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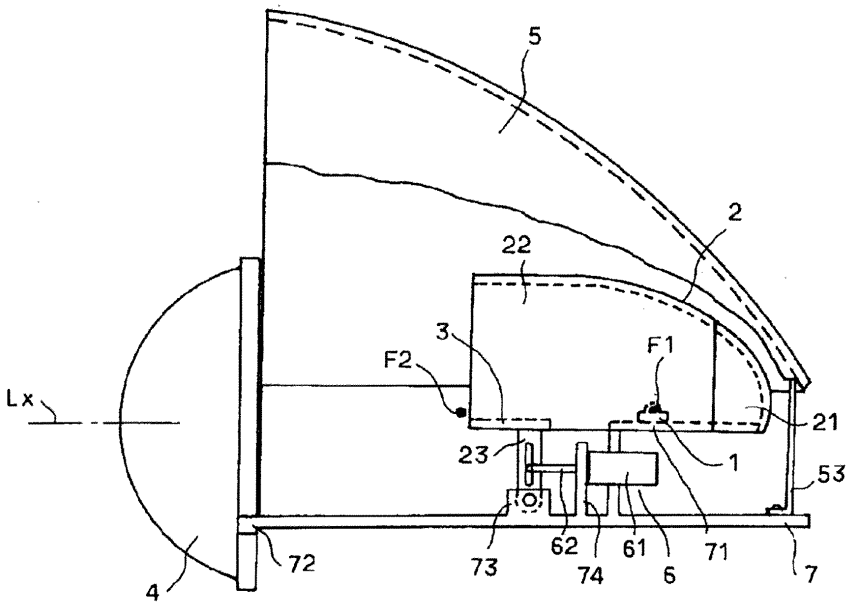
(54) Vehicular lamp

(57) A vehicular lamp includes a light source (1); a main reflector (2) that reflects light radiated from the light source (1); a shade (3) that blocks a portion of light condensed by the main reflector (2); a lens (4) that irradiates light not blocked by the shade (3); and a sub reflector (5) that is provided so as to cover the main reflector (2). The main reflector (2) is configured as divided into a first reflector portion (21), and a second reflector portion (22) that can be moved from a normal position to a different position by moving means (6). When the second reflector portion (22) is moved, light not reflected by the second reflector portion (22) is reflected and irradiated by the sub reflector (5).

FIG. 2



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Description

Field of the Invention

[0001] The present invention relates to a vehicular lamp that can change between different light distributions with one lamp, and more specifically relates to a vehicular lamp that is suitable for application to a headlamp that can change between a high beam distribution and a low beam distribution, for example.

Background to the Invention

[0002] An automobile lamp, especially a headlamp, must be able to illuminate in a high beam distribution that is known as a so-called driving beam, and illuminate in a low beam distribution that is known as a so-called dipped beam. Therefore, a so-called four-lamp type of headlamp has been proposed in the past, wherein a lamp with a high beam distribution and a lamp with a low beam distribution are each provided independently on the left and right sides of an automobile. For example, in recent years, a lamp having a light emitting diode (LED) as a light source has been proposed. As such a lamp, Japanese Patent Application Laid-Open (Kokai) No. 2007 -323839 proposes a projector type headlamp that is constituted by an LED light source, a main reflector with an elliptical shape for condensing light radiated from the LED light source, a shade for blocking a portion of light reflected by the main reflector, and a projection lens for projecting forward light transmitted through the shade. This lamp can be configured as a lamp with a desired low beam distribution by suitably setting the shape of the shade. This lamp can also be configured as a lamp with a high beam distribution by not providing a shade in its configuration. Thus, a four-lamp type headlamp can be configured by arranging the lamps with low beam and high beam distributions. Meanwhile, a two-lamp type of headlamp has also been proposed, wherein a headlamp that is capable of changing between a high beam distribution and a low beam distribution with one lamp is provided on the left and right sides of the automobile, which effectively contributes to reducing the automobile weight and size.

[0003] The four-lamp type headlamp has many lamps and is not preferable in terms of reducing the automobile weight and size. Although the two-lamp type headlamp has an advantage with its fewer number of lamps, this type of headlamp has a complicated structure because of the system for changing the shade or changing the light source provided within the lamp, and it is also difficult to control the low beam distribution to a desired light distribution. Especially in a projector type lamp having an LED as a light source such as that in Japanese Patent Application Laid-Open (Kokai) No. 2007-323839, it is difficult to provide a plurality of light sources due to space restrictions in terms of disposing the light source at a focal point of the main reflector. In addition, since the shade is provided as a fixed structure, switching the light distribution through positioning is difficult. Therefore, the two-lamp type headlamp as described above that uses a projector type headlamp having an LED as a light source has yet to be realized. The above problems are also found in a small two-lamp type headlamp having a bulb as a light source.

[0004] It is an object of the present invention to provide a vehicular lamp that can change between different light distributions with one lamp, and in particular, a vehicular lamp with a small and simple configuration capable of configuring a two-lamp type headlamp that can change between a high beam distribution and a low beam distribution.

Summary of the Invention

[0005] A vehicular lamp of the present invention is characterized by including: a light source; a main reflector that reflects light radiated from the light source in a condensed state; a shade that blocks a portion of light condensed by the main reflector; a lens that irradiates light not blocked by the shade in a predetermined direction of a vehicle; and a sub reflector that is disposed so as to cover the main reflector. The main reflector is configured as divided into a first reflector portion that reflects light in a vicinity area that includes a lamp optical axis, and a second reflector portion that reflects light in areas other than the vicinity area and that can be moved from a normal position to a different position by moving means. When the second reflector portion is moved, light no longer reflected by the second reflector portion is reflected by the sub reflector in a predetermined direction.

[0006] In the present invention, the shade may be moved together with the second reflector portion, and does not block light in the vicinity of the lamp optical axis when moved. In addition, the second reflector portion may be translated in a lamp optical axis direction or pivoted so as to change an angle with respect to the lamp optical axis.

[0007] Further, in the present invention, the sub reflector may be configured from a first sub reflector portion and a second sub reflector portion, wherein light from the light source when the second reflector portion is moved a predetermined amount is reflected by the first sub reflector portion, and light from the light source when the second reflector portion is moved more than the predetermined amount is also reflected by the second sub reflector portion.

[0008] The present invention may be configured as a two-lamp type headlamp capable of changing between a low beam distribution and a high beam distribution, for example. In such case, a low beam distribution is formed when the second reflector portion is not moved, a low beam distribution having additional area illumination is formed when the second reflector portion is moved the predetermined amount, and a high beam distribution is formed when the second reflector portion is moved more

than the predetermined amount.

[0009] According to the present invention, a vehicular lamp having different light distributions with one lamp can be realized by configuring a main reflector as divided into first and second reflector portions, configuring the second reflector portion so as to be movable by a reflector moving portion, and providing a sub reflector. Therefore, even in the case of a two-lamp type headlamp configuration that changes between a low beam distribution and a high beam distribution, for example, there is no need to provide a plurality of light sources and the lamp configuration does not increase in size. In addition, the light distribution is not changed by positioning a shade. Therefore, the lamp configuration is not overly complex.

[0010] Further, in the present invention, movement positions of the second reflector portion may be set in steps and the sub reflector configured as divided into first and second sub reflector portions. Thus, during a low beam distribution, for example, an illumination area can be added by light reflected by the first sub reflector, whereby a diversified low beam distribution can also be obtained.

Brief Description of the Drawings

[0011] Examples of the present invention will now be described in detail with reference to the accompanying drawings, in which:

FIG. 1 is an exploded exterior perspective view of a sub reflector according to a first embodiment.

FIG. 2 is a right side view with a portion of the first embodiment cut away.

FIG. 3 shows a schematic vertical cross-sectional view and a light distribution diagram for a low beam distribution according to the first embodiment.

