United States Patent

Anthonijsz

[15] **3,639,750**

[45] **Feb. 1, 1972**

[54] COMBINATION OF A REFLECTOR AND A HALOGEN LAMP

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[73] Assignee: **U.S. Philips Corporation,** New York, N.Y.

[22] Filed: **Nov. 4, 1969**

[21] Appl. No.: **873,885**

[30] **Foreign Application Priority Data**

Nov. 9, 1968 Netherlands.....6816006

[52] **U.S. Cl.** .....**240/11.4 R,** 240/41 BM, 240/41.35 R

[51] **Int. Cl.**.....**F21l 15/02,** G02b 5/10

[58] **Field of Search**.....240/11.4, 41.35, 41.36, 41 BM, 240/41 SB, 103; 313/113

[56] **References Cited**

UNITED STATES PATENTS

3,314,331	4/1967	Wiley	353/20
3,445,646	5/1969	Brooks et al.	240/41.35 X

Primary Examiner—James J. Gill

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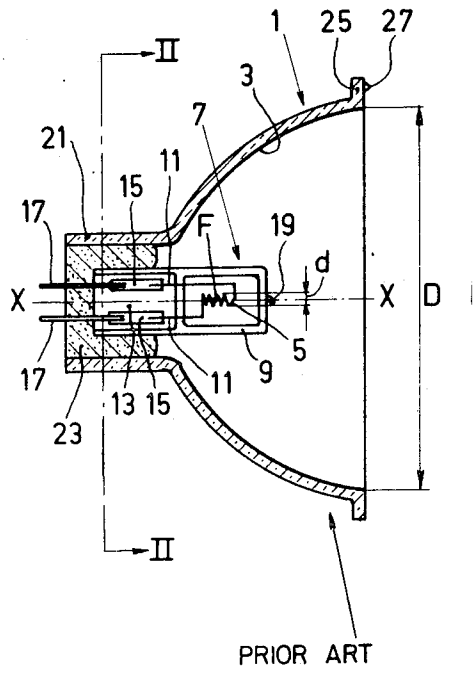
[57] **ABSTRACT**

A condenser mirror formed as a glass socket defining an ellipsoidal reflector, with a slot present in the socket in which the pinch part of a halogen filament lamp is secured. This socket includes a number of axially extending external reinforcement ribs or otherwise thickened portions.

