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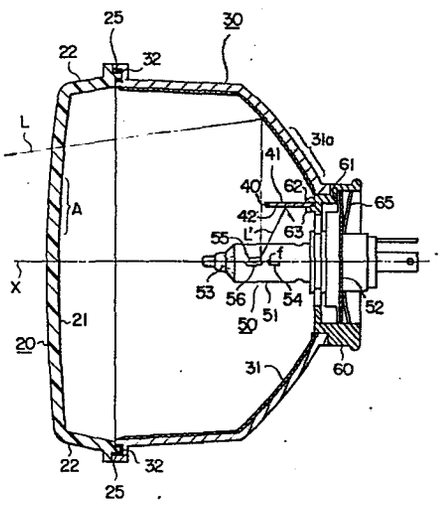
(54) **Vehicle headlamp.**

(57) A vehicle headlamp comprising a reflector (30) having a about parabolic reflecting face (31) formed on the inner surface thereof, and a lens (20) made of synthetic resin and attached to the front end of said reflector, wherein at least one filament (55) for a lamp (50) supported by said reflector is positioned ahead the focussing point (f) of said reflector, the reflecting face of said reflector has a zone (31A) where light of said filament is reflected onto an upper area (A) of said lens, and said zone (31A) is above the lamp and along an axis (Y) vertically passing through the optical axis (X) and shielded by a shielding member (40) arranged between the reflecting face of said reflector and the lamp.

FIG. 4



EP 0 111 579 A1

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VEHICLE HEADLAMP

The present invention relates to a vehicle headlamp and, more particularly, a vehicle headlamp provided with a front lens of synthetic resin.

The conventional front lens employed to the vehicle headlamp is formed by press-molding a mass of molten glass, but a front lens made of synthetic resin has been developed because it can be light-weighted and because it enables a plurality of prisms to be easily formed for the purpose of controlling light radiated from a filament.

In the case of the headlamp in which this synthetic resin front lens is employed, however, light reflected by the reflector is focussed to soften an upper area of said front lens under high temperature atmosphere or high terminal voltage, when filament for the lamp, which is attached to the reflector, are positioned ahead the focussing

point of said reflector. This will be described in more detail referring to the conventional headlamp shown in Figs. 1 and 2, in which Fig. 1 is a front view and Fig. 2 is a sectional view taken along the line I - I in Fig. 1.

As shown in Fig. 2, a lens 1 made of synthetic resin is attached to the front end of a reflector 2. The reflector 2 has a reflecting parabolic face 3, to which is fixed a lamp holder 4 for attaching a lamp 6 to the reflector 2. The lamp 6 attached to the lamp holder 4 by means of a set spring 5 includes a main filament 8, a sub-filament 9 and a light shielding cap 10 inside a glass envelope 7, said light shielding cap 10 serving to cover about the lower half of said sub-filament 9. The main filament 8 is positioned nearly corresponding to the focussing point (f) of said reflector 2 while the sub-filament 9 is positioned ahead the focussing point (f) of said reflector 2. Numeral 11 represents a light shielding coat applied to the front end of said glass envelope 7.

When light of the main filament 8 is reflected by the reflecting face 3, it becomes substantially parallel to an optical axis (X) or rather diffused. On the contrary, light (L) of the sub-filament 9 reflected by the reflecting face 3 becomes focussed as shown in Fig. 2. This is because the sub-filament 9 is positioned ahead the focussing point (f) of said reflector 2.

Vehicles are used under various circumstances such as on hot desert, for example. The headlamp attached to the vehicle which runs on such hot desert is brought under high temperature atmosphere. It is therefore necessary to test the headlamp to see if it can be used under high temperature atmosphere or at 80°C, for example. When the headlamp exposed as described above is left turned on under atmosphere of 80°C, heat is concentrated to the upper area (A) of the lens 1, as shown in Fig. 1, because of high temperature atmosphere outside the headlamp, heat

caused when focussed, and atmosphere caused hot inside the headlamp due to the turned-on lamp 6 and stayed in the headlamp at the upper portion thereof. As the result, the upper area (A) is softened by this concentrated heat.

It has also been found that this softening is caused even under normal temperature but when terminal voltage becomes high. When terminal voltage becomes high, light radiated from the sub-filament 9 becomes intense, thus causing heat to become high too. Therefore, reflected light (L) including high heat is combined with the atmosphere inside the headlamp to cause the area (A) to be softened.

An object of the present invention is to reduce the amount of reflected light incident onto the upper area of synthetic resin lens and to prevent heat from being concentrated onto the upper area.

Another object of the present invention is to provide a simple construction capable of preventing heat from being concentrated onto the upper area of synthetic resin lens.

These and other objects as well as features of the present invention will become apparent from the following detailed description with reference to the accompanying drawings.