FIG. 4 shows a schematic vertical cross-sectional view and a light distribution diagram for a high beam distribution according to the first embodiment.

FIG. 5 is an exterior perspective view similar to FIG. 1 of a second embodiment.

FIG. 6 is a right side view similar to FIG. 2 of the second embodiment.

FIG. 7 shows a schematic vertical cross-sectional view and a light distribution diagram for a low beam distribution according to the second embodiment.

FIG. 8 shows a schematic vertical cross-sectional view and a light distribution diagram for a high beam distribution according to the second embodiment.

FIG. 9 shows a schematic vertical cross-sectional view and a light distribution diagram for a low beam distribution according to a third embodiment.

FIG. 10 shows a schematic vertical cross-sectional view and a light distribution diagram for a different low beam distribution according to the third embodiment.

FIG. 11 shows a schematic vertical cross-sectional view and a light distribution diagram for a high beam distribution according to the third embodiment.

Detailed Description

[0012] FIG. 1 is an exploded exterior perspective view of a sub reflector described later according to a first embodiment in which the present invention is applied to a two-lamp type headlamp respectively provided on the left and right sides of an automobile. FIG. 2 is a right side view with a portion of the first embodiment cut away. The left and right headlamps have the same configuration, and each headlamp includes an LED 1 as a light source, a main reflector 2 that condenses light radiated from the LED 1, a shade 3 that blocks a portion of the condensed light to obtain a low beam distribution, and a condenser lens 4 for irradiating light not blocked by the shade 3 forward of the automobile. A sub reflector 5 for obtaining a high beam distribution is also provided at a position over the main reflector 2. Each headlamp further includes a reflector moving portion 6 that integrally rotates the shade 3 and a second reflector portion 22 of the main reflector 2 that will be described later in order to change the positions of the shade 3 and the second reflector portion 22.

[0013] The LED 1 is fixedly supported on a fixed plate 7. Light emitted by a light emitting portion, which serves as a light emitting point of the LED 1, is radiated from vertically above the light emitting portion toward a surrounding area. Here, a portion of the fixed plate 7 is provided with a base portion 71 that is formed protruding upward in a raised plateau-like manner, and the LED 1 is fixedly supported by the base portion 71. The main reflector 2 has a container-like shape in which a rotational ellipsoid having the light emitting portion of the LED 1 as a focal point F1 is respectively cut in half in the vertical and horizontal directions. The main reflector 2 is disposed so as to cover over the LED 1, and condenses light radiated from the LED 1 at a second focal point F2 that is arranged more forward toward a lamp optical axis Lx than the first focal point F1. Further, the main reflector 2 is divided into a first reflector portion 21 with a relatively narrow surface area that accounts for an elliptical vertex side of the main reflector 2, and a second reflector portion 22 with a wide surface area that accounts for a side of the main reflector 2 that is more forward than the first reflector portion 21 in the direction of the lamp optical axis Lx. The first reflector portion 21 is integratedly fixed to the base portion 71 of the fixed plate 7, and the second reflector portion 22 is movable due to the reflector moving portion 6. The shade 3 is integrated with the second reflector portion 22 at both left and right ends thereof. Alternatively, even if the shade 3 is formed as a separate body, the shade 3 is formed so as to integrally move with the second reflector portion 22. The shade 3 is formed as a flat plate, with a center area of a front edge portion 31 thereof receding backward in a curved manner toward a rearward direction of the lamp optical axis Lx. The shade 3 is also configured such that a portion of light to be condensed at the second focal point F2 is blocked at the front edge portion 31. The condenser lens 4 is con-

stituted by a convex lens whose rear-side focal point is disposed at a position in the vicinity of the second focal point F2, and which irradiates light not blocked by the shade 3 forward in a condensed state. The condenser lens 4 is fixedly supported by a front end support portion 72 of the fixed plate 7.

[0014] The sub reflector 5 is configured by a portion of the rotational ellipsoid having the light emitting portion of the LED 1, that is, the first focal point F1 and a vicinity position thereof, as a focal point. In addition, the sub reflector 5 is arranged so as to cover an overhead area of the main reflector 2, that is, an overhead area of the LED 1. The sub reflector 5 is fixedly supported on the fixed plate 7 by a plurality of support arms 53 that extend downward from a lower edge portion of the sub reflector 5.

[0015] The main reflector 2 further includes a pair of pivot arms 23 that extend downward from both left and right side edges of the second reflector portion 22. A lower end portion of the pivot arm 23 is connected by a rotation shaft, not shown in the drawing, to a support tab 73 provided in a standing condition on a portion of the fixed plate 7, and using the rotation axis as a fulcrum, the pivot arm 23 can be pivoted on a vertical plane. Viewed from the front, the pivot arm 23 on the right side is pivoted by the reflector moving portion 6. Here, an oblong hole 24 provided in the pivot arm 23 is connected to a distal end of a plunger 62 of a solenoid mechanism 61 that is supported by a support tab 74 on the fixed plate 7. The pivot arm 23, the second reflector portion 22 connected thereto, and the shade 3 pivot in accordance with advancing and retracting movement of the plunger 62 so as to be moved and set at a different pivot position. In the solenoid mechanism 61, the advancement/retraction position of the plunger 62 is controlled by a control signal from a light distribution control portion not shown in the drawings.

[0016] The shade 3 is subject to mirror surface processing by aluminum deposition or the like, for example, such that a surface of the shade 3 facing upward is a light reflective surface in this embodiment.

[0017] In the headlamp according to the first embodiment, during a low beam distribution the plunger 62 of the solenoid mechanism 61 is retracted rearward by a control of the light distribution control portion as shown by a schematic vertical cross section in FIG. 3(a). Therefore, the pivot arm 23 is at a rearward pivot position, and the second reflector portion 22 and the shade 3 are also set at pivot positions on the rearward side. These pivot positions on the rearward side are positions at which the focal point of the second reflector portion 22 coincides with the first focal point F1, and the shade 3 faces in the horizontal direction along the lamp optical axis Lx. When the LED 1 emits light in this state, most of the emitted light is reflected by the first reflector portion 21 and the second reflector portion 22, and condensed at the second focal point F2. A portion of the condensed light is blocked by the shade 3. Non-blocked light is incident to an area below the lamp optical Lx of the lens 4, and in this case, such light is condensed and irradiated forward to obtain the light distribution as shown in FIG. 3(b). In other words, such light is irradiated over an area below the lamp optical axis Lx that is wide in the left-right direction, and a horizontal cut-off line is formed by the shade 3 at an upper edge portion of the light distribution. By forming the shade 3 in a suitable shape, the horizontal cut-off line of the right-side area can be displaced lower than the cut-off line of the left-side area so as to obtain a low beam distribution suited for driving on the left side of the road. In this embodiment, a portion of light reflected by the reflector 2 is further reflected by the mirror surface on the upper-side surface of the shade 3 to pass through the lens 4 and irradiate forward. Such light can be used as a portion of the low beam distribution to enable an increase in irradiation efficiency.

[0018] Meanwhile, during a high beam distribution the plunger 62 of the solenoid mechanism 61 is advanced forward by the light distribution control portion as shown by a schematic vertical cross section in FIG. 4(a). Therefore, the pivot arm 23 is pivoted forward, and the second reflector portion 22 and the shade 3 are also set at pivot positions on the forward side. These pivot positions on the forward side are positions at which the second reflector portion 22 is displaced forward from the area directly over the LED 1, and the shade 3 is withdrawn below the lamp optical axis Lx. When the LED 1 emits light in this state, light radiated upward from the LED 1 passes through a gap created by moving the second reflector portion 22. Such light is then radiated to an area above the main reflector 2 and projected on the sub reflector 5 that is present thereabove. Light reflected by the sub reflector 5 is irradiated forward in a direction along the lamp optical axis Lx, and also irradiated in a direction over the lamp optical axis Lx as well as toward the left and right outer sides. Light radiated rearward from the LED 1 is reflected by the first reflector portion 21 and condensed at the second focal point F2, and then passes through the lens 4 to radiate forward. At such time, almost no light is blocked by the shade 3 and the light is irradiated to areas near the lamp optical axis Lx. Thus, as shown in FIG. 4(b), an irradiation area formed by reflecting of the first reflector portion 21 overlaps with an irradiation area formed by reflecting of the sub reflector 5. There is relatively little light diffusion in upper, lower, left and right areas including the lamp optical axis Lx and light is irradiated in a light distribution with a high light condensing characteristic. As a consequence, a high beam distribution can be obtained with an especially high luminosity in an area along the lamp optical axis Lx.

