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(54) Electric light source with reflector, reflector, and glass-moulded piece for use therein.

(57) The electric light source with reflector comprises a reflector (10) having a first and a second mirroring wall portion (12 resp. 22), which in axial sections are curved according to an arc (13 resp. 23) of a circle the centre of which lies before the plane P of the largest diameter (d), in an area extending predominantly at the other side of the axis, and behind plane P at the other side of the axis, resp. The reflector has a light emanating window (30) opposite to a lamp base (1). An electric light source (3) is disposed within the reflector (10) near plane P and the axis (11). The reflector (10) may be integrated with a lamp vessel (5) to give a reflector lamp. The invention also concerns a reflector having a lamp holder to receive an electric lamp suitable for use in the electric light source with reflector and to moulded glass bodies suitable for use in the reflector. The second and possibly the first wall portions (22, 12) have superimposed, tilted and transversely concave axial lanes (25 resp. 15), which prevent reflected rays to hit the light source and causing stray radiation. The lanes 15 may counteract or augment the deviation given to light rays by lanes 25. The reflector may be adjustable by its user.

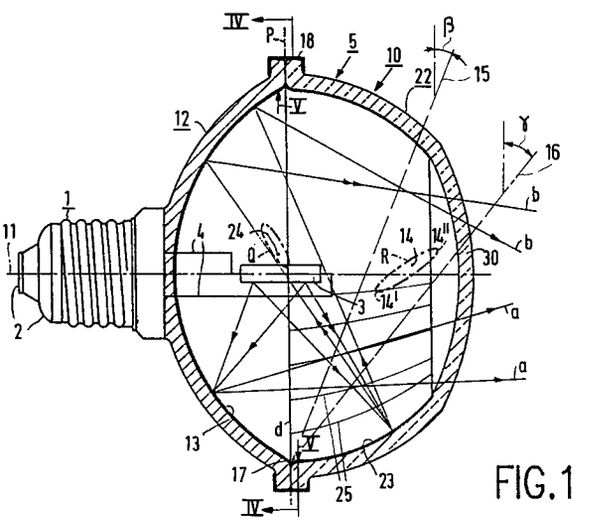

FIG.1

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The invention relates to an electric light source with reflector, comprising:

a lamp cap provided with contacts;

a reflector having a basic shape which is provided with:

an axis of symmetry and a largest diameter d in a plane P transverse to the axis of symmetry;

a first internally concave, mirroring wall portion behind the plane P which in axial cross-sections at a first side of the axis is curved substantially according to a circular arc having a centre of curvature in front of the plane P, in a region which is predominantly situated at the other side of the axis, which first wall portion is situated adjacent the lamp cap;

a second internally convace, mirroring wall portion in front of the plane P which in axial cross-sections at the first side of the axis is substantially curved according to a circular arc having a centre of curvature behind the plane P at the other side of the axis;

a luminous window which is intersected by the axis; the electric light source being arranged in the reflector in the vicinity of the axis and of the plane P, and connected to current conductors which extend to the contacts of the lamp cap. The invention also relates to a reflector and a moulded glass piece for use therein.

Such an electric light source with reflector and a reflector for use therein are described in the not previously published EP Patent Application 91 20 24 17.1 (PHN 13.842).

Radiation from the light source which directly hits the first wall portion is reflected there and thrown past the light source through the window to the exterior. The second wall portion does not represent any substantial obstacle to this. Radiation coming from the light source and directly hitting the second wall portion is reflected to the first wall portion and thrown to the exterior from there, being added to the former radiation so as to form the radiation beam of the device together with the radiation thrown directly to the exterior by the light source. The second wall portion also does not represent any substantial obstacle to the radiation issuing after reflection by the second wall portion and the first wall portion in that order. The first and the second wall portion accordingly cooperate closely in order to concentrate the generated radiation into a beam, while the second wall portion prevents radiation from issuing at great angles to the axis, which could be unpleasant or useless for practical purposes.

The light source with reflector and the reflector for use therein described in the said Patent Application form a wide light beam of more than 50°. The term "light" is understood to include UV light, visible light, and IR light. The reflector may have a first wall portion which has a first section curved substantially according to a circular arc and is remote from the plane P, and a second such section adjacent the plane P. The said reflector renders it possible for the electric lamp to irradiate a field with a high homogeneity.

In the device described, the light source may be arranged axially or transversely, for example, linearly. An incandescent body as the light source may have, for example, a compact shape such as the M-shape and be arranged axially, or, for example, be mounted as a rectilinear cylinder transverse to the axis or as an open polygon around the axis. The contours and the light distribution of the light beam depend only very slightly on the shape and position of the light source. Instead of an incandescent body, which may or may not be arranged in a, for example, tubular envelope, and which may or may not be surrounded by a halogen-containing gas, a pair of electrodes in an ionizable medium enclosed in an envelope may be used as the light source, for example a high-pressure sodium discharge lamp, for example for use in horticulture or for general lighting.

An electric incandescent lamp in which a reflector of a similar geometric construction is integrated with the lamp vessel of the incandescent lamp so as to form a reflector lamp is known from EP 0 284 117-B1.

A light source, an incandescent body, is arranged around the axis of the lamp vessel in this incandescent lamp. The mirroring wall portions form a light beam of very high intensity in the centre thereof, along the axis. The first and the second mirroring wall portion cooperate in a corresponding manner so as to form a beam of a small width of approximately 25°.