2 Claims, 4 Drawing Figures



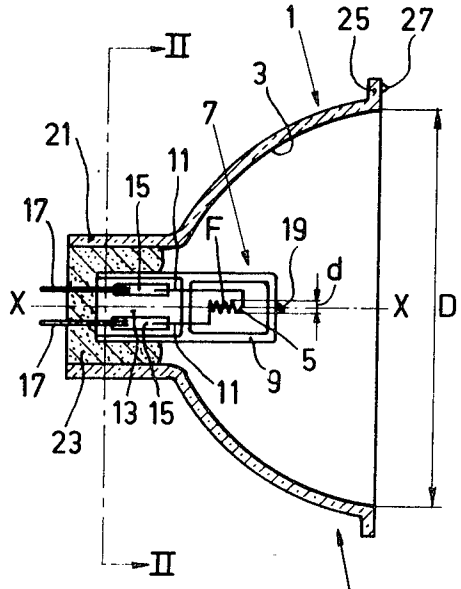


fig. 1
PRIOR ART

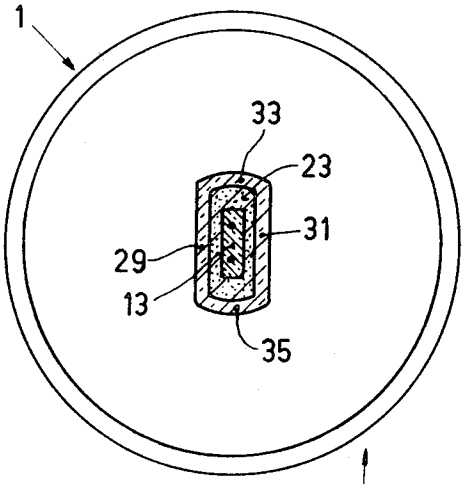


fig. 2
PRIOR ART

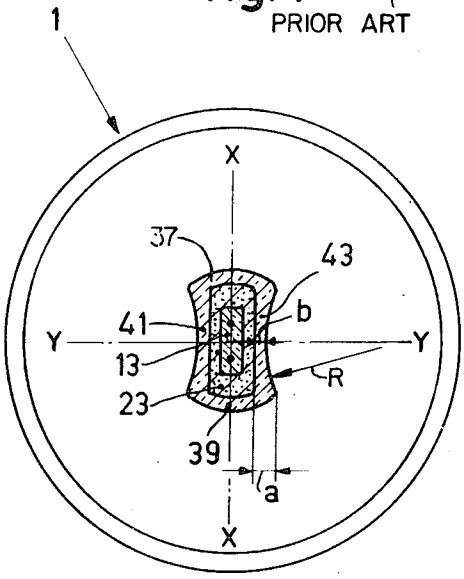


fig. 3

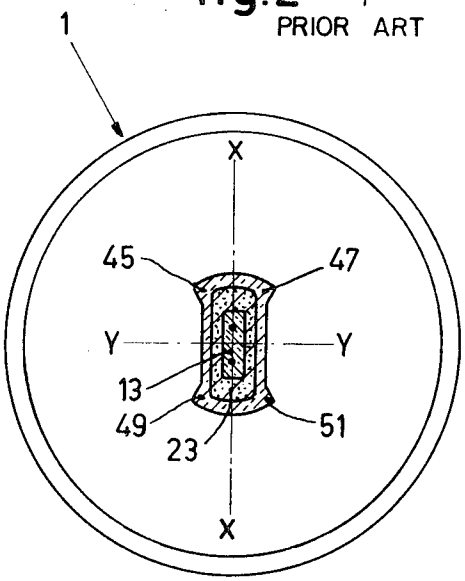


fig. 4

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COMBINATION OF A REFLECTOR AND A HALOGEN LAMP

The invention relates to a combination of a reflector and a halogen filament lamp for exposing the film window of a film projector. The reflector manufactured from compressed glass comprises an ellipsoidal part on the concave surface of which a reflecting layer is provided, and furthermore a cylindrical socket part adjoining the first part and extending in the optical axis of the reflector. The cylindrical part defines a central channel with an elongate cross section having two substantially parallel long sides which open into the ellipsoidal part, and the light source is a halogen filament lamp which has its pinch-shaped part secured in the cylindrical part by means of cement. This type of device is known from the U.S. Pat. No. 3,314,331.

This known device in the form of a projection lamp has a mirrored part of the envelope that serves as a condenser mirror. The envelope of the lamp is closed by a lamp socket in which the current supply wires of the filaments are incorporated in the conventional manner, and the socket in this lamp is situated at the area of the top of the ellipsoidal mirror, where the axis of revolution of the mirror intersects the latter.

The above lamp has the advantage that the accurate arrangement of the light source with respect to the mirror is effected already during the manufacture of the lamp and is therefore independent of the manufacture tolerances in the construction of a projector for which the lamp is destined. This advantage is not present in other known combinations, in which the light source and the mirror are secured separately in the projector.

Another feature of the above lamp is the construction of the socket part as a cylindrical part which has two flattened surfaces, the elongate channel cross section extending between the parallel surfaces. It has been found that in this shape which in itself is attractive, the concave reflector surface to be mirrored comprises in many of the compressed products a number of pleats which are oriented at right angles to said flat surface and which disturb a good optical effect and make such products useless. It has also been found that when a halogen filament lamp is cemented in the lamp socket with parallel surfaces, cracking of the glass often results afterwards, with an undesirably high reject percentage of useless lamps.

It is the object of the invention to mitigate these drawbacks by providing a reflector structure with a different shape in cross section. For this purpose the combination according to the invention is characterized in that, calculated from the short axis of symmetry to throughout the long axis of symmetry of the said elongate cross section of the channel, the wall thickness of the transverse profile of the cylindrical reflector part increases to at most double the wall thickness at the area of the short axis of symmetry.

