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Unité de lampe de véhicule

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Description

BACKGROUND OF THE INVENTION

Technical Field

[0001] The present disclosure relates to a vehicle lamp unit which uses a semiconductor light emitting element as a light source.

Related Art

[0002] In recent years, a vehicle lamp unit using a semiconductor light emitting element such as a light emitting diode as a light source has been widely used. However, the light-source light flux of the semiconductor light emitting element is very small compared with a discharge bulb, a halogen bulb, or the like. Accordingly, a vehicle illumination lamp having a plurality of lamp units has been proposed and described in JP-A-2005-317226.

[0003] The related art vehicle illumination lamp described in JP-A-2005-317226 includes a projection lens which is disposed on an optical axis extending in a lamp longitudinal direction and a plurality of light source units which are disposed behind a rear focal point of the projection lens with a predetermined gap therebetween in a substantially transverse direction. Each light source unit includes a light emitting element which is disposed on a reference axis extending in a direction tilted toward the optical axis in a forward direction of the lamp, and a reflector which reflects light emitted from the light emitting element in a forward direction toward the reference axis in at least a perpendicular plane.

[0004] Accordingly, it is possible to efficiently allow the light emitted from the light emitting elements of the plurality of light source units to be incident to the projection lens, and thus to ensure sufficient irradiation light intensity.

[0005] However, with the configuration described in JP-A-2005-317226, it is difficult to obtain uniform illumination in a light distribution pattern by using the light emitted from the projection lens of the vehicle lamp unit provided with the plurality of light source units.

[0006] For example, in a case where a light collecting region corresponding to a so-called hot zone is irradiated by a light collecting light source unit disposed on the optical axis, and a diffusion region is irradiated by a pair of diffusion light source units symmetrically disposed on both sides thereof, it is difficult to overlap the collected light reflected by the reflector of the light collecting light source unit with the diffused light reflected by the reflector of the diffusion light source unit when the light is emitted from the projection lens. For this reason, illumination in a synthesized light distribution pattern formed by the light collecting light source unit and the diffusion light source unit becomes non-uniform.

SUMMARY OF THE INVENTION

[0007] Accordingly, it is an aspect of the present invention to provide a vehicle lamp unit that allows illumination in a light distribution pattern to be uniform and ensures sufficient irradiation light intensity by using a semiconductor light emitting element as a light source.

[0008] According to the invention, there is provided a vehicle lamp unit with the features of claim 1.

[0009] According to the vehicle lamp unit having the above-described configuration, since the light reflected by the reflection surface of the center reflector and the light reflected by the reflection surface of the side reflector are allowed to be irradiated in the forward direction via the projection lens, it is possible to efficiently allow the light emitted from the first semiconductor light emitting element and the light emitted from the plurality of second semiconductor light emitting elements to be incident to the projection lens, and thus to ensure sufficient irradiation light intensity.

[0010] In addition, the light reflected by the reflection surface of the center reflector is irradiated to a light collecting region, and the light reflected by a diffusion reflection region of the reflection surface of the side reflector is irradiated to a diffusion region. Further, the light reflected by a connection reflection region of the reflection surface of the side reflector is irradiated to a connection region between the light collecting region and the diffusion region such that the regions do not overlap with each other. Thus, it is possible to obtain the uniform illumination in the synthesized light distribution pattern formed by the center reflector and the side reflector.

[0011] In the vehicle lamp unit having the above-described configuration, the first and second semiconductor light emitting elements may be controlled to be individually turned on or off.

[0012] According to the vehicle lamp unit having the above-described configuration, when the first semiconductor light emitting element and the plurality of second semiconductor light emitting elements are selectively turned on or off or each light intensity is adjusted, it is possible to form, for example, an AFS (Adaptive Front Lighting System) which changes a light distribution pattern in accordance with a steering rudder angle or a vehicle speed upon driving the vehicle on a curve road without rotatably driving the entire part of the lamp unit.

[0013] In the vehicle lamp unit having the above-described configuration, the pair of second semiconductor light emitting elements may be disposed on the pair of reference axes extending in a direction tilted by about 15° to about 35° toward the optical axis.

[0014] According to the vehicle lamp unit having the above-described configuration, it is possible to form a compact vehicle lamp unit capable of making the illumination in the light distribution pattern uniform.

[0015] In the vehicle lamp unit having the above-described configuration, a shade may be disposed between the projection lens and the first and second semiconduc-

tor light emitting elements so as to shield a part of light reflected by the center reflector and the side reflector so as to form a cutoff line of a light distribution pattern.

[0016] According to the vehicle lamp unit having the above-described configuration, for example, it is possible to form a light distribution pattern having a cutoff line such as a low-beam light distribution pattern of a head lamp.

[0017] Further, it is possible to provide an auxiliary reflection surface that is formed so as to extend backward in the optical axis direction from a light shielding edge of the shade, and a part of light reflected by the reflection surface is reflected upward by the auxiliary reflection surface. According to this configuration, it is possible to efficiently use the light to be shielded by the shade as irradiation light, and thus to improve the light flux availability of the light emitted from the semiconductor light emitting elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1 is a longitudinal sectional view showing a vehicle lamp provided with a vehicle lamp unit according to an exemplary embodiment of the invention; Fig. 2 is a longitudinal sectional view showing a configuration of the vehicle lamp unit of Fig. 1;

Fig. 3 is a bottom view of the vehicle lamp unit of Fig. 2;

Fig. 4 is a horizontal cross-sectional view illustrating a configuration of the vehicle lamp unit of Fig. 1;

Fig. 5 is another horizontal cross-sectional view illustrating the configuration of the vehicle lamp unit of Fig. 1; and

Fig. 6 is another horizontal cross-sectional view illustrating the configuration of the vehicle lamp unit of Fig. 1.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0019] Hereinafter, a vehicle lamp unit according to an exemplary embodiment of the present invention will be described in detail with reference to the drawings.

[0020] Fig. 1 is a longitudinal sectional view showing a vehicle lamp provided with a vehicle lamp unit according to an exemplary embodiment of the invention. Fig. 2 is a longitudinal sectional view showing a configuration of the vehicle lamp unit shown in Fig. 1. Fig. 3 is a bottom view showing a reflector shown in Fig. 2. Figs. 4 to 6 are horizontal cross-sectional views illustrating a configuration of the vehicle lamp unit shown in Fig. 1.