The known lamp is suitable for illuminating objects or regions of limited dimensions brightly, and thus giving local light accents.

EP 0 410 525-A1 also discloses an electric lamp in which a reflector of a similar geometric construction is integrated with the lamp vessel so as to form a reflector lamp. Here a first and a second mirroring wall portion cooperate in a corresponding manner so as to form a beam of small width. The light source here is an incandescent body or a discharge path between a pair of electrodes in an ionizable medium, and is axially arranged.

A disadvantage of the said electric light source with reflector and of the said electric lamp is that the radiation thrown back by the second wall portion to the first wall portion may find the light source in its path. If the light source has an envelope of its own, reflection may take place thereon, which disturbs the beam paths and gives rise to scattered radiation. Another possible result is a

locally higher thermal load on the light source, which may lead to instability of the light source and its premature failure.

It is an object of the invention to provide an electric light source with reflector of the kind described in the opening paragraph which effectively concentrates the generated radiation into a beam while at the same time avoiding reflection of radiation onto the light source. It is also an object of the invention to provide a reflector for this purpose.

According to the invention, this object is achieved in that

the light source has a cylindrical contour with a diameter d_1, concentric with the reflector;

the second wall portion has superimposed lanes which extend substantially in axial direction, are tilted relative to the basic shape, and are curved transverse to their axial direction substantially according to a circular arc with a centre of curvature situated on a cylinder coaxial with the axis of symmetry,

whereby the radii of said circular arc are at most tangent to the said coaxial cylinder and the said cylinder has a diameter d_c which is greater than 0.5 d_1.

Light rays reflected by the second wall portion towards the first wall portion are deflected by the superimposed lanes from the corresponding plane through the axis, so that they will go past the light source. Reflections onto the light source, and thus the generation of scattered radiation, are prevented by this. It is also prevented that the light source is unevenly heated.

The light source may be of various types: an incandescent body, an incandescent body in a, for example substantially cylindrical envelope filled with a gas which may or may not comprise a halogen, a discharge path between electrodes with an ionizable medium in an envelope, for example, made of quartz glass or ceramic material. In the case of an axially arranged light source having an envelope, the cylindrical contour of the light source coincides at least partly with the exterior surface of the envelope.

As will be clarified with reference to the drawings, rays coming from the second wall portion would just graze the light source on their way to the first wall portion if the diameter d_c were equal to 0.5 d_1.

The measure in the electric light source with reflector according to the invention leads to widening of the light beam formed compared with the beam of an identical light source with reflector without superimposed lanes. If so desired, this widening may be compensated for by means of the basic shape of the reflector. When the lanes are tilted to the same degree over their entire axial dimension, all light rays reflected thereon are deflected through the same angle and rays travelling a longer path to the first wall portion will be given a greater transverse deviation than rays travelling a shorter path. The former rays lead to a greater widening of the light beam. In a favourable embodiment, the lanes are twisted: the lanes are comparatively weakly tilted in locations from which light beams travel a longer path, while they are comparatively strongly tilted in locations from which light beams travel a comparatively short path. It is achieved in this way that locations of the second wall portion comparatively far removed from the light source do not deflect light rays more strongly than is desired.

It is a favourable property of the light source with reflector that light coming straight from the light source in an axial plane and also light coming from the light source in another axial plane towards the second wall portion and deflected by that wall portion towards the first wall portion are incident on the first wall portion in one and the same location. As a result, mixing of light takes place in the reflector and, if the light source does not emit light of the same colour everywhere, mixing of colours, so that the colour of the light beam is homogenized.

The light source with reflector may be so constructed that all lanes are tilted in the same direction. Alternatively, the lanes may form an alternating pattern, for example, be tilted in one and in the other direction alternately or in pairs, for example, alternately $+x°$, for example $+5$ or $+10°$, and $-x°$. These possible options may be relevant in dependence on the available manufacturing methods. The lanes may have a pitch around the axis of the reflector, especially if they are tilted in one and the same direction.

In a favourable embodiment, the first wall portion also has superimposed, substantially axially extending tilted lanes. The lanes in this embodiment may be used for counteracting or reinforcing the deflection of the light rays caused by the second wall portion. A beam which is further widened is obtained in the latter case. In the former case the deflection by the second wall portion may be entirely eliminated, or only partly eliminated. If a comparatively narrow light beam is desired, it is favourable if the second wall portion has lanes which deflect incident light rays through an angle of $x°$ and the first wall portion has lanes which deflect light rays through an angle of half that value, x being chosen so small as to be sufficient for preventing light from returning onto the light source in the given geometry. The explanation for this is that the first wall portion also reflects light which comes straight from the light source and which has accordingly not yet been subject to any deflection which is to be compensated for. This

light is thrown to the exterior through the window, as stated, without a second reflection.

A special embodiment is one in which both wall portions have lanes which are alternately tilted in the one and the other direction. This embodiment may be used for manufacturing a product having a comparatively wide beam or a product having a comparatively narrow beam by adjusting the two wall portions relative to one another during the manufacture of the light source with reflector. In a further development of this embodiment, the first wall portion is rotatably connected to the second wall portion, so that the user can vary the beam width.

The basic shape of the reflector may be rotationally symmetrical, but alternatively the basic shape may form a different closed configuration in cross-sections transverse to the axis.