Figs. 1 and 2 show the conventional vehicle headlamp, in which Fig. 1 is a front view thereof and Fig. 2 is a sectional view taken along the line I - I in Fig. 1.

Fig. 3 is a front view, partly broken, showing an embodiment of the present invention.

Fig. 4 is a sectional view taken along the line II - II in Fig. 3.

Fig. 5 is a sectional view similar to that in Fig. 1 and showing another embodiment of the present invention.

Fig. 6 is a sectional view similar to that in Fig. 3 and showing a further embodiment of the present invention.

Fig. 7 is a partially cutaway perspective view showing the shielding member of Fig. 6 enlarged.

A vehicle headlamp according to the present invention is shaped rectangular, for example, as shown in Fig. 3 and has a lens 20 attached to the front end of a reflector 30, as shown in Fig. 4. The lens 20 is made of transparent synthetic resin such as polycarbonate for example, and includes a lens face 21 formed on the inner surface thereof and provided with a plurality of prisms to control light, and a side wall 22 enclosing the lens face 21. The side wall 22 is air-tightly attached to the opened front end of said reflector 30 by means of a bonding agent 25 which is previously filled in a groove 32 formed on the opened front end face of said reflector 30.

The reflector 30 has an about parabolic reflecting face 31, which includes an attachment hole in which is fixed a lamp holder 60 for attaching a lamp 50. The reflector 30 may be formed integral to the lamp holder 60.

The lamp holder 60 is formed cylindrical so as to allow a glass envelope 51 for the lamp 50 to be inserted therethrough, and has a stepped portion 61 formed on the inner face thereof on which a flange 52 of said lamp 50 is rested. The flange 52 is urged against the stepped portion 61 by means of a set spring 65, thus enabling the lamp 50 to be attached to the lamp holder 60. It is preferable that the lamp holder 60 is made of synthetic resin when the reflector 30 is made of synthetic resin but that the former is made of metal when the latter is made of metal.

The lamp 50 includes a main filament 54, a sub-filament 55 and a light shielding cap 56 inside the glass envelope 51 to the front end of which is applied a light shielding coat 53, said light shielding cap 56 covering about the lower half of said sub-filament 55. The sub-filament 55 is position ahead the main filament 54 inside the glass envelope 51. The lamp 50 thus arranged may be of Halogen H_4 according to ECE regulation. The lamp 50 is attached to the lamp holder 60 in such a way that the sub-filament 55 is positioned ahead the focussing point (f) of the reflector 30, and that the main filament 54 is positioned nearly corresponding to the focussing point (f). Therefore, light of the main filament 54 is reflected by the reflecting parabolic face 31 to be substantially parallel to an optical axis (X) or to be rather diffused. On the contrary, light (L) of the sub-filament 55 reflected by the reflecting parabolic face 31 becomes focussed as shown in Fig. 4.

The sub-filament 55 is positioned ahead the focussing point (f) with its center lying on the optical axis (X), while the main filament 54 is positioned contacted with the optical axis (X) and the focussing point (f) but with its center lying under the optical axis (X). The main filament 54 is used as upper beam and the sub-filament 55 as dipped beam.

The reflecting parabolic face 31 is formed by vaporing a reflecting coat such as aluminium, for example, on to the parabolic face of reflector body. When the reflector body is made of metal or synthetic resin such as polybuthylene terephthalete, for example, it is preferable that an undercoat is interposed between the reflector body and the reflecting coat for the purpose of smoothing the reflecting coat.

The reflecting face 31 has a zone 31a where light of the sub-filament 55 is reflected to the upper area (A) of the

lens face 21. As shown in Fig. 3, the zone 31a is above the lamp 50 and along a line (Y) vertically passing through the optical axis (X). The zone 31a is shielded by a shielding member 40 arranged between the reflecting face 31 and the lamp 50.

The shielding member 40 is a metallic plate and has such area that enables light of sub-filament to be prevented from entering into the zone 31a. The shielding member 40 is fitted between rails 62 and 63 formed on the front end face of said lamp holder 60, and kept substantially parallel to the optical axis (X) as shown in Fig. 4, thus achieving a design effect of keeping the shielding member 40 invisible from the front when the headlamp is turned off. For the purpose of forming light absorbing faces, the whole of said shielding member 40 may be subjected to a process of letting light be absorbed as much as possible, such as the application of black plating or coating. In the case of the shielding member 40 attached as shown in Fig. 4, however, it is preferable that one face of said shielding member 40 located on the side of the reflecting face 31 is silver-plated, white or silver-coated, or aluminium-vapored to form a reflecting face 41. This is because one's eyes reflected by the zone 31a is absorbed by the light absorbing face, thus causing the viewer to see the inside of the headlamp quite dark, when the face of said shielding member 40 located on the side of the reflecting face 31 is subjected to light-absorbing process. It is also preferable that the other face of said shielding member 40 located on the side of said lamp 50 is processed to form a light absorbing face 42 so as to prevent light from being reflected as little as possible.