[0021] As shown in Fig. 1, a vehicle lamp unit 100 according to an exemplary embodiment is, for example, a low-beam head lamp, and has a structure in which a lamp unit (vehicle lamp unit) 20 is accommodated in a lamp chamber formed by a lamp body 13 and a transparent light transmitting cover 11.

[0022] The lamp unit 20 which forms a low-beam light distribution pattern is disposed such that an optical axis Ax thereof extends in a vehicle longitudinal direction. Specifically, the optical axis Ax of the lamp unit 20 extends in a direction tilted downward by about 0.5 to about 0.6° with respect to a horizontal direction.

[0023] In addition, as shown in Figs. 1 and 2, the lamp unit 20 according to the embodiment is formed as, for example, a projector-type lamp unit. The lamp unit 20 includes a projection lens 35 which is disposed on the optical axis Ax; a Light Emitting Diode (LED) 25 which is a first semiconductor light emitting element disposed on the optical axis Ax behind a rear focal point F of the projection lens 35; a center reflector 30 which includes a reflection surface 31 used to reflect light emitted from the LED 25 in a forward direction toward the optical axis Ax; a plurality of LEDs (in this exemplary embodiment, two LEDs 26 and 27 are provided) as second semiconductor light emitting elements respectively disposed on left and right reference axes Bx and Cx, respectively, extending in a direction tilted toward the optical axis Ax at both sides of the LED 25 (see Fig. 3); a side reflector 40 which includes a reflection surface 41 used to reflect light emitted from the LED 26 in the forward direction toward the reference axis Bx; a side reflector 50 which includes a reflection surface 51 used to reflect light emitted from the LED 27 in the forward direction toward the reference axis Cx; and a shade 29 which is disposed between the projection lens 35 and the LEDs 25, 26, and 27 and shields a part of the light which is reflected by the center reflector 30 and the side reflectors 40 and 50 so as to form a cutoff line of a light distribution pattern. The light distribution pattern may be predetermined.

[0024] In addition, the lamp unit 20 is supported by the lamp body 13 via a frame (not shown), and the frame is supported by the lamp body 13 via an aiming mechanism (not shown).

[0025] The LEDs 25, 26, and 27 are, for example, white-emitting LEDs in which the light emitting chip has, for example, a rectangular light emitting surface of about 1 x 4 mm, where the LEDs 25, 26, and 27 are disposed behind the rear focal point F of the projection lens 35 and are supported by respective substrates 33 so as to respectively face upward in directions perpendicular to the optical axis Ax and the reference axes Bx and Cx.

[0026] The center reflector 30 is a substantially dome-shaped member which is provided on the upper side of the LED 25, and includes a reflection surface 31 which collects and reflects the light emitted from the LED 25 in the forward direction toward the optical axis Ax.

[0027] The reflection surface 31 is formed in a substantially oval spherical surface shape about the optical axis Ax serving as a central axis. In detail, in the reflection surface 31, the sectional shape including the optical axis Ax is set to a substantially oval shape, and the eccentricity is configured to gradually increase in a direction from a perpendicular section to a horizontal section.

[0028] However, the rear focal points of the ovals form-

ing the sections are set to the same position, and the LED 25 is disposed at the first focal point of the oval forming the perpendicular section of the reflection surface 31. Accordingly, as shown in Fig. 4, the reflection surface 31 collects and reflects the light emitted from the LED 25 in the forward direction toward the optical axis Ax. At this time, in the perpendicular section including the optical axis Ax, the light is allowed to be substantially converged at the second focal point (the rear focal point F of the projection lens 35) of the oval.

[0029] The side reflector 40 located on the left side of the center reflector 30 is a substantially dome-shaped member which is provided on the upper side of the LED 26, and includes a reflection surface 41 which diffuses and reflects the light emitted from the LED 26 in the forward direction toward the optical axis Bx (see Fig. 5).

[0030] In addition, the reflection surface 41 is formed in a substantially oval spherical surface shape about the optical axis Bx serving as a central axis. However, an inner reflection surface 41a on the side of the optical axis Ax is formed as a connection reflection region having light collecting power smaller than that of the reflection surface 31 of the center reflector 30, and an outer reflection surface 41b on the opposite side of the LED 26 from the optical axis Ax is formed as a diffusion reflection region having light collecting power smaller than that of the connection reflection region.

[0031] In detail, in the inner reflection surface 41a, the sectional shape including the reference axis Bx is formed into a substantially oval shape, and the eccentricity is configured to gradually increase more than that of the reflection surface 31 of the center reflector 30 in a direction from the perpendicular section to the horizontal section (see Fig. 5). In addition, in the outer reflection surface 41b, the sectional shape including the reference axis Bx is set to a substantially oval shape, and the eccentricity is configured to gradually increase more than that of the inner reflection surface 41a in a direction from the perpendicular section to the horizontal section (see Fig. 6).

[0032] The side reflector 50 located on the right side of the center reflector 30 is a substantially dome-shaped member which is provided on the upper side of the LED 27, and includes the reflection surface 51 which diffuses and reflects the light emitted from the LED 27 in the forward direction toward the reference axis Cx (see Fig. 4).

[0033] In addition, the reflection surface 51 is formed in a substantially oval spherical surface shape about the reference axis Cx serving as a central axis. However, an inner reflection surface 51a on the side of the optical axis Ax is formed as a connection reflection region having light collecting power smaller than that of the reflection surface 31 of the center reflector 30, and an outer reflection surface 51b on the opposite side of the LED 27 from the optical axis Ax is formed as a diffusion reflection region having light collecting power smaller than that of the connection reflection region.

[0034] In detail, in the inner reflection surface 51a, the sectional shape including the reference axis Cx is set to

a substantially oval shape, and the eccentricity is configured to gradually increase more than that of the reflection surface 31 of the center reflector 30 in a direction from the perpendicular section to the horizontal section. In addition, in the outer reflection surface 51b, the sectional shape including the reference axis Cx is set to a substantially oval shape, and the eccentricity is configured to gradually increase more than that of the inner reflection surface 51a in a direction from the perpendicular section to the horizontal section.