[0019] As described above, the headlamp according to the first embodiment is realized by configuring a main reflector of a lamp such as that described in Patent Document 1 as divided into the first and second reflector portions 21, 22, configuring the second reflector portion 22 so as to be movable by the reflector moving portion 6, and newly adding the sub reflector 5. Therefore, even in the case of a two-lamp type headlamp configuration,

there is no need to provide a plurality of LEDs, that is, light sources, and the headlamp configuration does not increase in size. In addition, the shade 3 is fixed to the second reflector portion 22 and moves together with the second reflector portion 22. There is thus no need for minute positioning of the shade 3, and the constitution of the reflector moving portion 6 for pivoting the second reflector portion 22 can be configured by the solenoid mechanism 61 alone. A simple configuration can therefore be used so that the headlamp constitution does not become overly complex.

[0020] FIG. 5 is a partially exploded exterior perspective view of a headlamp according to a second embodiment, and FIG. 6 is a right side view thereof. Like reference numerals are used for portions equivalent to those of the first embodiment. In the second embodiment as well, the main reflector 2 is divided into the first reflector portion 21 and the second reflector portion 22. However, in this case, the second reflector portion 22 and the shade 3 are independent from one another. The shade 3 is fixed such that both ends thereof are supported by a portion of the fixed plate 7, in this case, portions of guide pieces 75 that will be described later. The second reflector portion 22 is configured such that both left and right side edge portions 22a extend somewhat downward and are accommodated in guide grooves 75a, which have a recessed shape in the lamp optical axis direction and are provided on upper surfaces of a pair guide pieces 75 that are provided facing each other in the left-right direction on the fixed plate 7. The left and right side edge portions 22a are guided by the guide grooves 75a and translated back and forth in the direction of the lamp optical axis Lx. A connection piece 25 having a reverse L shape is provided on a right-side surface of the second reflector portion 22. The plunger 62 of the solenoid mechanism 61 of the reflector moving portion 6, which is fixedly supported by the guide piece 75, is connected to the connection piece 25. Advancing and retracting operations in the forward and backward directions of the plunger 62 cause the second reflector portion 22 to move integrally in the forward and backward directions such that the position of the second reflector portion 22 changes.

[0021] According to the second embodiment, during a low beam distribution, the second reflector portion 22 is at a retracted position as shown by a schematic vertical cross section in FIG. 7(a), and constitutes the main reflector 2 together with the first reflector portion 21. This state is the same as that in the first embodiment; therefore, as shown in FIG. 6(b), the same low beam distribution as that in the first embodiment is obtained.

[0022] Meanwhile, during a high beam distribution, as shown by a schematic vertical cross section in FIG. 8(a), the second reflector portion 22 is moved forward in the direction of the lamp optical axis Lx by the plunger 62 of the solenoid mechanism 61 and withdrawn from directly above the LED 1. When the LED 1 emits light in this state, similar to the first embodiment, light radiated upward passes through a gap between the first and second reflector portions 21, 22 and is radiated to an area above the main reflector 2. Such light is then reflected by the sub reflector 5 that is present thereabove and irradiated forward. Light radiated rearward from the LED 1 is reflected by the first reflector portion 21 and condensed at the second focal point F2. In the second embodiment, the shade 3 is fixed. Therefore, the condensed light is partially blocked by the shade 3 and the light not blocked passes through the lens 4 and is irradiated forward. Thus, according to the second embodiment, as shown in FIG. 8(b), similar to the first embodiment, an area that includes the lamp optical axis Lx is illuminated at a relatively high luminosity, while areas to the left, right, and below this area have illumination areas with relatively low luminosity where the horizontal cut-off line caused by the shade 3 remains. A high beam distribution is obtained by the overlapping of these areas.

[0023] The headlamp according to the second embodiment, similar to the first embodiment, is realized by configuring the main reflector 2 of the lamp as divided into the first and second reflector portions 21, 22, configuring the second reflector portion 22 so as to be movable by the reflector moving portion 6, and newly adding the sub reflector 5. Therefore, even in the case of a two-lamp type headlamp configuration, there is no need to provide a plurality of LEDs, that is, light sources, and the lamp configuration does not increase in size. The shade 3 is also fixed, so a configuration for positioning the shade 3 is not needed and the lamp configuration does not become complex. Further, since the second reflector portion 22 is translated, the configuration of the reflector moving portion 6 and the positioning operation can be made even more simple and straightforward.

[0024] FIG. 9(a) is a schematic vertical cross-sectional view along the lamp optical axis Lx of a headlamp according to a third embodiment. Like reference numerals are used for portions equivalent to those of the first and second embodiments. In the third embodiment, the second reflector portion 22 and the shade 3 that constitute the main reflector 2 are independent from one another, and the shade 3 is fixedly supported as in the second embodiment. In addition, the second reflector portion 22 is configured so as to be translated back and forth in the direction of the lamp optical axis Lx by the reflector moving portion 6, which is not shown in the drawing, as in the second embodiment.

[0025] The third embodiment differs from the first and second embodiments in that the sub reflector 5 is formed as defined or divided into a first sub reflector portion 51 in a rear-side area near the lamp optical axis Lx, and a second sub reflector portion 52 in an area more forward than the first sub reflector portion 51. An example is illustrated here in which the first sub reflector portion 51 and the second sub reflector portion 52 are integrated. The first sub reflector portion 51 is configured such that light radiated from the LED 1 is reflected in the direction of the lamp optical axis Lx and also reflected toward an area leftward of the lamp optical axis Lx. The second sub

reflector portion 52 is configured such that light radiated from the LED 1 is reflected in the direction of the lamp optical axis Lx and also reflected slightly over the lamp optical axis Lx in the left and right directions.

[0026] In the third embodiment, during a low beam distribution, as shown in FIG. 9(a), the second reflector portion 22 is at a retracted position. This state is the same as that in the first embodiment; therefore, as shown in FIG. 9(b), the same low beam distribution as that in the first embodiment is obtained. During the low beam distribution according to the third embodiment, as shown in FIG. 10(a), the second reflector portion 22 can also be moved forward by a minute predetermined dimension. If the second reflector portion 22 is moved forward by the predetermined dimension, a minute gap is created between the first and second reflector portions 21, 22 directly over the LED 1. Thus, a portion of the light radiated from the LED 1 passes through the minute gap and projects onto the first sub reflector portion 51, and in this case, is reflected toward a left-side area in the direction of the lamp optical axis Lx. Therefore, as shown in FIG. 10(b), in addition to the low beam distribution, an illumination area with high luminosity is formed in an upper left-side area to realize a so-called overhead illumination for illuminating road signs and the like.