The electric light source may be fixedly connected to the reflector so as to form a unit which supports a lamp cap.

The electric light source may be accommodated, for example, in a lamp vessel with which the reflector is integral so as to form a reflector lamp provided with a lamp cap. Wall portions of the lamp vessel are then shaped and mirrored so as to form the reflector. The lamp vessel may be made from glass. The lamp vessel then has a seam, for example, in the plane P. It is built up in that case from a first and a second moulded piece which comprise the first and the second wall portion, respectively. The second moulded piece may also comprise a wall portion which forms the luminous window. A neck-shaped portion supporting the lamp cap may be present at a lamp vessel opposite the luminous window. Alternatively, however, the lamp cap may be supported by the first moulded piece itself. The two moulded pieces may be rigidly connected to one another, or be mutually rotatable or even detachable, for example, if the light source is exchangeable.

The light source may alternatively be fastened in a reflector, for example a metal reflector, so as to form a lamp/reflector unit which supports a lamp cap. The luminous window may or may not be closed off by a translucent e.g. transparent disc.

Mirroring of wall portions of the reflector may be obtained by means of a, for example, vapour-deposited metal layer, for example, aluminium, aluminium and copper, gold, chromium, or by means of a dichroic filter, for example a filter which reflects visible light and transmits heat radiation.

Alternatively, however, the reflector together with a lampholder may form a luminaire in which the light source can be accommodated with the lamp cap placed in the lampholder. The invention also relates to such a reflector. The reflector may be separable in the plane P so as to facilitate the insertion of a light source therein. The parts of the reflector may be rotatably fastened to one another, for example, for providing an adjustment possibility of the beam width.

It will be obvious that the same arrangement of optical elements and the same cooperation for concentrating generated radiation into a beam, while avoiding undesirable reflections, are realised in these embodiments.

Various basic shapes of the reflector are possible, for example, one in which the first mirroring wall portion in every axial cross-section at the first side of the axis has a centre of curvature situated in a region which lies predominantly at the other side of the axis and which is bounded, for example, by lines which enclose an angle β and an angle γ of 23 and 39°, respectively, with the plane P and which intersect the plane P in the point where the first mirroring wall portion intersects the plane P at the first side of the axis;

the second mirroring wall portion has a centre of curvature which is situated in a region having the shape of an ellipse Q whose major axis has a first end in the plane P at a distance of 0.02 d from the axis of symmetry and a second end at a distance of 0.07 d from the plane P and 0.13 d from the axis of symmetry, which ellipse has a major axis which is 6.8 times the length of the minor axis.

A reflector with such a basic shape yields a wide beam of 50° or more, for example, 60 or 70°. An advantage is that there is a high degree of freedom in positioning of the light source and in the shape thereof. Thus the light source may be arranged axially or transversely, for example, linearly. An incandescent body as the light source may have, for example, a compact shape, such as the M-shape, or be a straight cylinder and be arranged axially or transversely. Alternatively, however, an incandescent body may be positioned around the axis as an open polygon. It was found that the contours and the light distribution of the light beam to be formed have a very slight dependence on the shape at the position of the light source.

When a single electric light source with reflector is used for illuminating a field, while it is in addition desirable for this field to be irradiated with a high degree of evenness, it is favourable when the first mirroring wall portion has a first section remote from the plane P which is curved substantially according to a circular arc whose centre of curvature is situated in a region having the shape of an ellipse S whose major axis has a first end at the first side of the axis of symmetry at a distance of 0.20 d from the plane P and 0.03 d from the axis of symmetry and a second end at the other side of the axis of symmetry at a distance of 0.50 d from the plane P and 0.12 d from the axis of symmetry, the major axis of this ellipse being 33.3 times the

length of the minor axis, and

a second section near the plane P curved substantially according to a circular arc whose centre of curvature is situated in a region at the other side of the axis and which has the shape of an ellipse T whose major axis has a first end at a distance of 0.32 d from the plane P and 0.10 d from the axis of symmetry and a second end at a distance of 0.49 d from the plane P and 0.33 d from the axis of symmetry, the major axis of this ellipse being 11.3 times the length of the minor axis. In this case the light beam has a higher luminous flux at acute angles to the axis than along the axis. The luminous flux is substantially proportional to $\cos^{-3}\alpha$ at an angle α to the axis of symmetry up to comparatively great angle values then.

A different basic shape of a reflector has a first wall portion which in axial cross-sections is substantially curved according to a circular arc and which extends substantially in transverse direction behind the plane P, the centre of curvature lying in front of the plane P at the other side of the axis of symmetry, and a second wall portion which in axial cross-sections is substantially curved according to a circular arc and extends substantially in axial direction in front of the plane P, the centre of curvature lying behind the plane P, at the other side of the axis of symmetry.

A further basic shape of a reflector is similar to that mentioned in the preceding paragraph, but the first wall portion has a centre of curvature which is situated in front of the plane P in a region which extends on either side of the axis of symmetry.

This and other aspects of the electric light source with reflector according to the invention are shown in the drawings, in which

Fig. 1, Fig. 2 and Fig. 3 show a first, a second, and a third embodiment, respectively, in axial cross-section;

Fig. 4 shows diagrammatic transverse cross-sections taken on the line IV-IV in a modified version of Fig. 1; and

Fig. 5 shows elevations taken on the line V in modified versions of Fig. 1.