[0035] Further, the center reflector 30 and the side reflectors 40 and 50 are integrally formed with each other, and the respective reflection surfaces 31, 41, and 51 are formed by aluminum deposition or the like.

[0036] The projection lens 35 is formed as a plane-convex lens of which the front surface is a convex surface and the rear surface is a flat surface. As shown in Fig. 2, in the projection lens 35, the rear focal point F is disposed on the optical axis Ax so as to be located at the second focal point of the reflection surface 31 of the reflector 30. Accordingly, an image formed on a focal point surface including the rear focal point F is projected in the forward direction as an inverse image.

[0037] The shade 29 according to the exemplary embodiment is formed in a block (lump) shape so as to be simultaneously used as a holder for the projection lens 35 and the LEDs 25, 26, and 27, and the center reflector 30 and the side reflectors 40 and 50 which are integrally formed with each other are placed thereon.

[0038] In addition, the shade 29 forms a cutoff line of a light distribution pattern in such a manner that a light shielding edge 29c is located near the rear focal point F of the projection lens 35 so as to shield a part of light reflected by the center reflector 30 and the side reflectors 40 and 50.

[0039] Further, in the shade 29, an upper surface 29a extending backward in the direction of the optical axis Ax from the light shielding edge 29c reflects upward a part of light reflected by the center reflector 30 and the side reflectors 40 and 50. The upper surface 29a is provided with an auxiliary reflection surface 36 subjected to a reflection surface process.

[0040] That is, the shade 29 is formed so that the light shielding edge 29c (i.e., a ridge between the auxiliary reflection surface 36 and a front end surface 29b of the shade 29) passes through the rear focal point F of the projection lens 35.

[0041] In addition, when a part of light is reflected upward by the auxiliary reflection surface 36, it is possible to efficiently use the light to be shielded by the shade 29 as irradiation light, and thus to improve the light flux availability of the light emitted from the LEDs 25, 26, and 27.

[0042] Further, the light shielding edge 29c of the shade 29 is formed in a curved shape, in which both left and right sides thereof protrude forward in a top view (see Fig. 4), so as to correspond to the curvature of the image surface of the projection lens 35. The curved light shielding edge 29c aligns with a focal point group of the

projection lens 35. That is, the shade 29 has a structure in which the light shielding edge 29c is formed along the focal point group of the projection lens 35, and the shape of the light shielding edge 29c is directly used as the shape of the cutoff line.

[0043] As described above, in the lamp unit 20 according to the exemplary embodiment, since the light reflected by the reflection surface 31 of the center reflector 30 and the light reflected by the reflection surfaces 41 and 51 of the side reflectors 40 and 50 are allowed to be irradiated in the forward direction via the projection lens 35, it is possible to efficiently allow the light emitted from one LED 25 and the light emitted from two LEDs 26 and 27 to be incident to the projection lens 35, and thus to ensure sufficient irradiation light intensity.

[0044] In addition, as shown in Fig. 4, the collected light reflected by the reflection surface 31 of the center reflector 30 is irradiated to a light collecting region in the light distribution pattern. As shown in Fig. 5, the diffused light reflected by the outer reflection surfaces 41b and 51b corresponding to the diffusion reflection regions of the reflection surfaces 41 and 51 of the side reflectors 40 and 50 is irradiated to a diffusion region.

[0045] Further, as shown in Fig. 6, the light reflected by the inner reflection surfaces 41a and 51a corresponding to the connection reflection regions of the reflection surfaces 41 and 51 of the side reflectors 40 and 50 is irradiated to the connection region between the light collecting region and the diffusion region which cannot overlap with each other. Thus, it is possible to obtain the uniform illumination in the synthesized light distribution pattern formed by the center reflector 30 and the side reflectors 40 and 50.

[0046] Furthermore, the lamp unit 20 according to the exemplary embodiment is controlled to individually turn on or off the LEDs 25, 26, and 27.

[0047] Thus, when the LEDs 25, 26, and 27 are selectively turned on or off or each light intensity thereof is adjusted, it is possible to form, for example, an AFS which changes a light distribution pattern to the left or right in accordance with a steering rudder angle or a vehicle speed upon driving the vehicle in a curve road without rotatably driving the entire part of the lamp unit 20.

[0048] That is, for example, when the light intensity of the LED 26 is increased for a right curve road and the light intensity of the LED 27 is increased for a left curve road, it is possible to improve a visualizing performance in a vehicle moving direction. Additionally, when the light intensity of the opposite-side LED is decreased at this time, it is possible to improve the visualizing performance without increasing the entire output of the lamp unit 20.

[0049] Furthermore, in the lamp unit 20 according to the exemplary embodiment, since the shade 29 is simultaneously used as the holder for the projection lens 35 and the center reflector 30 and the side reflectors 40 and 50, it is possible to highly precisely set the positional relationship of the projection lens 35, the center reflector 30, the side reflectors 40 and 50, and the shade 29 before

assembling the vehicle lamp 100. Accordingly, it is possible to easily assemble the vehicle lamp 100.

[0050] In the exemplary embodiment, since the LEDs 26 and 27 are respectively disposed on the reference axes Bx and Cx extending in a direction tilted by about 15° to about 35° toward the optical axis Ax, it is possible to obtain a compact lamp unit 20.

[0051] While the present invention has been shown and described with reference to certain exemplary embodiments thereof, other implementations are within the scope of the claims.

[0052] For example, in the above-described exemplary embodiment, the vehicle lamp unit is used as the low-beam head lamp, but the vehicle lamp unit can be used as various vehicle lamp units such as a fog lamp or a bending lamp in such a manner that the shade is omitted or a plurality of pairs of side reflectors and a plurality of pairs of semiconductor light emitting elements are used in combination. Even in this case, it is possible to obtain the same advantage as that of the above-described exemplary embodiment. Further, the semiconductor light emitting element as the light source is not limited to the light emitting diode, but an LD (semiconductor laser) or the like may be adopted.