[0027] During a high beam distribution, as shown in FIG. 11(a), the second reflector portion 22 is moved to a forward position that is almost completely withdrawn from directly over the LED 1, similar to the second embodiment. When the LED 1 emits light in this state, similar to the first and second embodiments, light radiated upward passes through a gap between the first and second reflector portions 21, 22 and is radiated to an area above the main reflector 2. Such light is then reflected by the sub reflector 5 that is present thereabove and irradiated forward. At such time, since the first sub reflector potion 51 and the second sub reflector portion 52 in the sub reflector 5 each reflect such light, different areas are illuminated. Light reflected by the first sub reflector portion 51 heads in a leftward direction along the lamp optical axis Lx as shown in FIG. 10(b), and light reflected by the second sub reflector portion 52 is directed above the lamp optical axis Lx similar to the first and second embodiments. Light radiated rearward from the LED 1 is reflected by the first reflector portion 21 and condensed at the second focal point F2. Therefore, similar to the second embodiment, a portion is blocked by the shade 3. Thus, according to the third embodiment, as shown in FIG. 11(b), an area that includes the lamp optical axis Lx is illuminated at a high luminosity, while an area to the left of this area is illuminated at a somewhat high luminosity, and an area below these areas has an illumination area with a relatively low luminosity where the horizontal cut-off line remains. A high beam distribution is obtained by the overlapping of these areas.

[0028] The headlamp according to the third embodiment is realized by configuring the main reflector 2 of the lamp as divided into the first and second reflector portions 21, 22, configuring the second reflector portion 22 so as to be movable by the reflector moving portion, and newly configuring the sub reflector 5 from the first and second sub reflector portions 51, 52. Therefore, similar to the first and second embodiments, even in the case of a two-lamp type headlamp configuration, there is no need to provide a plurality of LEDs, that is, light sources, and the lamp configuration does not increase in size. In addition, the shade is not moved for positioning, so the lamp configuration does not become complex. By configuring the movement position of the second reflector portion 22 so as to position the second reflector portion 22 at two steps and suitably designing the shapes of each of the first and second sub reflector portions 51, 52, any kind of additional illumination area such as an overhead light distribution is possible during a low beam distribution. Consequently, various light distributions can be achieved.

[0029] Here, in the second and third embodiments as well, the second reflector portion of the main reflector may be configured so as to rotationally move such that an angle with respect to the lamp optical axis changes, similar to the first embodiment. However, the shade remains fixed as in the second and third embodiments. In addition, the configuration of the reflector moving portion for moving the second reflector portion is not limited to the solenoid mechanism described in each embodiment; various types of moving mechanisms may be employed.

[0030] The first to third embodiments illustrate examples in which the present invention is applied to a headlamp capable of changing between a low beam distribution and a high beam distribution. However, the present invention may be similarly applied to any vehicular lamp in which changing between different light distributions is required. In addition, the light source is not limited to an LED, and the present invention may also be applied to a vehicular lamp that uses another light emitting body, such as a bulb, as its light source.

[0031] In the first to third embodiments, the sub reflector is configured from a rotational paraboloid. However, the sub reflector is not limited to this shape, and the configuration of the sub reflector may be modified as appropriate depending on the light distribution required. In particular, the first sub reflector portion of the third embodiment illuminates a left-side forward area of the host vehicle during a low beam distribution. However, when illumination of directly forward and leftward areas of the host vehicle is desired, the first sub reflector portion may be configured so as to reflect light toward these areas.

Claims

1. A vehicular lamp comprising:

a light source;
a main reflector that reflects light radiated from the light source in a condensed state;
a shade that blocks a portion of light condensed

by the main reflector;
a lens that irradiates light not blocked by the shade in a predetermined direction of a vehicle; and
a sub reflector that is disposed so as to cover the main reflector, wherein
the main reflector is configured as divided into a first reflector portion that reflects light in a vicinity area that includes a lamp optical axis, and a second reflector portion that reflects light in areas other than the vicinity area and that can be moved from a normal position to a different position by moving means, and
when the second reflector portion is moved, light no longer reflected by the second reflector portion is reflected by the sub reflector in a predetermined direction.

2. The vehicular lamp according to claim 1, wherein the shade is moved together with the second reflector portion, and does not block light in the vicinity of the lamp optical axis when moved.

3. The vehicular lamp according to claim 1 or 2, wherein the second reflector portion is one of translated in a lamp optical axis direction and pivoted so as to change an angle with respect to the lamp optical axis.

4. The vehicular lamp according to any one of claims 1 to 3, wherein a low beam distribution is formed when the second reflector portion is not moved, and a high beam distribution is formed when the second reflector portion is moved.

5. The vehicular lamp according to any one of claims 1 to 3, wherein the sub reflector is configured from a first sub reflector portion and a second sub reflector portion, wherein light from the light source when the second reflector portion is moved a predetermined amount is reflected by the first sub reflector portion, and light from the light source when the second reflector portion is moved more than the predetermined amount is also reflected by the second sub reflector portion.

6. The vehicular lamp according to claim 5, wherein a low beam distribution is formed when the second reflector portion is not moved, a low beam distribution having additional area illumination is formed when the second reflector portion is moved the predetermined amount, and a high beam distribution is formed when the second reflector portion is moved more than the predetermined amount.