In Fig. 1, the electric light source with reflector has a lamp cap 1 provided with contacts 2 and a reflector 10 with a basic shape having an axis of symmetry 11 and a largest diameter d in a plane P transverse to the axis of symmetry.

The reflector has a first internally concave mirroring wall portion 12 behind the plane P which in axial cross-sections at a first side of the axis 11 is curved substantially according to a circular arc 13 with a centre of curvature 14 in front of the plane P, which first wall portion is arranged adjacent the lamp cap 1. The reflector 10 also comprises a second internally concave mirroring wall portion 22 in front of the plane P which in axial cross-sections at the first side of the axis 11 is curved substantially according to a circular arc 23 with a centre of curvature 24 behind the plane P at the other side of the axis.

A luminous window 30 of the reflector 10 has a largest diameter of less than 0.8 d, here 0.68 d, and is intersected by the axis 11.

A light source 3, a high-pressure sodium vapour discharge lamp in the Figure: an envelope in which an electric discharge can be generated between electrodes in a filling of sodium, mercury and rare gas, is axially arranged in the reflector 10 in the vicinity of the axis 11 and the plane P, and connected to current conductors 4 which extend to the contacts 2 of the lamp cap 1.

In the Figure, the first mirroring wall portion 12 has in axial cross-section at the first side of the axis 11 a centre of curvature 14 which is situated in a region which lies predominantly at the other side of the axis and which is bounded by lines 15, 16 which enclose an angle β and an angle γ of 23 and 39°, respectively, with the plane P and which intersect the plane P in the point 17 where the first mirroring wall portion 12 intersects the plane P at the first side of the axis.

The centre of curvature 14 in the Figure is situated in a region having the shape of an ellipse R whose major axis has a first end 14' at the first side of the axis of symmetry 11 at a distance of 0.23 d from the plane P and 0.04 d from the axis of symmetry and a second end 14'' at the other side of the axis of symmetry at a distance of 0.38 d from the plane P and 0.07 d from the axis of symmetry. The major axis of the ellipse R is 10.4 times the length of the minor axis.

The second mirroring wall portion 22 has a centre of curvature 24 situated in a region having the shape of an ellipse Q whose major axis has a first end 24' in the plane P at a distance of 0.02 d from the axis of symmetry 11 and a second end 24'' at a distance of 0.07 d from the plane P and 0.13 d from the axis of symmetry, the major axis of said ellipse being 6.8 times the length of the minor axis.

The light source 3 has a cylindrical contour with a diameter d_1 which is concentric with the reflector.

The second wall portion 22 has superimposed lanes 25 which extend substantially in axial direction, are tilted relative to the basic shape, and are curved transverse to their axial direction substantially according to a circular arc having a centre of curvature on a cylinder which is coaxial with the axis of symmetry 11, whereby the radii of said circular arc are at most tangent to said coaxial cylinder, while said cylinder has a diameter d_c which is greater than 0.5 d_1.

The light source 3 is fixedly connected to the reflector 10 so as to form a unit which supports a lamp cap 1.

The reflector 10 is integrated with a closed lamp vessel 5 made of moulded glass, forming a reflector lamp. The lamp vessel consists of a first part, which comprises the first mirroring wall portion 12, and a second part which comprises the second mirroring wall portion 22, for example, mirroring owing to an aluminium layer, and the window 30. The two parts are interconnected by a ring 18, for example made of metal, so as to form a seam which lies in the plane P.

The light rays a are thrown to the exterior by the first wall portion 12. The rays b first hit the second wall portion 22, are reflected towards the first wall portion, and then issue from the lamp vessel 5. In the beam formed, they are joined by those rays which issue to the exterior without being reflected.

In Figs. 2 and 3, corresponding parts have reference numerals which are 40 higher each time than those in the immediately preceding Figure.

In the lamp/reflector unit of Fig. 2, the light source 43 has an M-shaped axially arranged incandescent body in a hard-glass, vacuumtight envelope with a halogen-containing inert gas. The light source is fixed in a metal reflector 50 which supports the lamp cap 41 and has a riveted seam in the plane P. The centres of curvature and the ellipses Q and R are situated as in the preceding Figure. Both wall portions 52 and 62 have superimposed lanes 55 and 65, respectively, which extend substantially in axial direction, are tilted relative to the basic shape, and are curved transverse to their axial directions substantially according to a circular arc. A number of these lanes is depicted. The two wall portions can be rotated relative to one another.

In Fig. 3, the reflector 90 has a lampholder 111 for the lamp cap 81 of the separate light source 83 near the first mirroring wall portion 92.

The light rays b shown in Fig. 1 are projected in the plane of the drawing; the rays a actually run in said plane, as would the rays b if the second wall portion 22 had not been provided with lanes. The Figure shows that the rays b would then graze or hit the light source 3 after being reflected by the mirroring circular arc 23. An undesirable irradiation and an undesirable reflection would then occur. Depending on the tilting direction of the relevant lane 25, the rays b in the reflector lamp shown are either passed over or below the light source 3. As a result, they do not run in the plane of the drawing or in any other plane through the axis 11 after being reflected by the wall portion 12.

In Fig. 4, the modification of the electric light lamp with reflector of Fig. 1 has lanes 15 which are superimposed on the first wall portion 12.