According to the present invention, the zone in the reflecting parabolic face which is projected onto the area of said lens face is shielded by the shielding member, as described above. As the result, the area can be kept lower in temperature and thus prevented from becoming

softened. In addition, the shielding member can be easily attached to the lamp holder.

Fig. 5 is a sectional view showing another embodiment of the present invention. Same parts as those in the above-described embodiment will be represented by same numerals and description on these parts will be omitted.

The shielding member 40 for shielding the zone 31a is curved along the reflecting parabolic face 31 and attached to a stand 64 formed on the lamp holder 60 by means of screws 70 in this second embodiment. Light absorbing process may be applied to the whole of said shielding member 40, but the face of said shielding member 40 located on the side of the lamp 50 is formed as an irregularly reflecting face 43 for the sake of visibility when viewed from the front. Namely, the material surface of said shielding member 40 is made rough and uneven by shot-blasting, for example, and then aluminium-vapored or silver-coated to form the irregularly reflecting face 43. Therefore, light (L') radiated from the sub-filament 55 and directed to the zone 31a is irregularly reflected and diffused by the shielding member 40, so that the amount of light incident onto the area (A) can be reduced to keep the area (A) lower in temperature and thus to prevent the area (A) from being softened. The other face of said shielding member 40 located on the side of the reflecting face 31 may be formed either as light absorbing face or as irregularly reflecting face, and it is formed as a light absorbing face 42 in this second embodiment.

Fig. 6 is a sectional view showing a further embodiment of the present invention and Fig. 7 is a partially cutaway perspective view showing the shielding member 40 of Fig. 6 enlarged. Same parts as those in the above-described embodiments will also be represented by same reference numerals and description on these parts will be omitted, too.

The shielding member 40 for shielding the zone 31a is arranged between the reflecting face 31 and the lamp 50 and attached at one end thereof to an upper flat wall 33 of said reflector 30 by means of rivets 71. The shielding member 40 shields even the reflecting face 31 of said reflector 30 in addition to the zone 31a thereof in this third embodiment. Therefore, this portion of said shielding member 40 which is located on the side of the lamp 50 and which is intended to shield the reflecting face 31 is formed as a reflecting parabolic face 44 which has same focussing point as that (f) of said reflecting face 31, while that portion of said shielding member 40 which is located on the side of the lamp 50 and which is intended to shield the zone 31a is formed as an irregularly reflecting face 43. Namely, only that portion of material surface of said parabolic shielding member 40 which is intended to shield the zone 31a is made rough and uneven by shot-blasting and then aluminium-vapored or silver-coated. As the result, parabolic reflecting and irregularly reflecting faces 44 and 43 are formed on that face of said shielding member 40 which is located on the side of the lamp 50. Therefore, light (L') radiated from the sub-filament 55 toward the zone 31a is irregularly reflected by the irregularly reflecting face 43 of said shielding member 40, thus enabling the amount of light incident onto the area (A) to be reduced to prevent said area (A) from being softened. In addition, light (ℓ) reflected by the reflecting face 44 of said shielding member 40 is so controlled that it can be used as effective light.

Although the present invention has been described in detail with reference to the drawings, it should be understood that the present invention is not limited to the above-described embodiments but that modifications and improvements not departing from the technical scope of the present invention are all included in the scope of the present invention.

CLAIMS:

1. A vehicle headlamp comprising

(a) a reflector having an about parabolic reflecting face formed on the inner surface thereof,

(b) a lens made of synthetic resin and attached to the front end of said reflector,

(c) a lamp having at least one filament in a glass envelope and attached to the reflector in such a way that the filament is positioned ahead the focussing point of said reflecting face,

(d) a zone located on the reflecting face to reflect light of said filament onto an upper area of said lens, and

(e) a shielding member arranged between the reflecting face and the lamp to shield the zone.

2. A vehicle headlamp according to claim 1 wherein said lamp is attached to the reflector through a lamp holder to which is attached said shielding member.

3. A vehicle headlamp according to claim 2 wherein said shielding member is attached substantially parallel to an optical axis, and this face of said shielding member which is located on the side of the reflecting face is formed as a reflecting face, while that face of said shielding member which is located on the side of the lamp is formed as a light absorbing face.

4. A vehicle headlamp according to claim 2 wherein said shielding member is curved and attached along the reflecting face and that face of said shielding member which is located on the side of the lamp is formed as an

irregularly reflecting face.