Claims

1. A vehicle lamp unit (20) comprising:

- a projection lens (35) which is disposed on an optical axis (Ax) extending in a vehicle longitudinal direction;
- a first semiconductor light emitting element (25) which is disposed on the optical axis (Ax) behind a rear focal point (F) of the projection lens;
- a center reflector (30) which comprises a reflection surface (31) which reflects light emitted from the first semiconductor light emitting element (25) in a forward direction toward the optical axis (Ax);
- a plurality of second semiconductor light emitting elements (26, 27) which are disposed, respectively, on reference axes (Bx, Cx) and behind the rear focal point of the projection lens, the reference axes (Bx, Cx) each extending in a direction tilted with respect to the optical axis (Ax); and
- a plurality of side reflectors (40, 50), which correspond to respective ones of the plurality of second semiconductor light emitting elements (26, 27), each of the side reflectors (40, 50) comprising a reflection surface (41, 51) which reflects light emitted from the corresponding second semiconductor light emitting element (26, 27) in the forward direction toward the corresponding reference axis (Bx, Cx),

characterized in that,

side reflectors comprises an inner reflection surface (41a, 51a) which is disposed on a side of the corresponding reference axis (Bx, Cx) closest to the optical axis (Ax) and which is formed as a connection reflection region having a sectional shape formed into an oval shape, its eccentricity gradually increasing more than that of the reflection surface of the center reflector (30) in a direction from a perpendicular section to a horizontal section, and an outer reflection surface (41b, 51b) which is disposed on a side of the corresponding reference axis (Bx, Cx) opposite from the optical axis (Ax) and which is formed as a diffusion reflection region having a sectional shape formed into an oval shape, its eccentricity gradually increasing more than that of the connection reflection region in a direction from a perpendicular section to a horizontal section.

2. The vehicle lamp unit (20) according to claim 1, wherein each of the first semiconductor light emitting element (25) and the plurality of second semiconductor light emitting elements (26, 27) are controlled to be individually turned on or off.
3. The vehicle lamp unit (20) according to claim 1 or 2, wherein two second semiconductor light emitting elements (26, 27) are disposed on two reference axes (Bx, Cx), respectively, each of the two reference axes (Bx, Cx) extending in a direction tilted about 15 to about 35° with respect to the optical axis (Ax).
4. The vehicle lamp unit according to any one of claims 1 to 3, further comprising:

a shade (29) which is disposed between the projection lens (35) and the first semiconductor light emitting element (25) and plurality of second semiconductor light emitting elements (26, 27), and which shields a part of light reflected by the center reflector (30) and the side reflectors (40, 50) so as to form a cutoff line of a light distribution pattern.

Patentansprüche

1. Fahrzeuglampeneinheit (20), umfassend:

eine Projektionslinse (35), die auf einer optischen Achse (Ax) angeordnet ist, die sich in einer Fahrzeuginnenrichtung erstreckt; ein erstes Halbleiter-Lichtemissionselement (25), das auf der optischen Achse (Ax) hinter einem Rückfokuspunkt (F) der Projektionslinse angeordnet ist; einen Zentralreflektor (30), der eine Reflektionsoberfläche (31) umfasst, die aus dem ersten

Halbleiter-Lichtemissionselement (25) emittiertes Licht in einer Vorwärtsrichtung zur optischen Achse (Ax) hin reflektiert;

eine Mehrzahl von zweiten Halbleiter-Lichtemissionselementen (26, 27), die jeweils auf Referenzachsen (Bx, Cx) und hinter dem Rückfokuspunkt der Projektionslinse angeordnet sind, wobei sich die Referenzachsen (Bx, Cx) beide in einer Richtung erstrecken, die in Bezug auf die optische Achse (Ax) verkippt ist; und eine Mehrzahl von Seitenreflektoren (40, 50) die Entsprechenden der Mehrzahl von zweiten Halbleiter-Lichtemissionselementen (26, 27) entsprechen, wobei jeder der Seitenreflektoren (40, 50) eine Reflektionsoberfläche (41, 51) umfasst, die aus dem entsprechenden zweiten Halbleiter-Lichtemissionselement (26, 27) emittiertes Licht in der Vorwärtsrichtung zur entsprechenden Referenzachse (Bx, Cx) hin reflektiert, **dadurch gekennzeichnet, dass** Seitenreflektoren eine innere Reflektionsoberfläche (41a, 51a) umfassen, die auf einer Seite der entsprechenden Referenzachse (Bx, Cx) nächst zur optischen Achse (Ax) angeordnet ist und als eine Verbindungsreflektionsregion geformt ist, die eine Schnittform aufweist, die in eine ovale Form geformt ist, wobei ihre Exzentrizität graduell mehr als diejenige der Reflektionsoberfläche des Zentralreflektors (30) in einer Richtung von einem rechtwinkligen Abschnitt zu einem horizontalen Abschnitt ansteigt, und eine äußere Reflektionsoberfläche (41b, 51b), die auf einer Seite der entsprechenden Referenzachse (Bx, Cx) entgegengesetzt zur optischen Achse (Ax) angeordnet ist, und die als eine Difusionsreflektionsregion ausgebildet ist, die eine Schnittform aufweist, die in eine ovale Form geformt ist, wobei ihre Exzentrizität graduell mehr ansteigt als diejenige der Verbindungsreflektionsregion in einer Richtung von einem rechtwinkligen Abschnitt zu einem horizontalen Abschnitt.

2. Fahrzeuglampeneinheit (20) gemäß Anspruch 1, wobei jedes des ersten Halbleiter-Lichtemissionselement (25) und der Mehrzahl von zweiten Halbleiter-Lichtemissionselementen (26, 27) gesteuert wird, um individuell ein- oder ausgeschaltet zu werden.

3. Fahrzeuglampeneinheit (20) gemäß Anspruch 1 oder 2, wobei zwei zweite Halbleiter-Lichtemissionselemente (26, 27) auf zwei Referenzachsen (Bx, Cx) jeweils angeordnet sind, wobei sich jede der zwei Referenzachsen (Bx, Cx) in einer Richtung erstreckt, die um etwa 15 bis etwa 35° in Bezug auf die optische Achse (Ax) gekippt ist.

4. Fahrzeuglampeneinheit gemäß einem der Ansprüche 1 bis 3, weiter umfassend:

eine Blende (29), welche zwischen der Projektionslinse (35) und dem Halbleiter-Lichtemissionselement (25) und Mehrzahl von zweiten Halbleiter-Lichtemissionselementen (26, 27) angeordnet ist, und die einen Teil von Licht abschirmt, welches durch den Zentralreflektor (30) und die Seitenreflektoren (40, 50) reflektiert wird, um so eine Schnittlinie eines Lichtverteilungsmusters zu bilden.

