the filament is deposited on its mirror surface. As set out hereinbefore, this disadvantage is strongly mitigated by the presence of the screen around the filament.

The invention will now be described with reference to the drawing, which shows an embodiment of a combination according to the invention. This embodiment is a projection lamp the bulb of which is partly mirror-coated.

FIG. 1 shows this lamp diagrammatically and partly in sectional view.

FIG. 2 is a perspective view of the filament with part of its terminal wires and the wire grating of the lamp, which construction is shown partly in exploded view for the sake of clarity.

The lamp shown has a cap **1** and a glass bulb **2** having an ellipsoidal wall portion **3–4–3** and a spherical wall portion **3–5–5–3**. A focus of the ellipsoid and the centre point of the spherical portion coincide at the point F. The ellopsoidal portion **3–4–3** is entirely mirror-coated and the spherical portion **3–5–5–3** is partly mirror-coated—the gate **5—5** being left uncovered. The mirror-coating **15** of portion **3–4–3** may be a so-called cold-light mirror-coating.

The flattened filament **6** lies in the proximity of the focusing point F and is secured by its ends **7** to the terminal wires **8** which are provided in the pinch **9** of a

stem tube **10**. The wire screen **11** of the lamp consists of a plurality of flattened wire loops **12** and of two stay wires **13**. The dimensions and shape of the screen are such and the screen is secured with the interposition of insulating glass beads **14** to the terminal wires **8** so, that the wire loops **12** surround the filament and the distance between a screen-wire loop and the adjacent part of the filament is smaller than 5 mm.

Rays emitted by the filament **6** are collected by the elliptic mirror **3–4–3** so as to form a beam and leave the lamp through the gate **5–5**, and then form images of the filament in the proximity of the second focus of said mirror (not shown). Although parts of the wire loops **12** are disposed between the filament **6** and the elliptic mirror **3–4–3** and between the filament and the second focus, it is a surprise to find that these screen elements do not give rise to any disturbing shadow effect at or in the vicinity of the second focus—at which a film gate may be arranged which must be illuminated by the lamp with uniform brightness.

Due to the presence of the wire grating, the degree of blackening of the lamp bulb may be very low so that the decrease in light output of the lamp during its life can be strongly counteracted.

What we claim is:

1. In a projection lamp including an elliptical condenser mirror, a filament located in an area of the focus of the mirror, and current-supply wires supporting the filament, the improvement in combination therewith, comprising at least one stay wire extending from a current-supply wire, and a screen supported by said stay wire and formed of spaced wire loops which are positioned generally parallel to each other, substantially surround the filament, and are spaced less than 5 mm. from the filament.

2. A lamp as defined in claim **1** further comprising a thermal insulating element interconnecting each stay wire with a corresponding current-supply wire.

3. A projection lamp as claimed in claim **1** further comprising a bulb part with said elliptical condenser mirror forming a part thereof.

4. A projection lamp as claimed in claim **3** wherein said condenser mirror is secured to the elliptical wall portion of said lamp bulb.

5. A projection lamp as claimed in claim **1** wherein said filament is helically wound and has a flattened cross-section and said wire loops of the screen are also flattened in cross-section.

6. In a projection lamp including an elliptical condenser mirror, a filament located in an area of the focus of the mirror, and current-supply wires supporting the filament, the improvement in combination therewith, comprising at least one stay wire extending from a current-supply wire, and a screen supported by said stay wire and formed of a plurality of spaced generally U-shaped wire elements one end of each element being secured to said stay wire.

7. A lamp as defined in claim **6** wherein the filament has a top part remote from the current-supply wires, and each of said screen wire elements is positioned whereby its closed end is adjacent the top part of the filament and its open end is adjacent the current-supply wires.

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