Fig. 4a shows a large number of rays b, while only portions are shown of those parts which run from the second wall portion 22 to the first wall portion 12 (Fig. 1). All light rays, in fact, originate from the light source 3 and none of the rays shown (a and b, Fig. 1) comes near the light source after being reflected by the first wall portion 12. Since none of the rays shown has yet been in contact with the first wall portion 12, the diagrammatically depicted lanes 15 have not yet had any influence. In the viewing direction, the rays are deflected to the right, *i.e.* clockwise, by the second wall portion 22. The Figure shows a radiation-free zone immediately surrounding the light source. None of the rays hits or even grazes the light source.

Fig. 4b shows the tilting and curvature of the lanes 15 and 25. The lanes 15a are tilted to the right in the viewing direction in accordance with the arrows situated next to them, the interposed lane 15b to the left. So the lanes 15 form an alternating pattern. Similarly, the lanes 25a and 25b are tilted in an alternating pattern. The tilting directions are such in the Figure that the lanes 15 fluently merge into the lanes 25. The lanes 15 and 25 are curved substantially according to a circular arc transverse to their axial directions. Point L is a point of the axis about which lane 25a is tilted. A radius of the circular arc of this lane is referenced 25'. The centre of curvature is C_c. The radius 25' is tangent to and the centre of curvature lies on a cylinder which is coaxial with the axis 11 of symmetry and has a diameter d_c. In the Figure, the diameter d_c is equally large as d_1, the diameter of the contour of the light source 3, *i.e.* greater than 0.5 d_1. A light beam b' originating from the light source 3 comes from point L. The beam just passes outside the "radiation-free zone" Z_{RF}. It is evident from the Figure that, if d_c had been 0.5 d_1, b' would have grazed the light source 3. The lanes 15 end before reaching the apex of the first wall portion. No rays b reach this apex, so that a lane cannot cooperate there with lanes of the second wall portion 22.

Arcs of a circumscribed circle are drawn in Fig. 5 for clarification purposes.

In Fig. 5a, all lanes 25b are tilted in the same direction. The same is true for the lanes 15a, but in the opposite direction. A lane 15a cooperates with a lane 25b each time so as to eliminate an initial reflection of the light rays shown.

The same happens in Fig. 5b, but with lanes 25a and 25b, and 15b and 15a, respectively, which are tilted in the one and the other direction alternately. By giving the first wall portion 12'' an angular rotation relative to the second wall portion 22'' it is possible to change the deflection of the light rays. When the second wall portion is aligned relative to the first in order to provide the smallest possible deflection of the light rays, a greatest

possible deflection can be realised by means of an angular rotation of the second wall portion of 360/n °, where n is the number of lanes of the wall portion.

Claims

1. An electric light source with reflector, comprising:

a lamp cap (1) provided with contacts (2);

a reflector (10) having a basic shape which is provided with:

an axis of symmetry (11) and a largest diameter d in a plane P transverse to the axis of symmetry;

a first internally concave, mirroring wall portion (12) behind the plane P which in axial cross-sections at a first side of the axis is curved substantially according to a circular arc (13) having a centre of curvature (14) in front of the plane P, in a region which is predominantly situated at the other side of the axis, which first wall portion is situated adjacent the lamp cap (1);

a second internally convace, mirroring wall portion (22) in front of the plane P which in axial cross-sections at the first side of the axis (11) is substantially curved according to a circular arc (23) having a centre of curvature (24) behind the plane P at the other side of the axis;

a luminous window (30) which is intersected by the axis (11);

the electric light source (3) being arranged in the reflector (10) in the vicinity of the axis (11) and of the plane P, and connected to current conductors (4) which extend to the contacts (2) of the lamp cap (1),

characterized in that

the light source (3) has a cylindrical contour with a diameter d_1, concentric with the reflector (10);

the second wall portion (22) has superimposed lanes (25) which extend substantially in axial direction, are tilted relative to the basic shape, and are curved transverse to their axial direction substantially according to a circular arc with a centre of curvature situated on a cylinder coaxial with the axis of symmetry (11),

whereby the radii of said circular arc are at most tangent to the said coaxial cylinder and the said cylinder has a diameter d_c which is greater than 0.5 d_1.

2. An electric light source with reflector as claimed in Claim 1, characterized in that the lanes (25) are twisted.

3. An electric light source with reflector as claimed in Claim 1 or 2, characterized in that the lanes (25) are tilted in the one and the other direction in an alternating pattern.

4. An electric light source with reflector as claimed in Claim 1 or 2, characterized in that the first wall portion (52) has superimposed lanes (55) which run substantially in axial direction, are tilted relative to the basic shape, and are curved transverse to their axial direction substantially according to a circular arc.

5. An electric light source with reflector as claimed in Claim 4, characterized in that the lanes (55) of the first wall portion (52) are tilted so as to counteract the deflection of light rays caused by the lanes (65) of the second wall portion (62).