Revendications

1. Unité de phare de véhicule (20) comprenant :

une lentille de projection (35) qui est disposée sur un axe optique (Ax) s'étendant dans une direction longitudinale de véhicule ;
un premier élément d'émission de lumière à semi-conducteur (25) qui est disposé sur l'axe optique (Ax) derrière un point focal arrière (F) de la lentille de projection ;
un réflecteur central (30) qui comprend une surface de réflexion (31) qui réfléchit de la lumière émise par le premier élément d'émission de lumière à semi-conducteur (25) dans une direction en avant vers l'axe optique (Ax) ;
une pluralité de deuxièmes éléments d'émission de lumière à semi-conducteur (26, 27) qui sont disposés, respectivement, sur des axes de référence (Bx, Cx) et derrière le point focal arrière de la lentille de projection, les axes de référence (Bx, Cx) s'étendant chacun dans une direction inclinée par rapport à l'axe optique (Ax) ; et
une pluralité de réflecteurs latéraux (40, 50), qui correspondent à des respectifs parmi la pluralité de deuxièmes éléments d'émission de lumière à semi-conducteur (26, 27), chacun des réflecteurs latéraux (40, 50) comprenant une surface de réflexion (41, 51) qui réfléchit de la lumière émise par le deuxième élément d'émission de lumière à semi-conducteur (26, 27) correspondant dans la direction en avant vers l'axe de référence (Bx, Cx) correspondant,

caractérisée en ce que

des réflecteurs latéraux comprennent une surface de réflexion intérieure (41a, 51a) qui est disposée sur un côté de l'axe de référence (Bx, Cx) correspondant le plus proche de l'axe optique (Ax) et qui est formée en tant que région de réflexion de connexion ayant une forme sectionnelle réalisée en une forme ovale, son excentricité augmentant graduellement davantage que celle de la surface de réflexion du réflecteur central (30) dans une direction

depuis une section perpendiculaire jusqu'à une section horizontale, et

une surface de réflexion extérieure (41b, 51b) qui est disposée sur un côté de l'axe de référence (Bx, Cx) correspondant opposé à l'axe optique (Ax) et qui est formée en tant qu'une région de réflexion de diffusion ayant une forme sectionnelle réalisée en une forme ovale, son excentricité augmentant graduellement davantage que celle de la région de réflexion de connexion dans une direction depuis une section perpendiculaire jusqu'à une section horizontale.

2. Unité de phare de véhicule (20) selon la revendication 1,

dans laquelle chacun parmi le premier élément d'émission de lumière à semi-conducteur (25) et la pluralité de deuxièmes éléments d'émission de lumière à semi-conducteur (26, 27) est commandé pour être allumé ou éteint individuellement.

3. Unité de phare de véhicule (20) selon la revendication 1 ou 2,

dans laquelle deux deuxièmes éléments d'émission de lumière à semi-conducteur (26, 27) sont disposés, respectivement, sur deux axes de référence (Bx, Cx), chacun des deux axes de référence (Bx, Cx) s'étendant dans une direction inclinée de près de 15 à près de 35° par rapport à l'axe optique (Ax).

4. Unité de phare de véhicule selon l'une quelconque des revendications 1 à 3, comprenant en outre :

un abat-jour (29) qui est disposé entre la lentille de projection (35) et le premier élément d'émission de lumière à semi-conducteur (25) et la pluralité de deuxièmes éléments d'émission de lumière à semi-conducteur (26, 27), et qui fait écran à une partie de la lumière réfléchie par le réflecteur central (30) et les réflecteurs latéraux (40, 50) de façon à former une ligne de découpage d'un motif de distribution de lumière.