FIG. 1

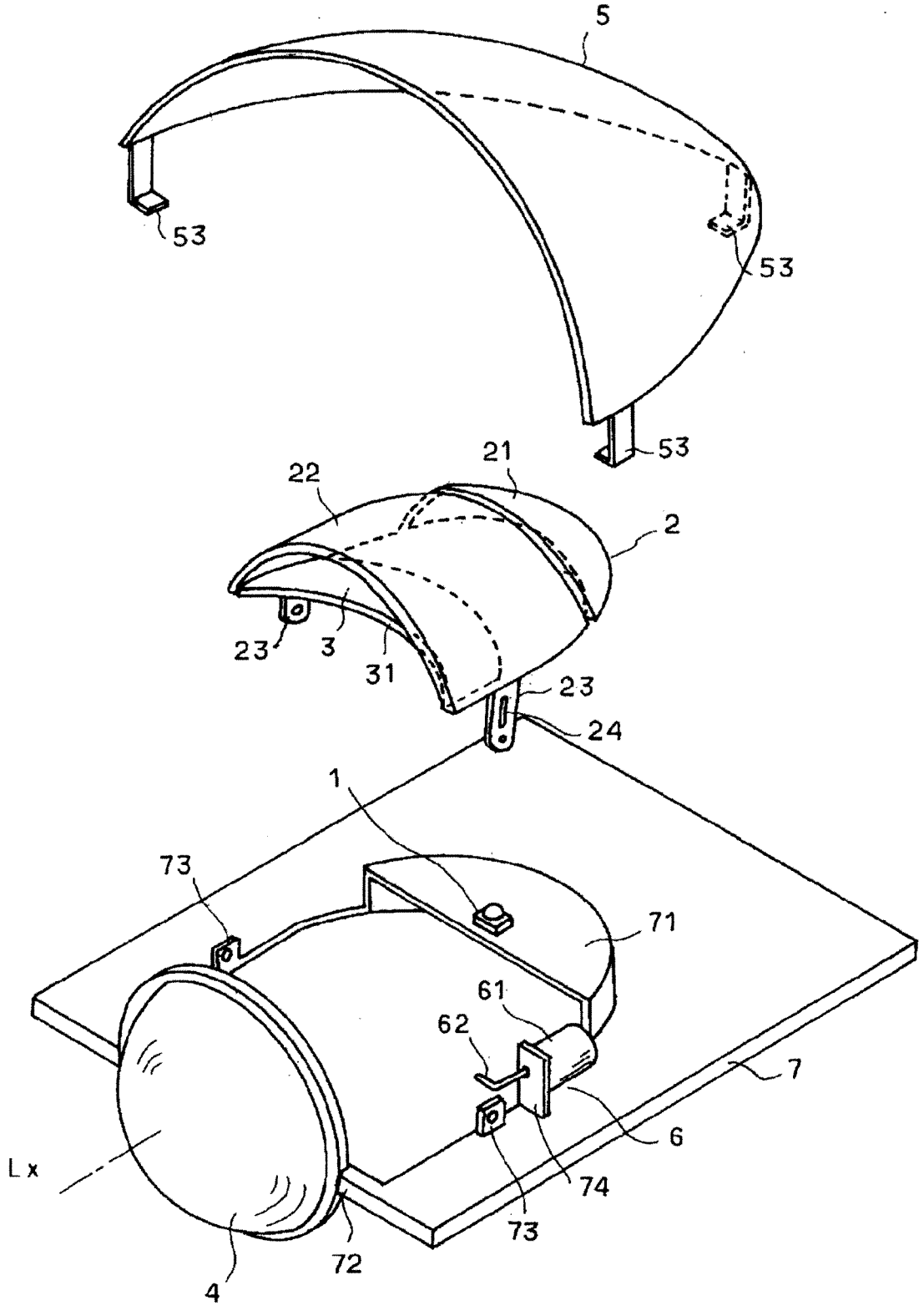


FIG. 2

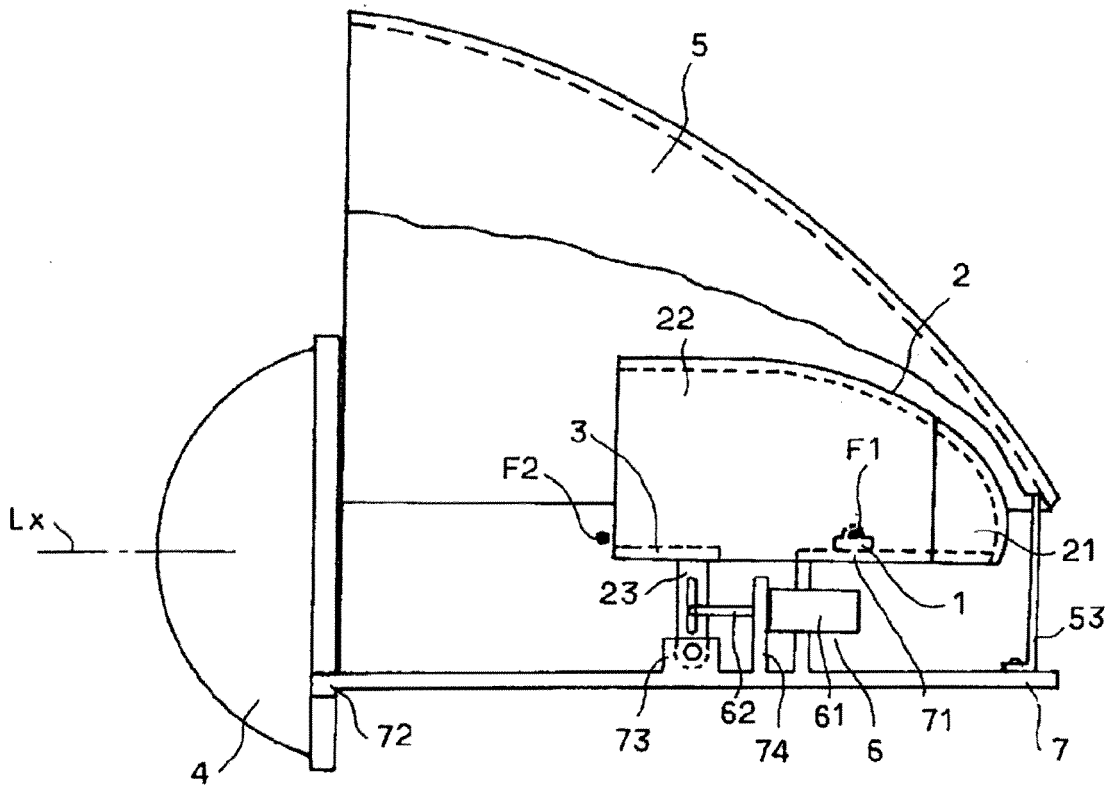


FIG. 3A

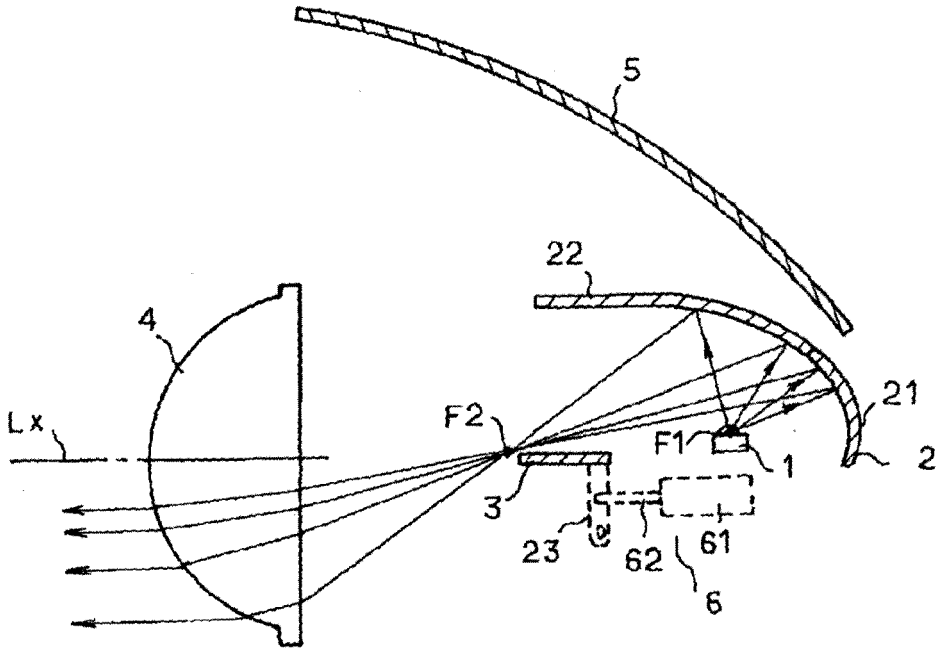


FIG. 3B

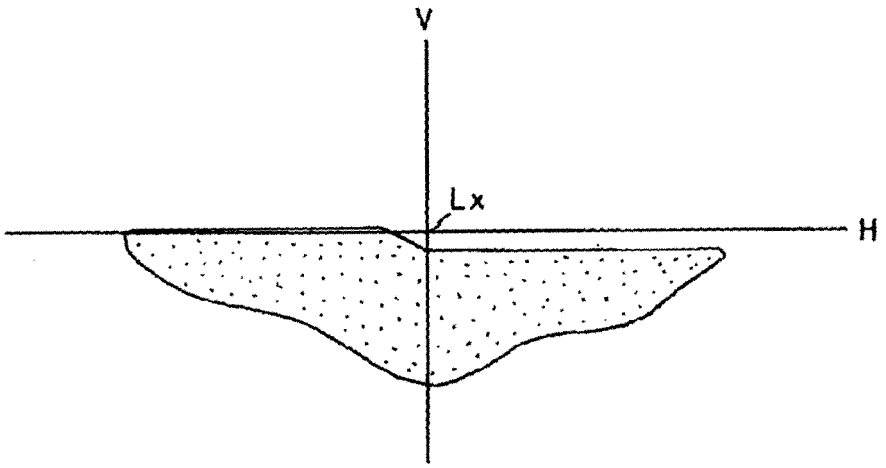