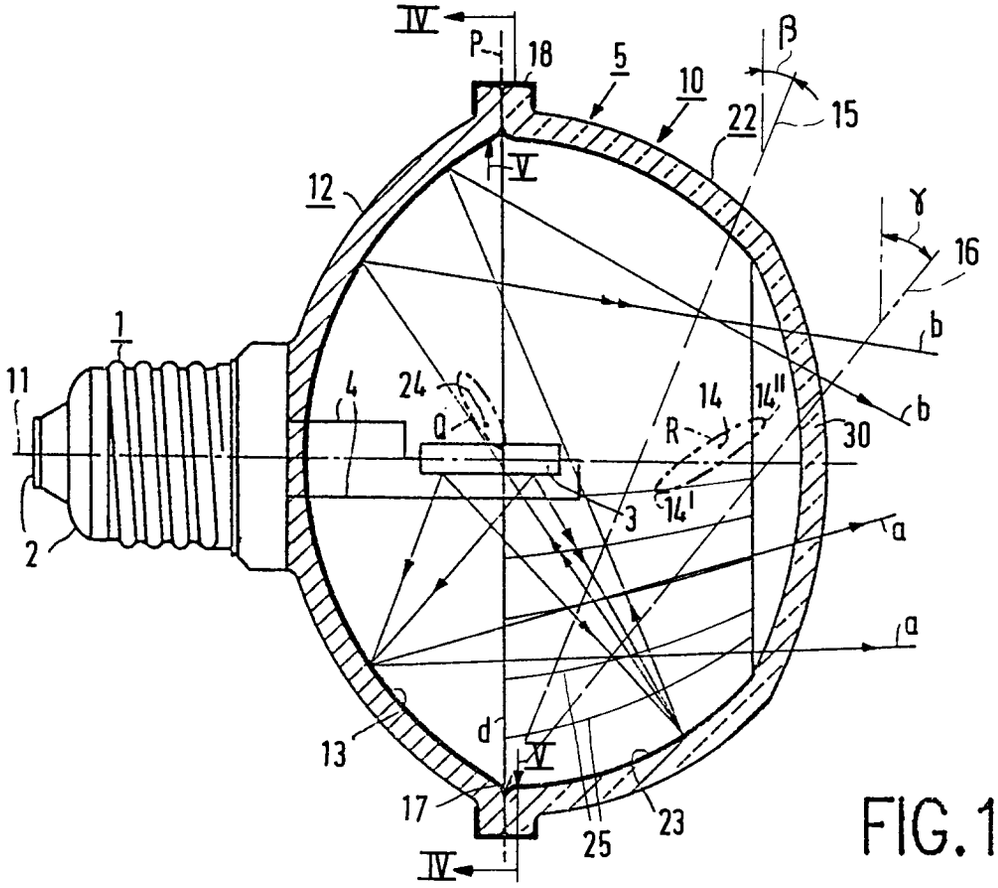
6. An electric light source with reflector as claimed in Claim 4 or 5, characterized in that the first (52) and the second wall portion (62) are rotatably connected to one another.

7. An electric light source with reflector as claimed in any one of the preceding Claims, characterized in that the light source (3) is fixedly connected to the reflector (10) so as to form a unit which supports a lamp cap (1).

8. An electric light source with reflector as claimed in Claim 7, characterized in that the reflector (10) is integral with a closed lamp vessel (5).

9. A reflector (90) provided with a lampholder (114) suitable for use in the electric light source with reflector as claimed in any one of the Claims 1 to 6.

10. A moulded glass body (5) suitable for use in the reflector (10) of the electric light source with reflector as claimed in any one of the Claims 1 to 6.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P
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5
10
β
15
22
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12
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16
1
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11
4
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3
14'
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a
d
13
V
17
25
23
IV

FIG.1

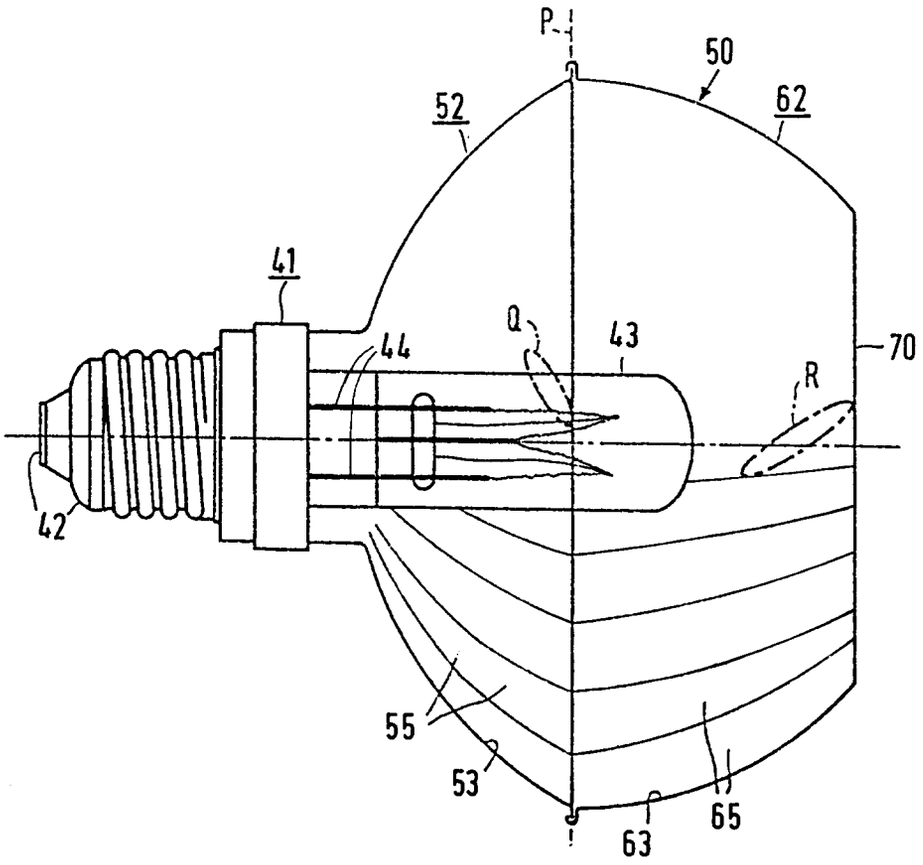
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FIG.2