5. A vehicle headlamp according to claim 1 wherein said shielding member is attached to an upper wall of said reflector and a part of said shielding member which is located on the side of the lamp and which is intended to shield the zone is formed as an irregularly reflecting face while the other thereof is formed as a parabolic reflecting face, the focussing point of the reflecting face of said shielding member corresponding to that of the reflecting face of said reflector.

1/6

FIG. 1

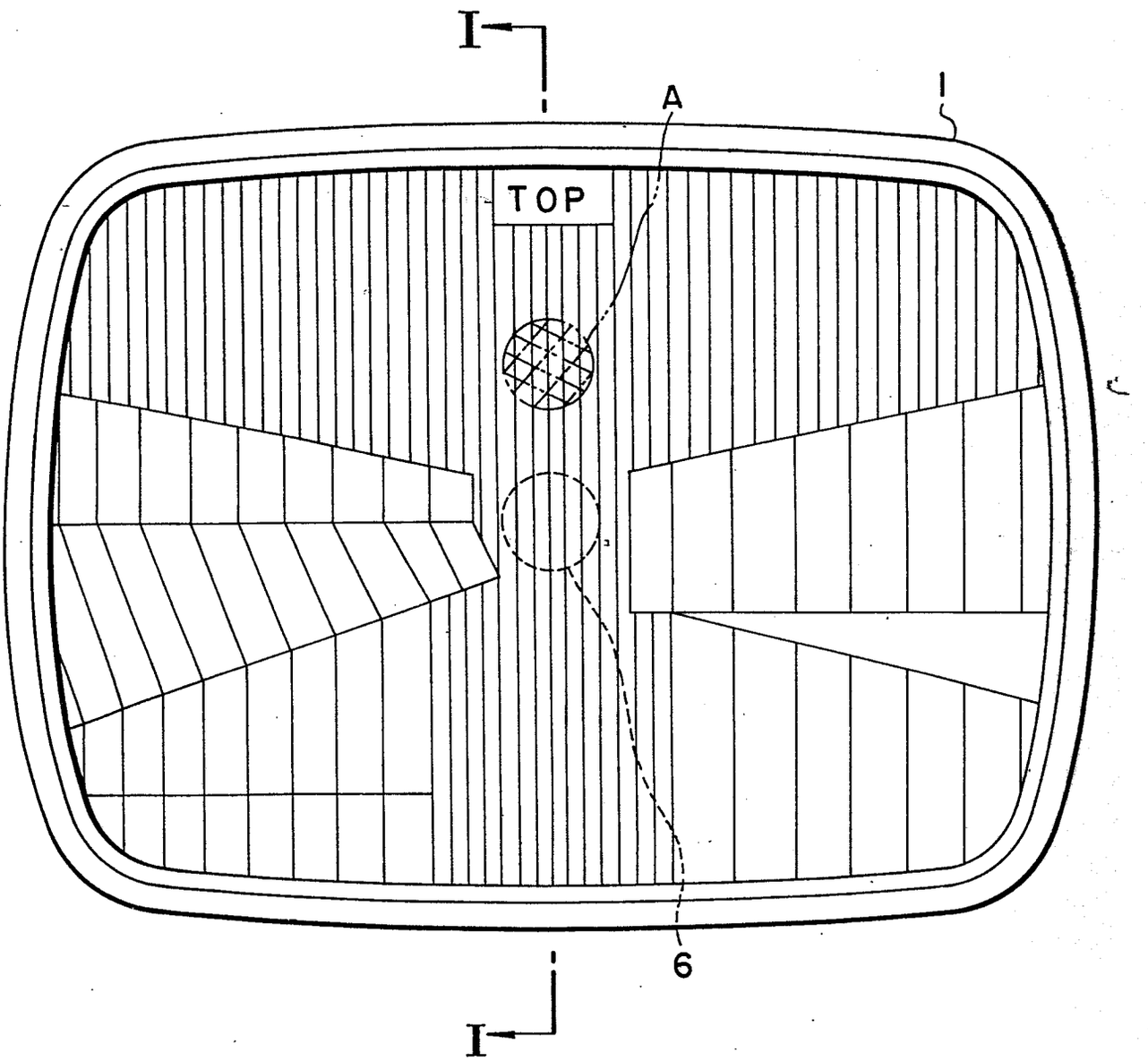

FIG. 2

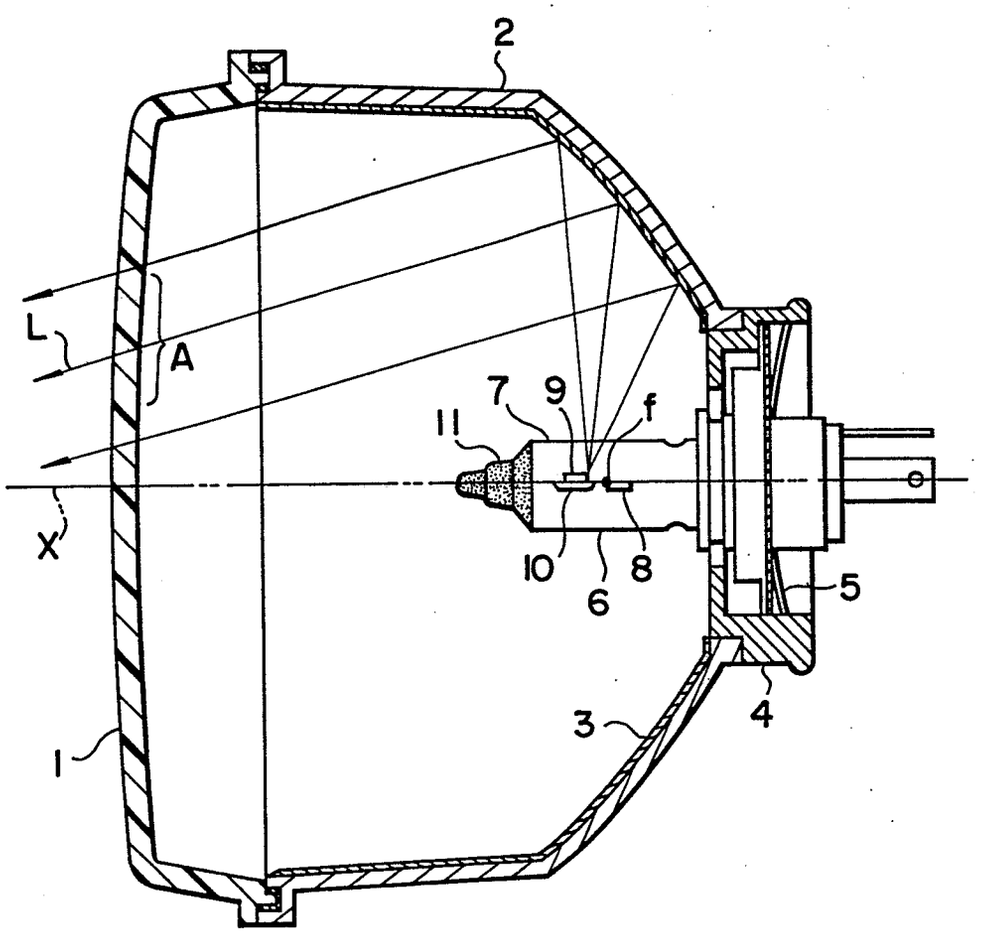

FIG. 3

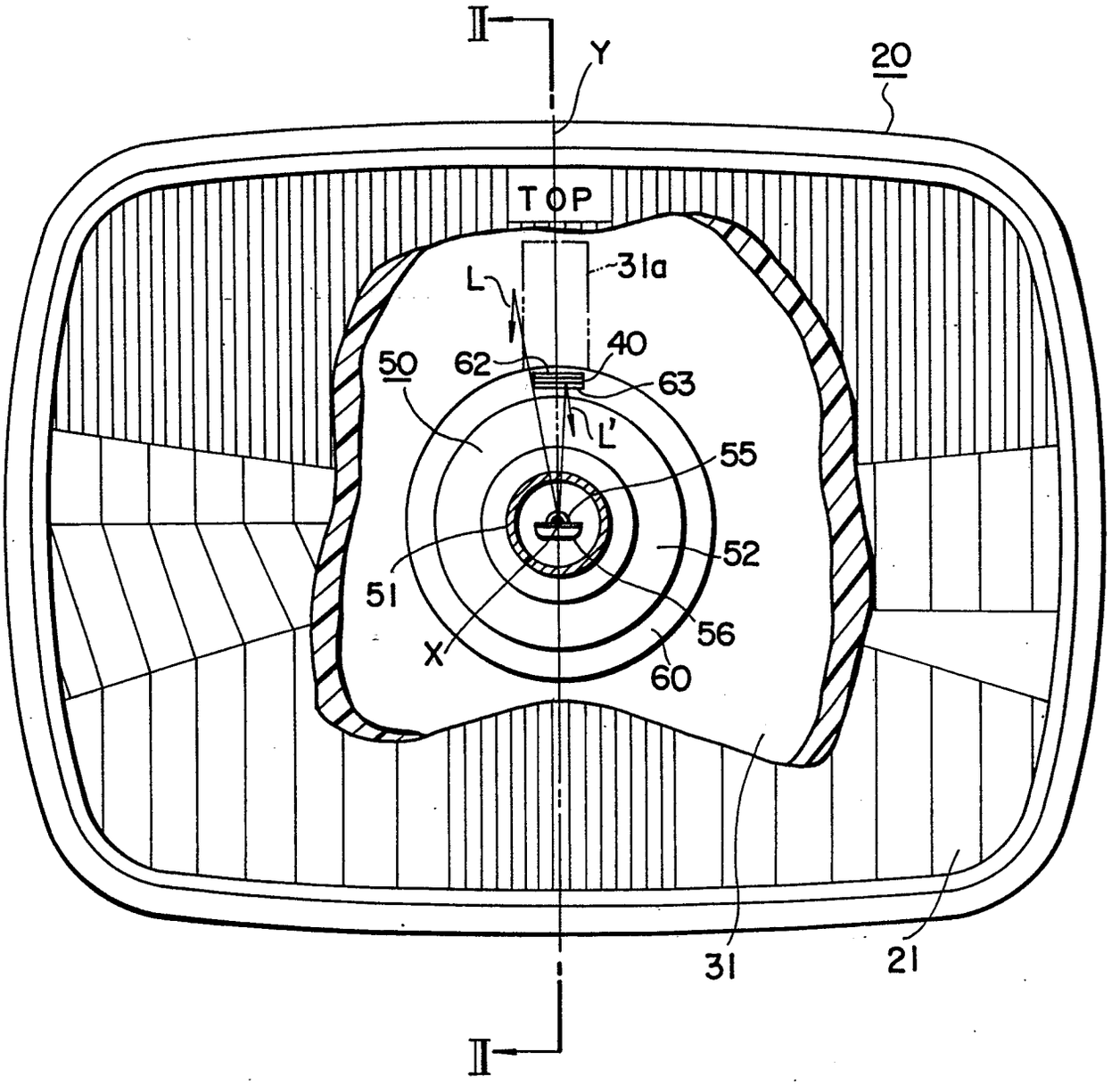

FIG. 4

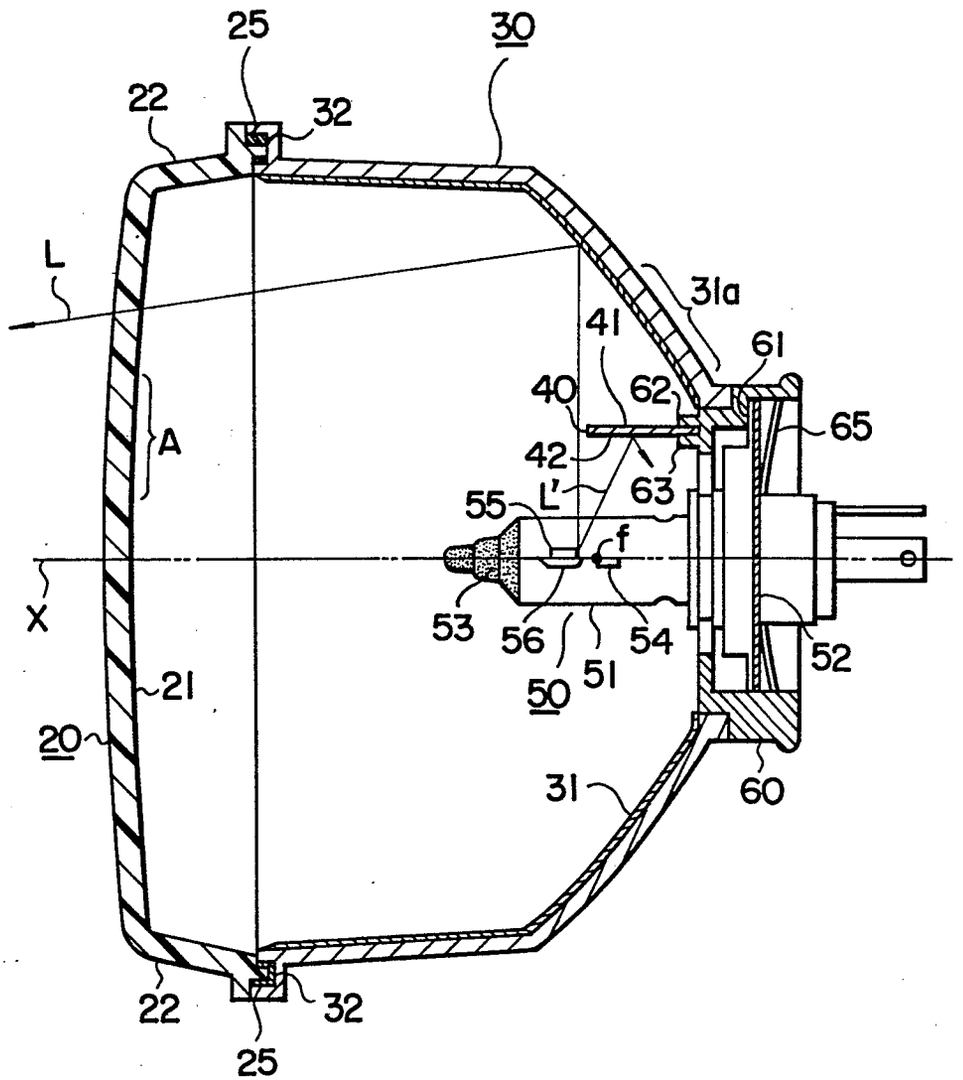
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FIG. 5