FIG. 4A

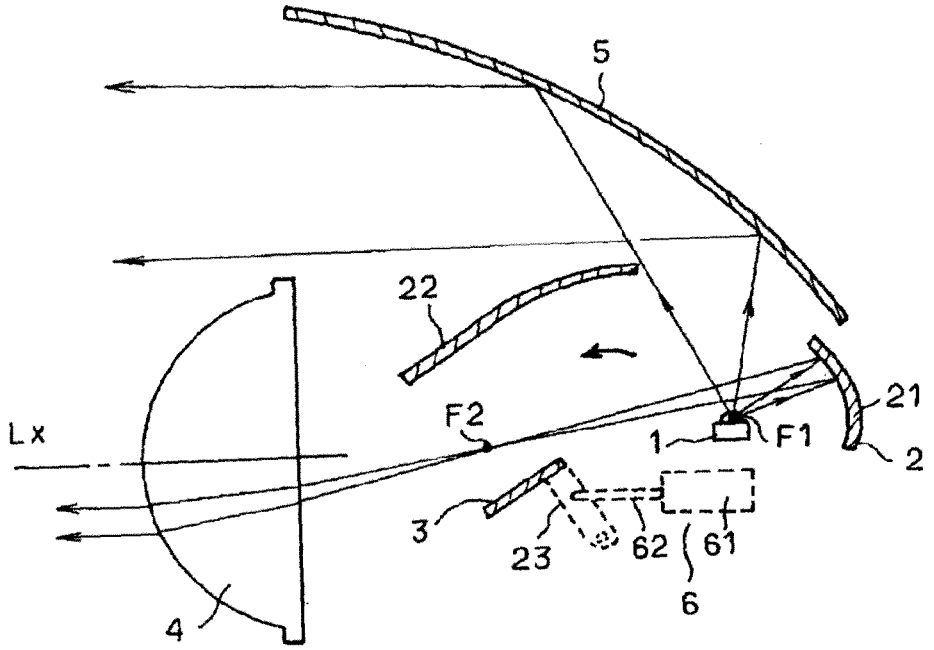


FIG. 4B

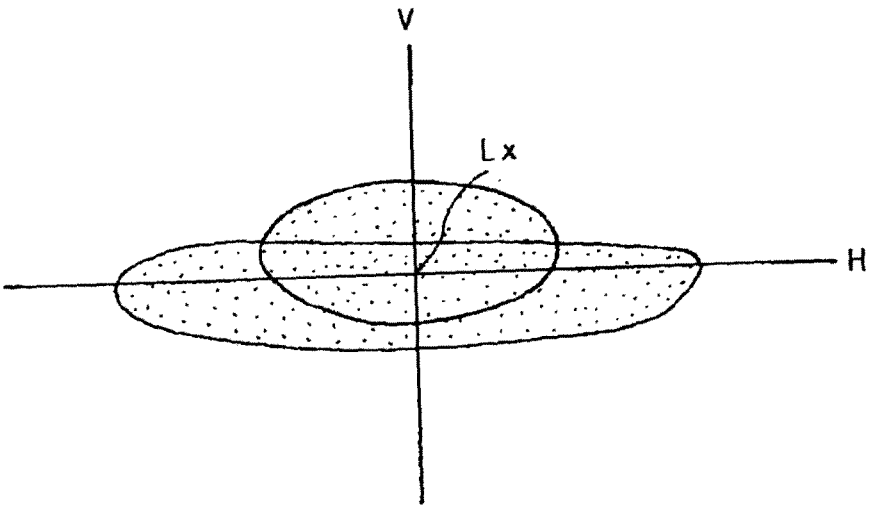


FIG. 5

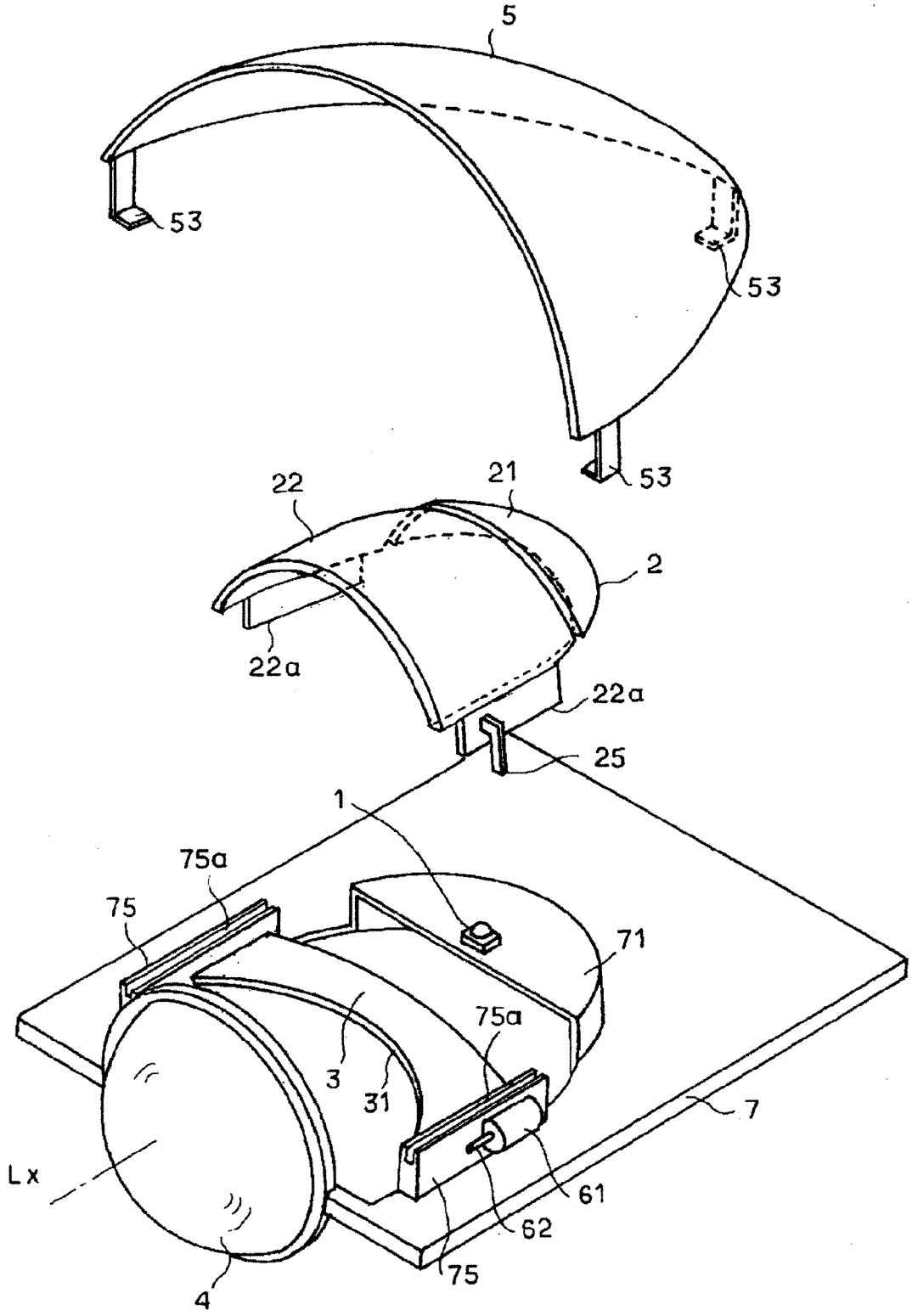


FIG. 6

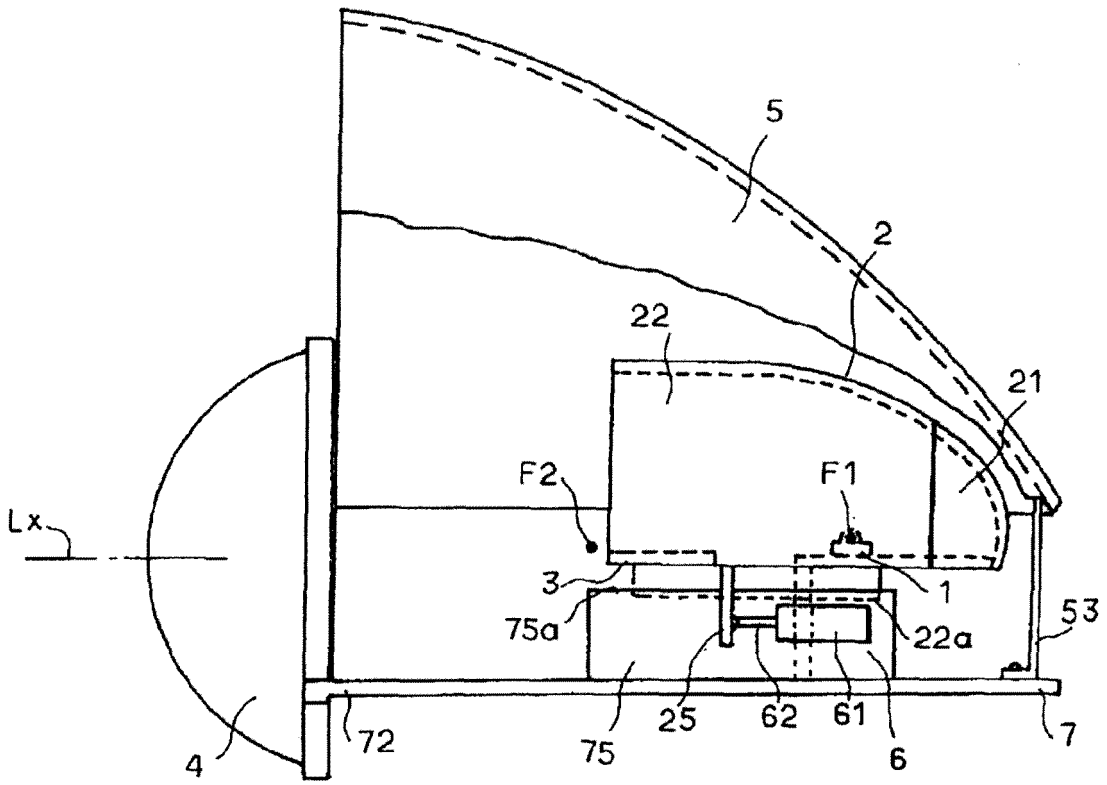


FIG. 7A