FIG. 1

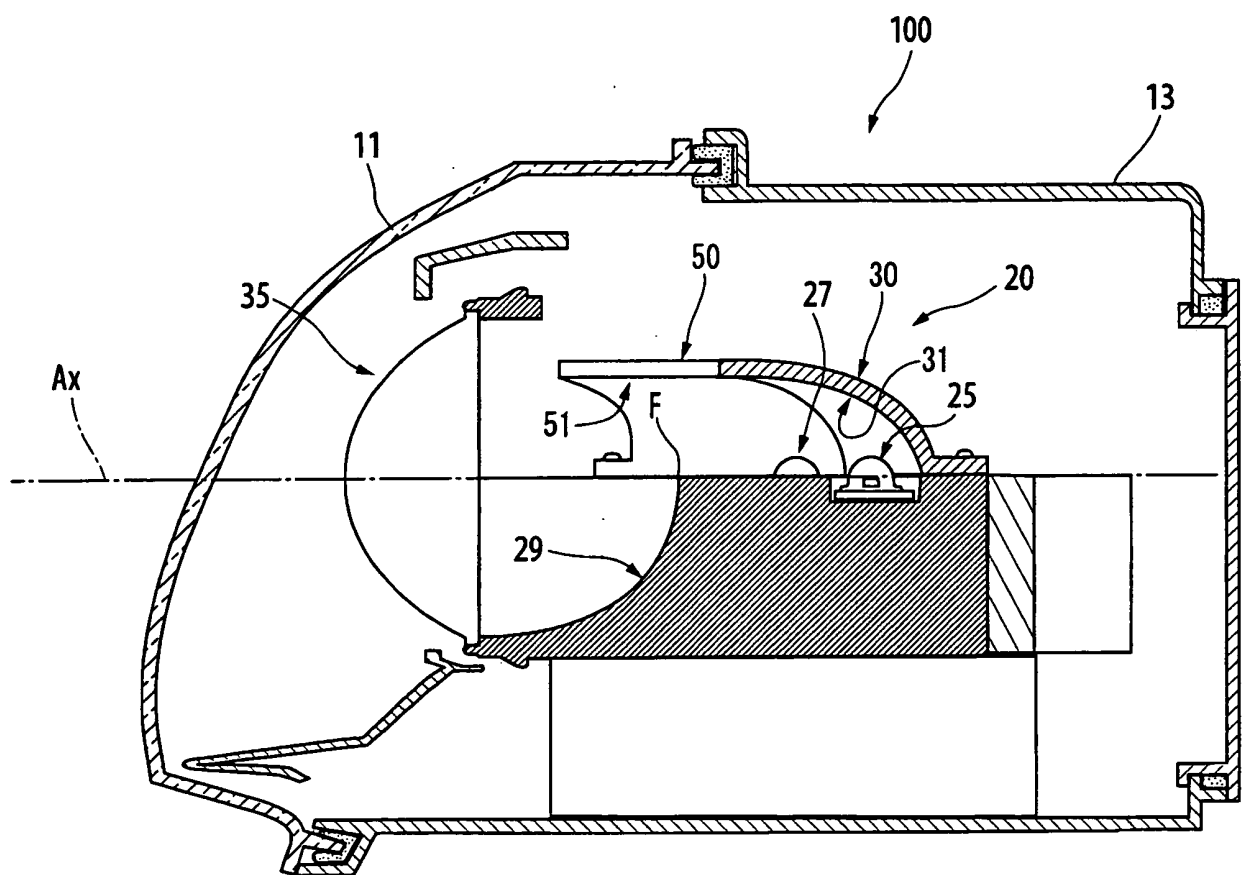


FIG. 2

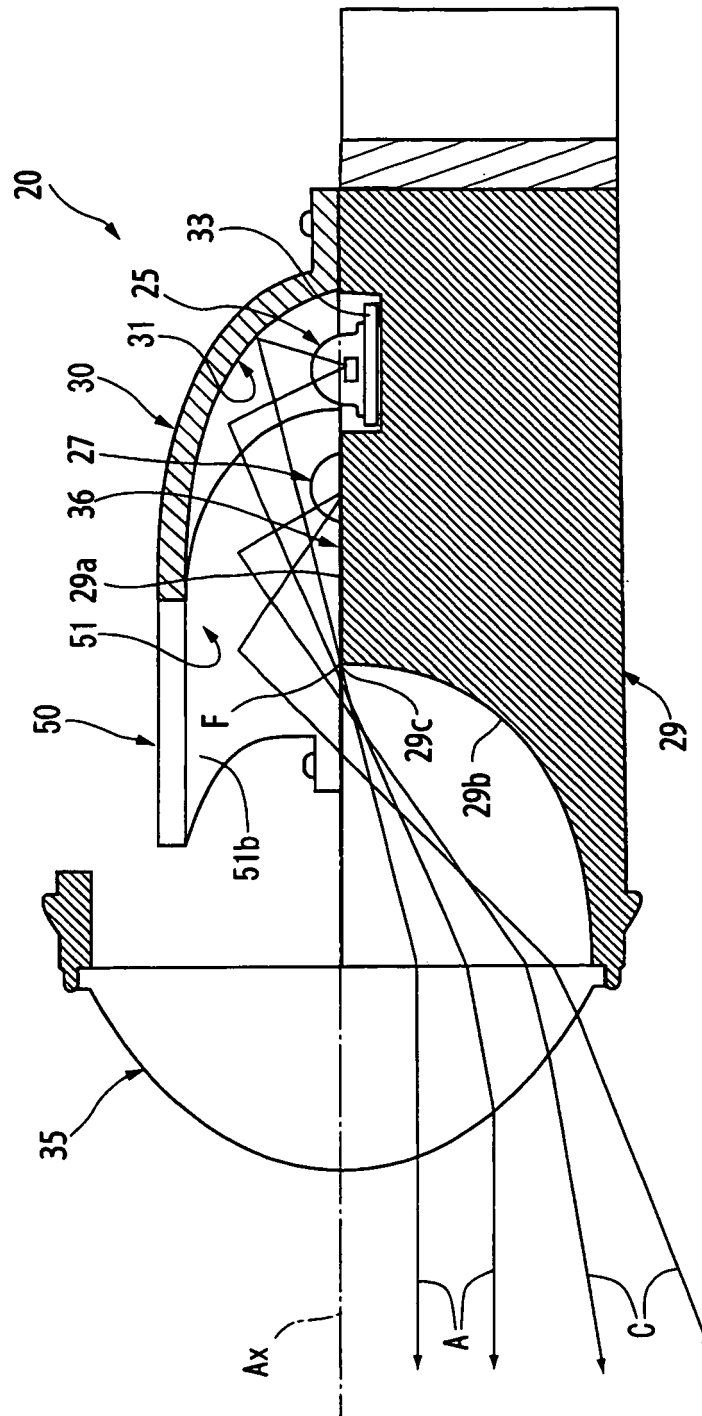


FIG. 3