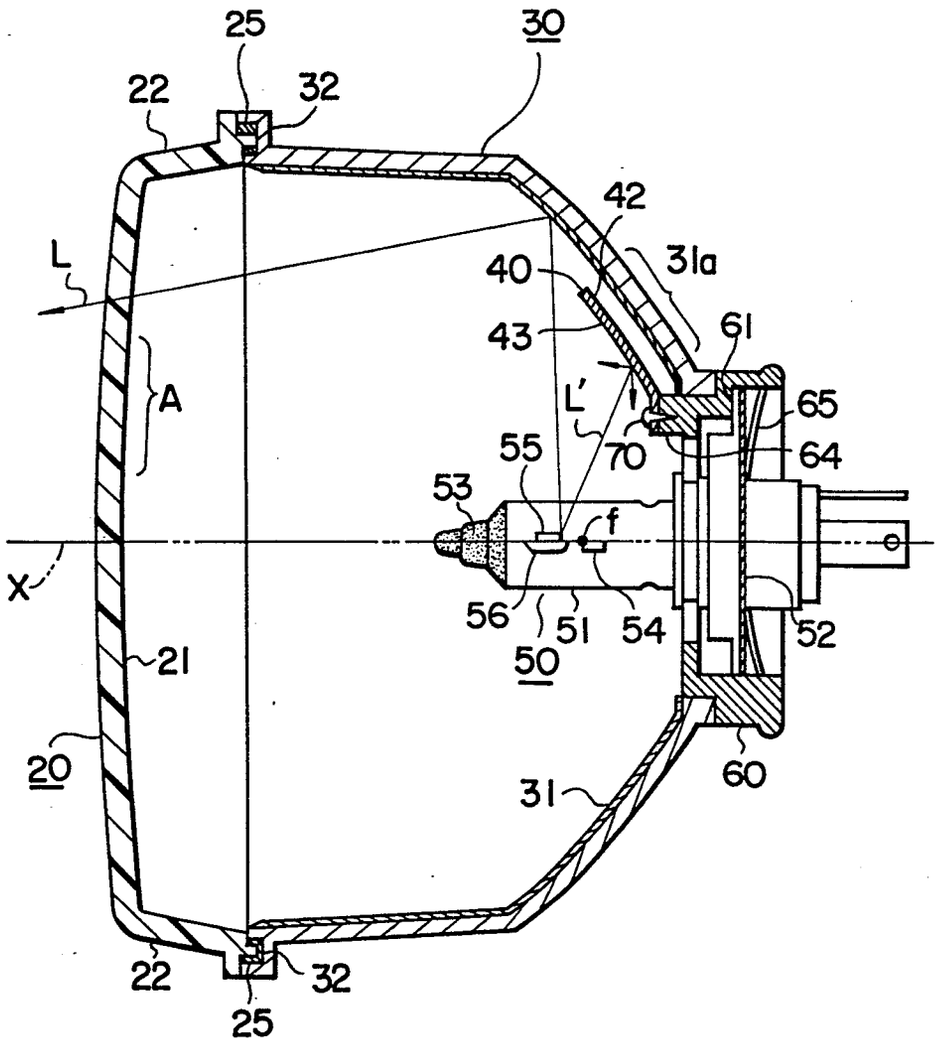
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FIG. 6