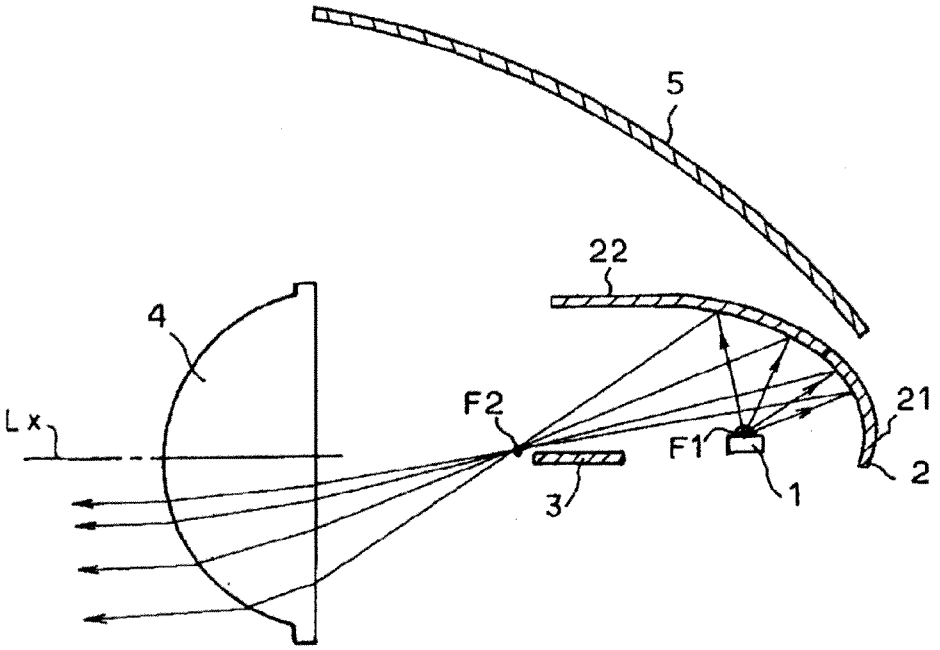


FIG. 7B

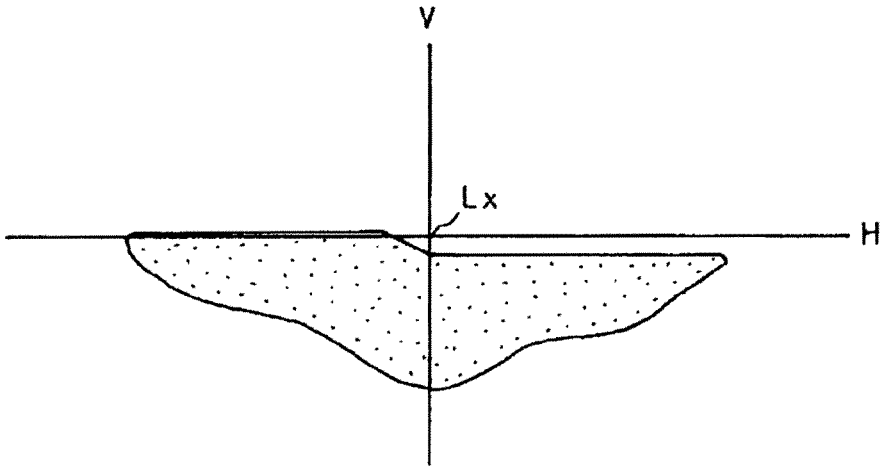


FIG. 8A

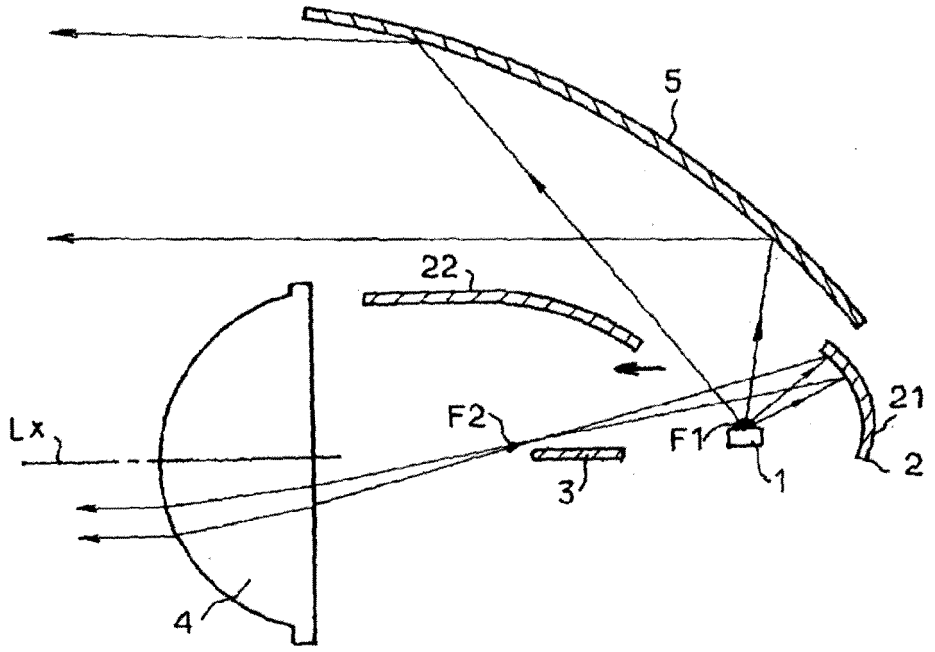


FIG. 8B

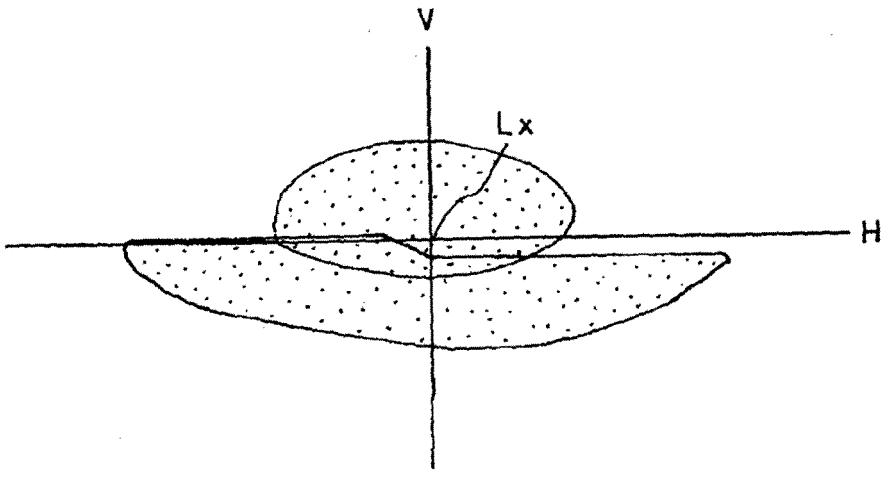


FIG. 9A