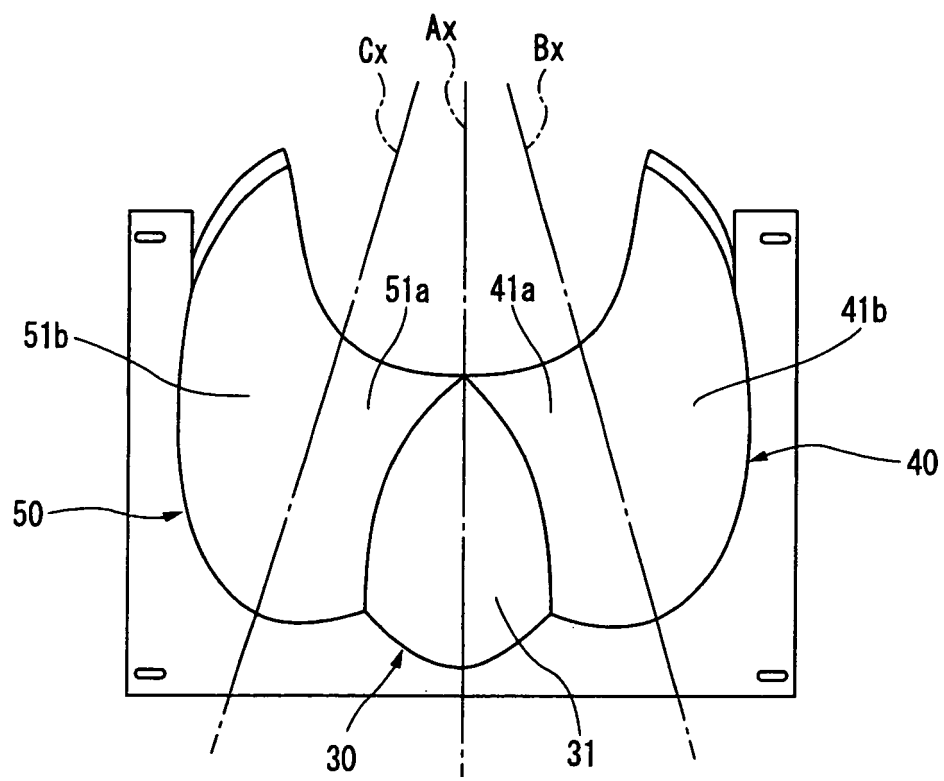


FIG. 4

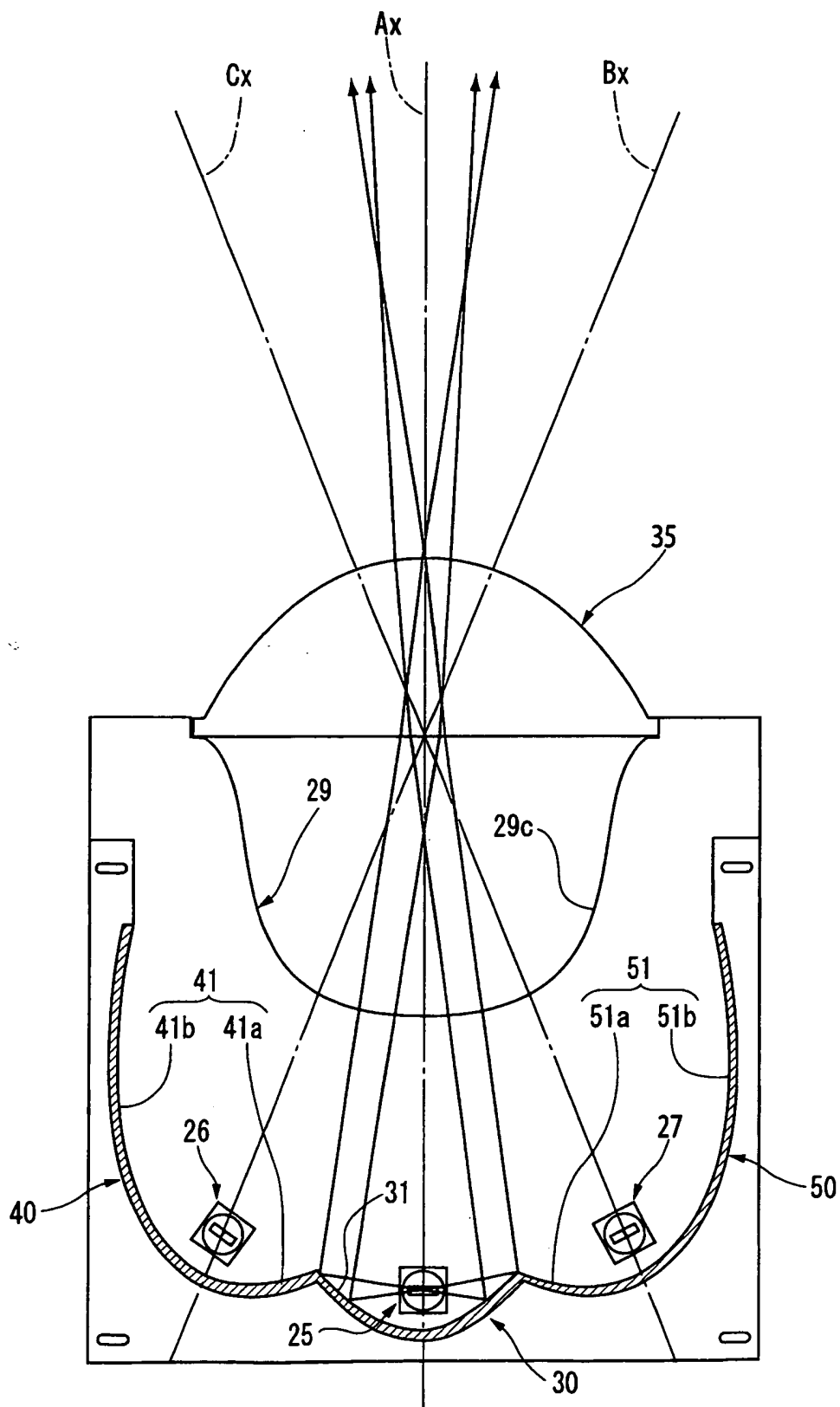


FIG. 5

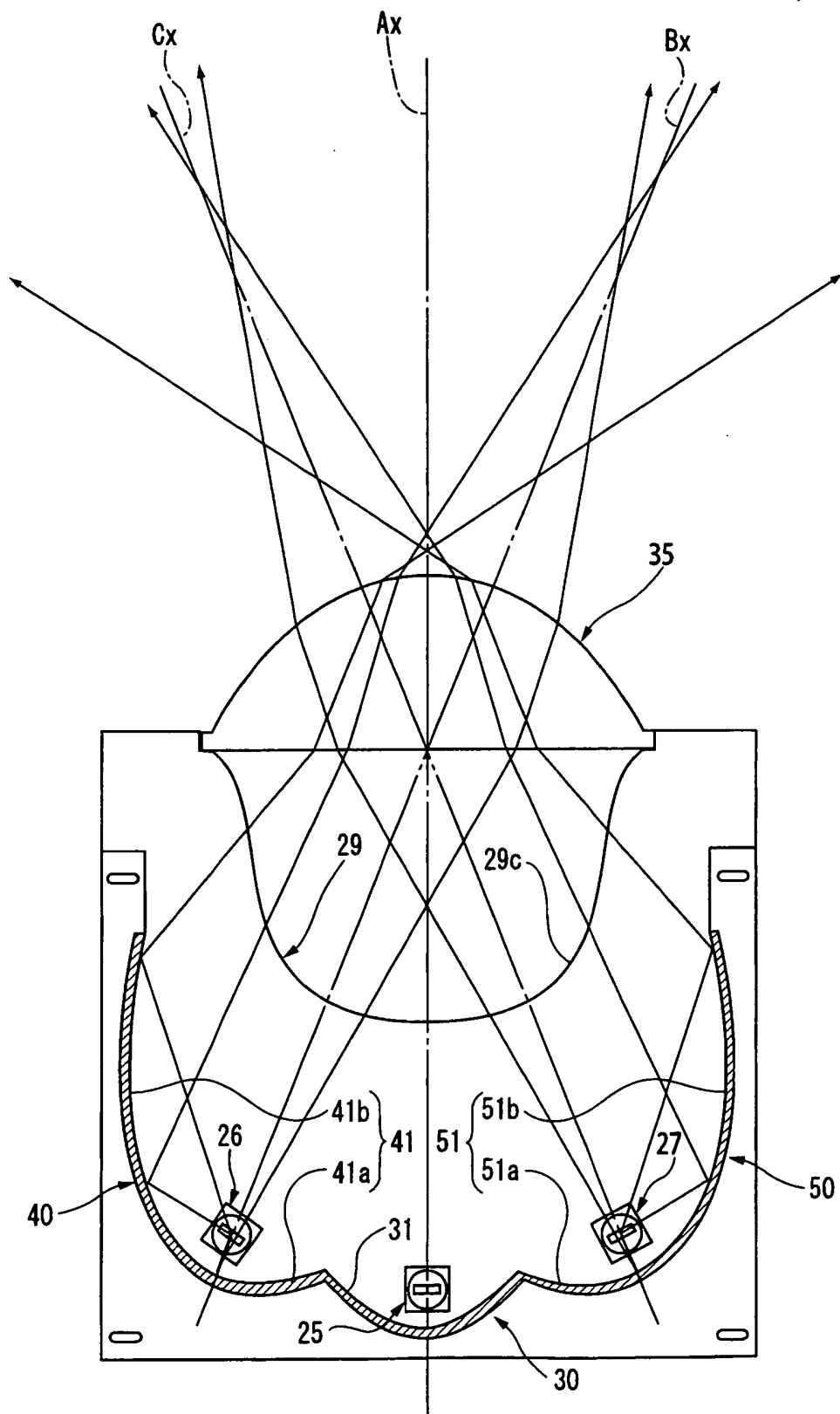