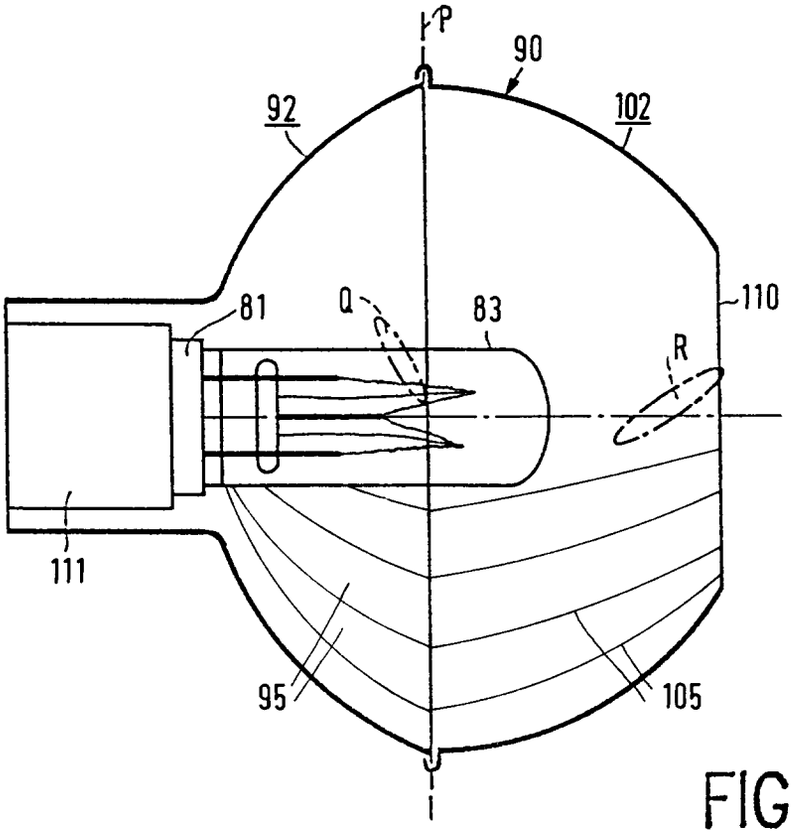


FIG.3

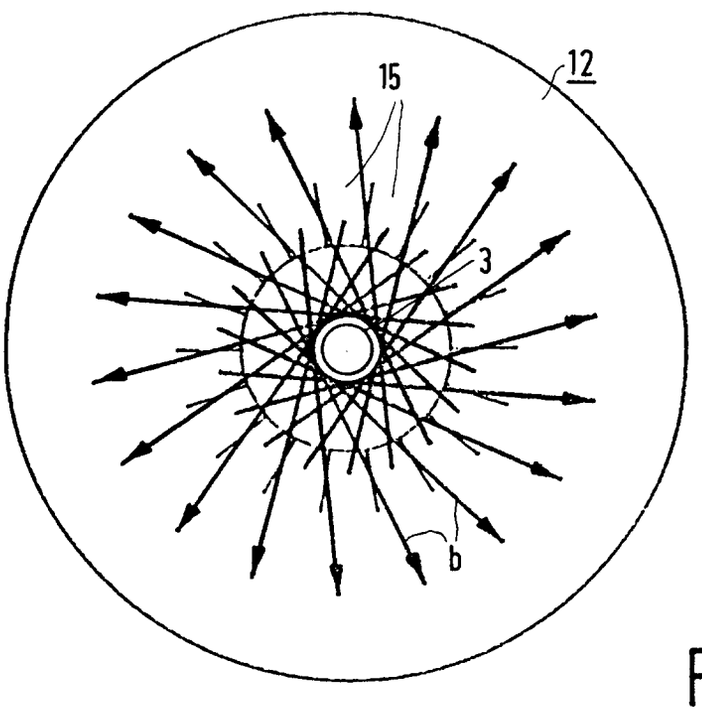


FIG.4a

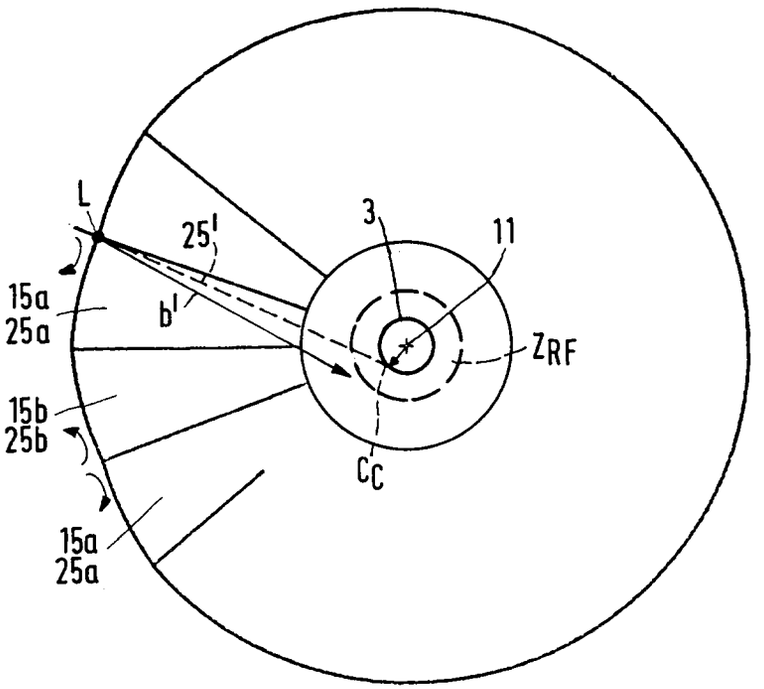
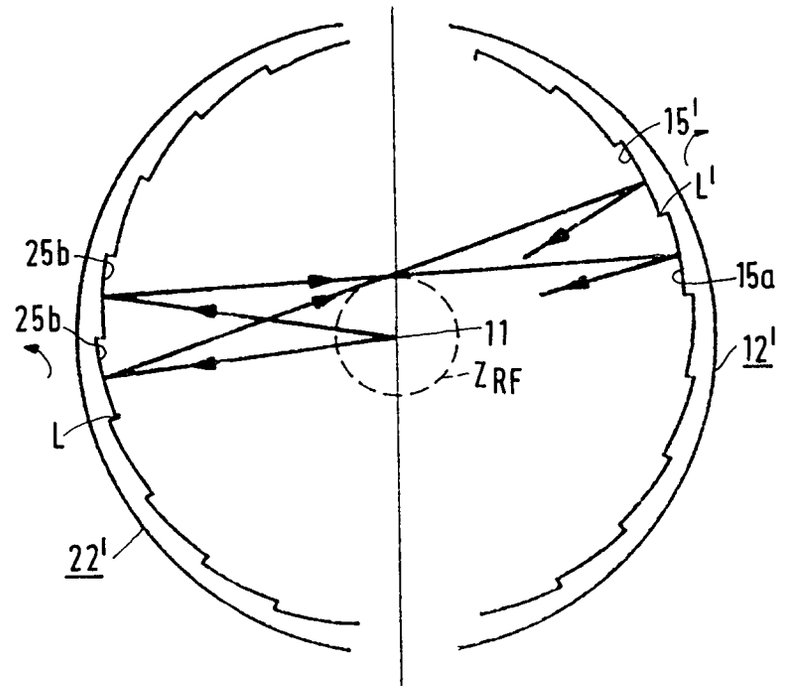
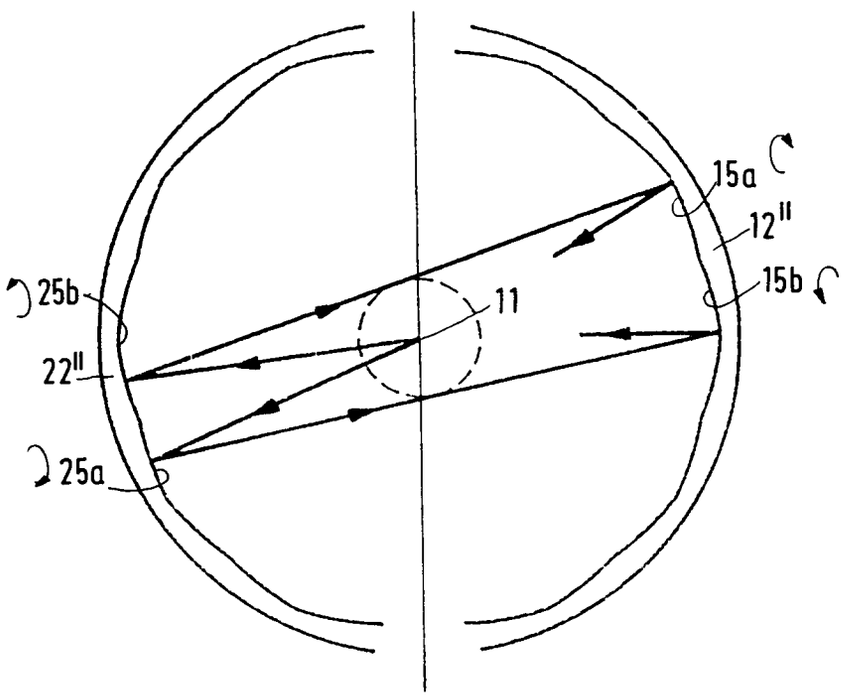


FIG.4 b



a



b

FIG.5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 4103

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.5)
Y	FR-A-846 118 (COMPAGNIE DES LAMPES) * the whole document *	1-4,7-10	F21V7/04
D,Y	EP-A-0 410 525 (NV PHILIPS' GLOEILAMPENFABRIEKEN) * abstract; figures *	1-4,7-10	
A	FR-A-1 222 687 (ANCIENS ETABLISSEMENTS BARBIER, BENARD & TURENNE SA) * the whole document *	1-4	
A	US-A-1 186 165 (BENJAMIN) * figures *	1-4	
A	EP-A-0 228 555 (MANVILLE CORP.) * abstract; figures *	1-4	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

F21V
H01K
H01J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 APRIL 1993	GINO C.P.G.

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