An embodiment is preferably used in which the cylindrical reflector part is formed as a circular cylindrical surface having two external grooves extending axially in the reflector axis, each groove extending beside the long sides of the channel and being formed as a part of a circular cylindrical concave surface.

In order that the invention may be readily carried into effect, it will now be described in greater detail, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a cross-sectional view of a prior art projection lamp;

FIG. 2 is a cross-sectional view taken on the line II—II of FIG. 1;

FIG. 3 is a cross-sectional view analogous to that shown in FIG. 2, but with a varied cross section of the socket according to the invention;

FIG. 4 is another embodiment analogous to FIG. 3.

The embodiment shown comprises a concave mirror condenser body 1 of compressed glass which comprises on its inside an ellipsoidal surface and is provided there with a thin mirroring layer 3; preferably constructed as a so-called cold-light mirror. The axis of the ellipsoid (at the same time the optical axis of the combination) is denoted by X—X and one of the two foci is denoted by F. The largest diameter D of the mirror will be in the order of magnitude of 5 cm. when the mirror is used in conventional film projectors. The filament 5 of a halogen filament lamp 7 is wound helically, preferably of covered wire, and in this example is cylindrical. It is situated so that it includes the focus F, and that its axis generally coincides with the ellipsoidal axis X—X. The filament 5 is suspended in the envelope 9 of the halogen lamp 7 by means of the supporting wires 11 which are secured to the foils 15 incorporated in the pinch 13 of the lamp, the current supply pins 17 are connected to the foils 15. The envelope 7 also comprises the sealing tip 19. After accurate adjustment relative to the mirror, the lamp is permanently secured in the socket 21 of the mirror body 1 by means of any suitable cementing material 23.

The mirror body 1 furthermore includes an annular fitting edge 25 which ensures a good centering of the combination relative to the optical axis of the projector when the combination is secured in a suitable projector. The fitting edge 25 includes an abutment cam 27 which ensures the angular position around the optical axis X—X at which the lamp and the mirror of the combination during the manufacture thereof are arranged mutually, so that the combination indeed produces a light distribution which is as even as possible over an exposed image field. It is of course intended that the abutment cam 27, upon assembling the combination in a projector, cooperates with an associated groove or aperture in the projector in such manner that the optimum angular position of the combination is reproduced.

The cross section of the socket in FIG. 2 shows two parallel surfaces 29 and 31 and two curved surfaces 33 and 35. This cross section has been found to give rise to cracking of the glass material of the socket and to pleat in the most central part of the mirror layer 3 when the glass body 1 is shaped by compression.

It has been found that this can be avoided considerably by altering the cross section of the socket 21 as shown in FIG. 3. This cross section comprises two convex curved parts 37 and 39, and two concave parts 41 and 43. The curved surfaces are all formed as parts of circular-cylindrical surfaces. Care should be taken that the wall thickness, calculated from the short axis of symmetry Y—Y, increases gradually in the direction of the long axis of symmetry Z—Z in which, however, the dimension a is not larger than two times the diameter b.

FIG. 4 shows another embodiment in which also four thickened ribs 45, 47, 49 and 51 are visible.

What is claimed is:

1. A combination of a reflector and a halogen lamp for exposing the film window of a film projector, the reflector which is manufactured from compressed glass comprising an ellipsoidal first part on the concave surface of which a reflecting layer is provided and a cylindrical socket part adjoining the first part and extending along the optical axis of the reflector, said socket comprising a central channel with an elongate cross section having two approximately parallel long sides which opens into the ellipsoidal part, the light source being a halogen filament lamp having its pinch-shaped part secured in the said cylindrical part by means of a cement mass, characterized in that, calculated from the short axis of symmetry to throughout the long axis of symmetry of the said elongate cross section of the channel, the wall thickness of the transverse profile of the cylindrical reflector part increases to maximally double the wall thickness at the area of the short axis of symmetry.

2. A combination as claimed in claim 1, characterized in that the cylindrical reflector part is formed as a circular cylindrical surface having two external grooves extending axially in the reflecting axis, each groove extending beside the long sides of the channel and being formed as a part of a circular cylindrical concave surface.

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