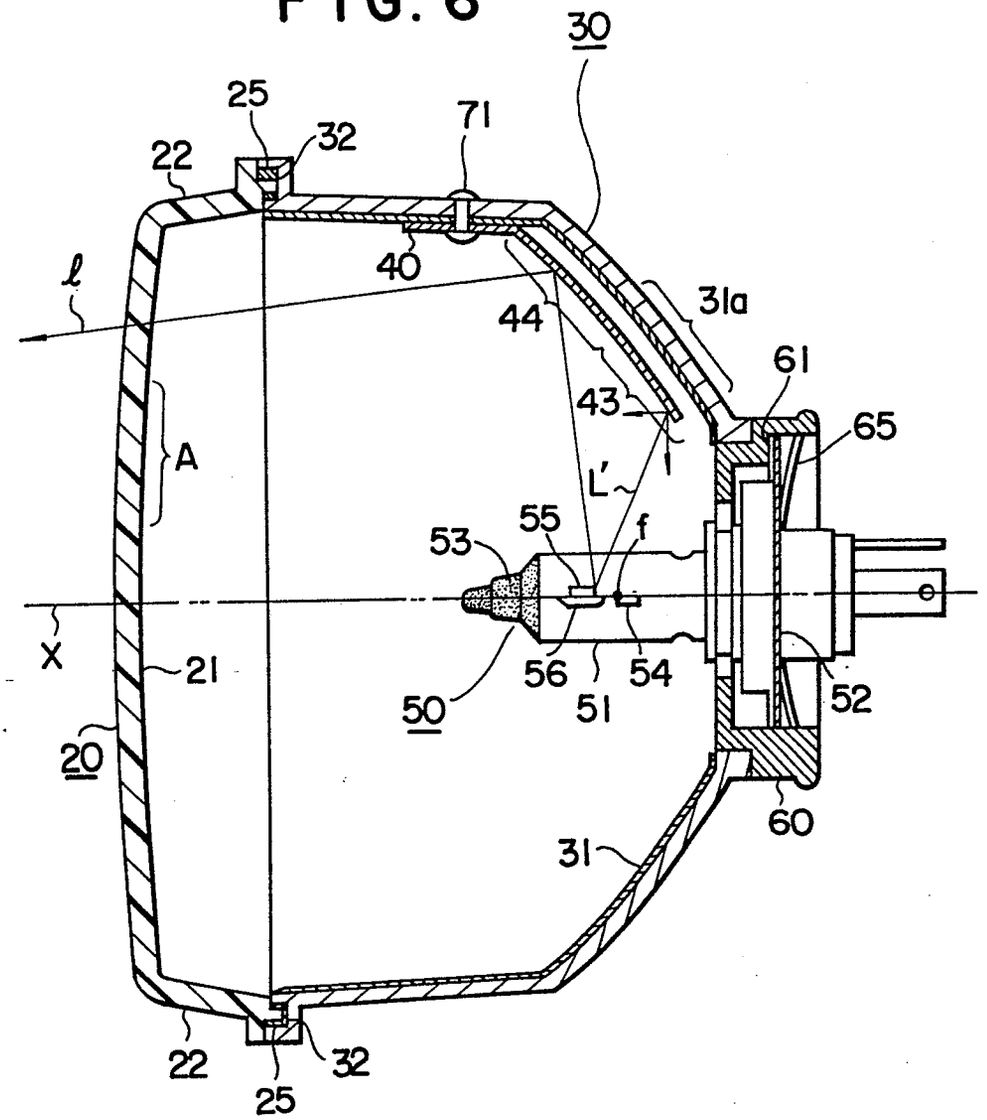
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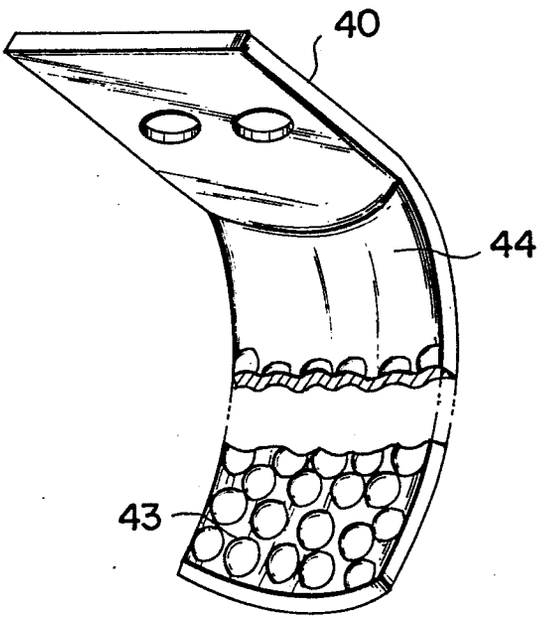
FIG. 7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EUROPEAN SEARCH REPORT

0111579
Application number

EP 82 11 1722

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	GB-A-2 011 600 (CIBIE) * Whole document *	1,3	F 21 M 7/00 F 21 M 3/14
A	GB-A-2 079 434 (SEIMA) * Page 2, lines 61-65, 78 *	2,4,5	
A	US-A-1 644 686 (MARKEL) * Page 1, lines 65-77; figures 1-8 *	4,5	
A	FR-A-2 125 674 (DUCELLIER) * Page 5, lines 1-3 *	5	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

F 21 M
F 21 V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17-08-1983	FOUCRAY R.B.F.

CATEGORY OF CITED DOCUMENTS

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