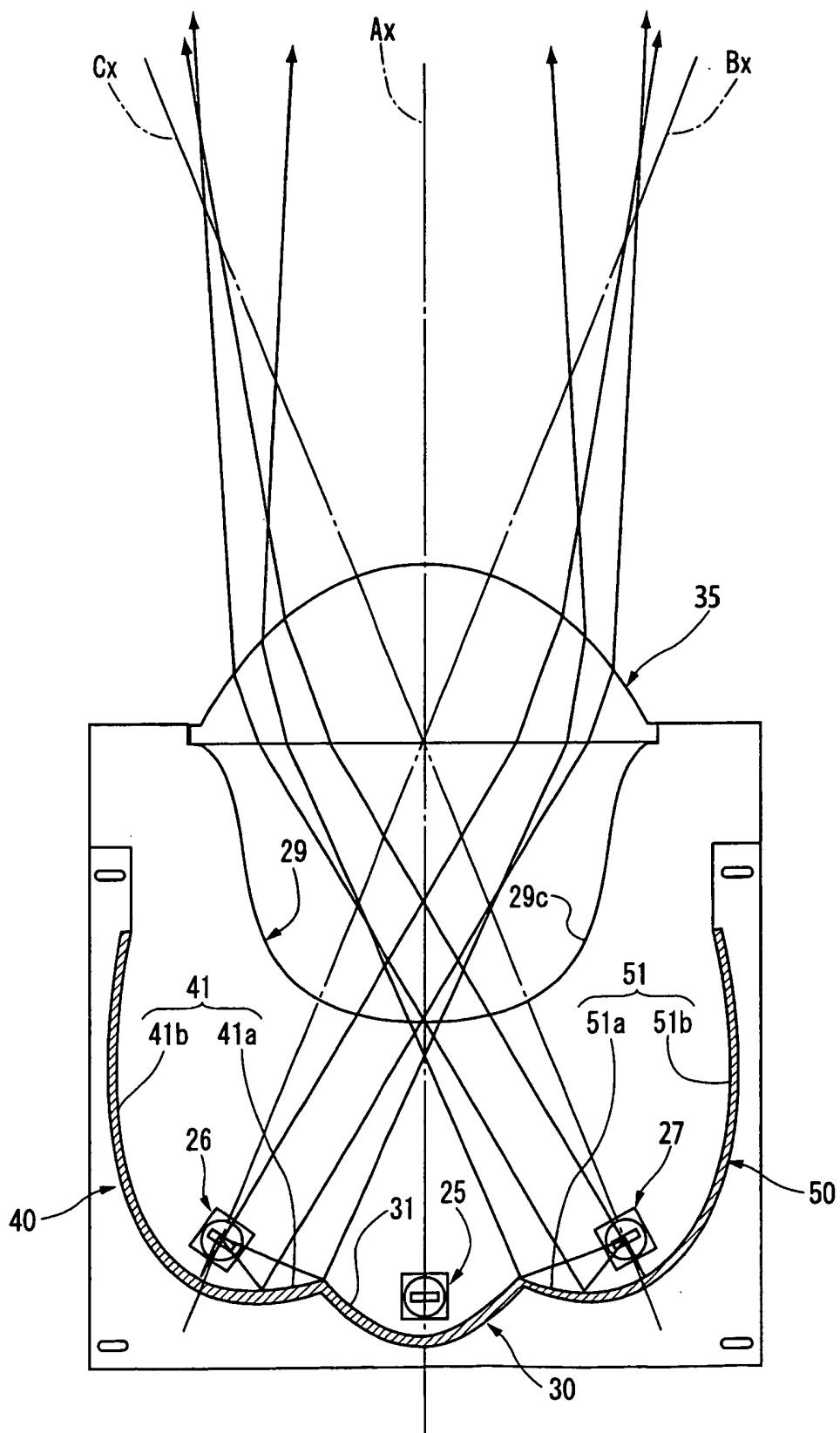


FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2005317226 A [0002] [0003] [0005]