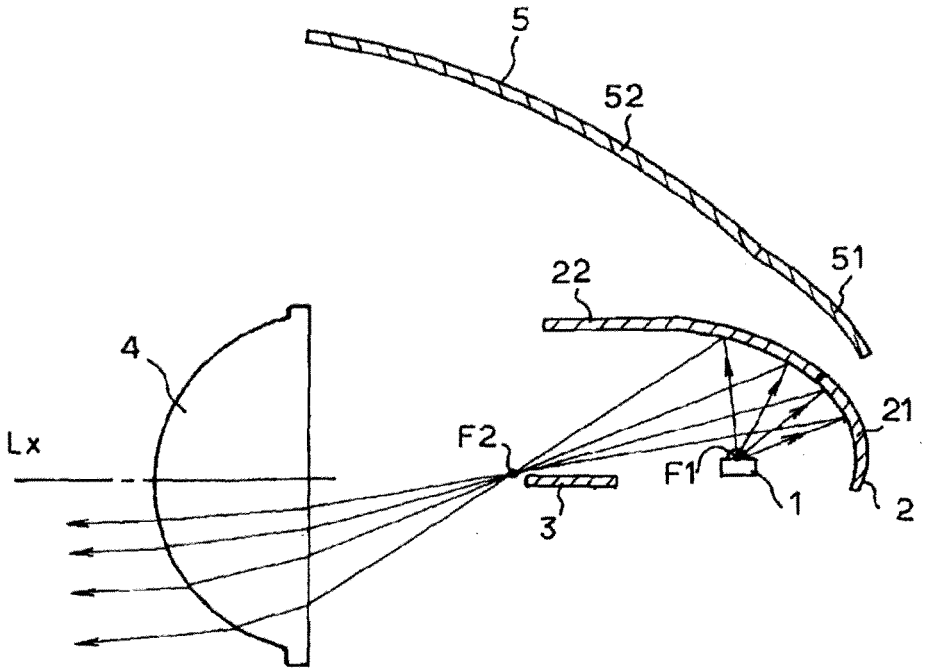


FIG. 9B

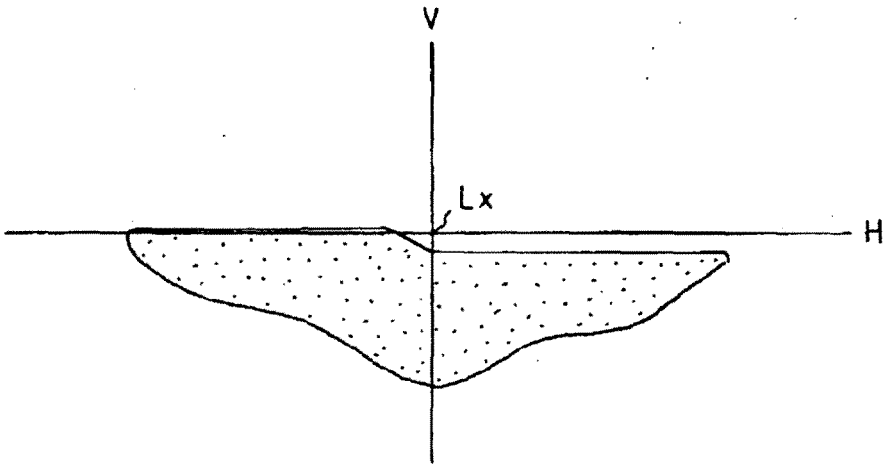


FIG. 10A

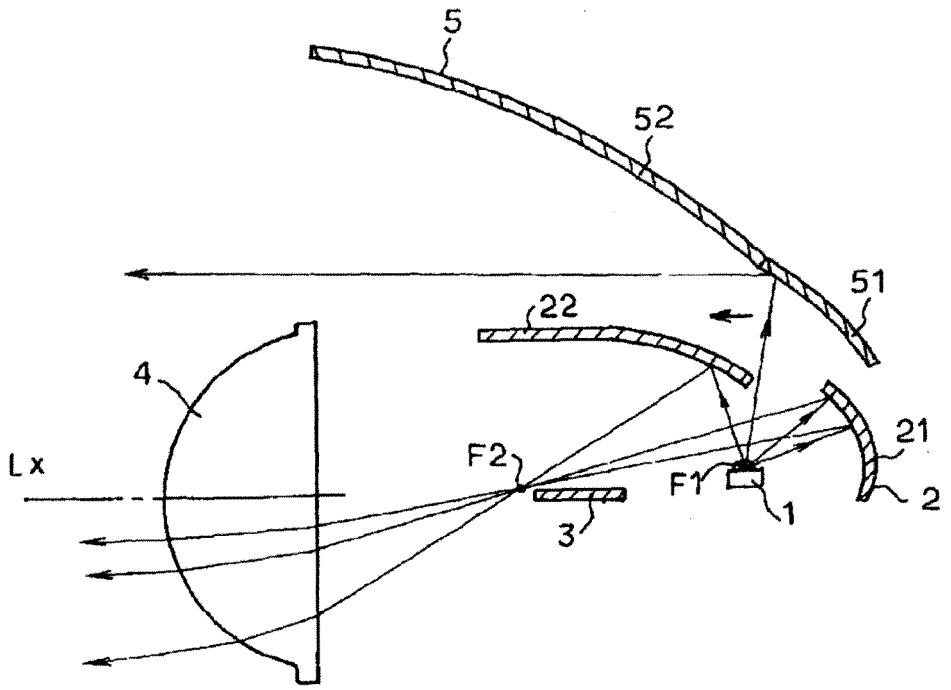


FIG. 10B

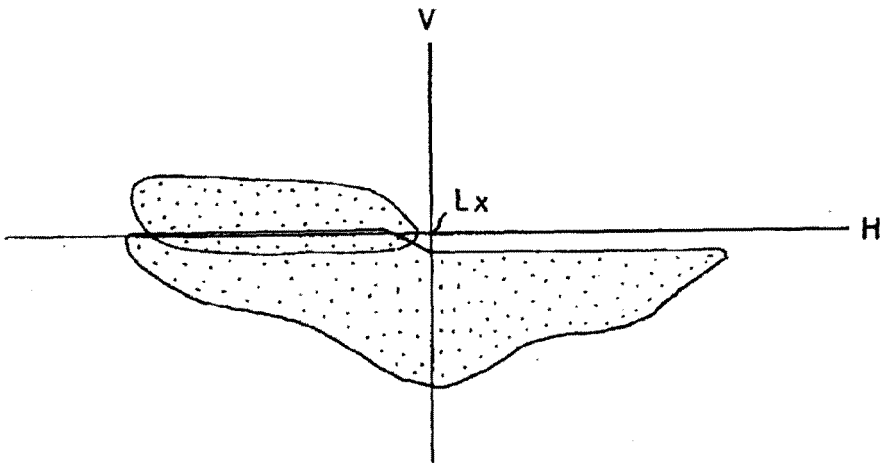


FIG. 11A

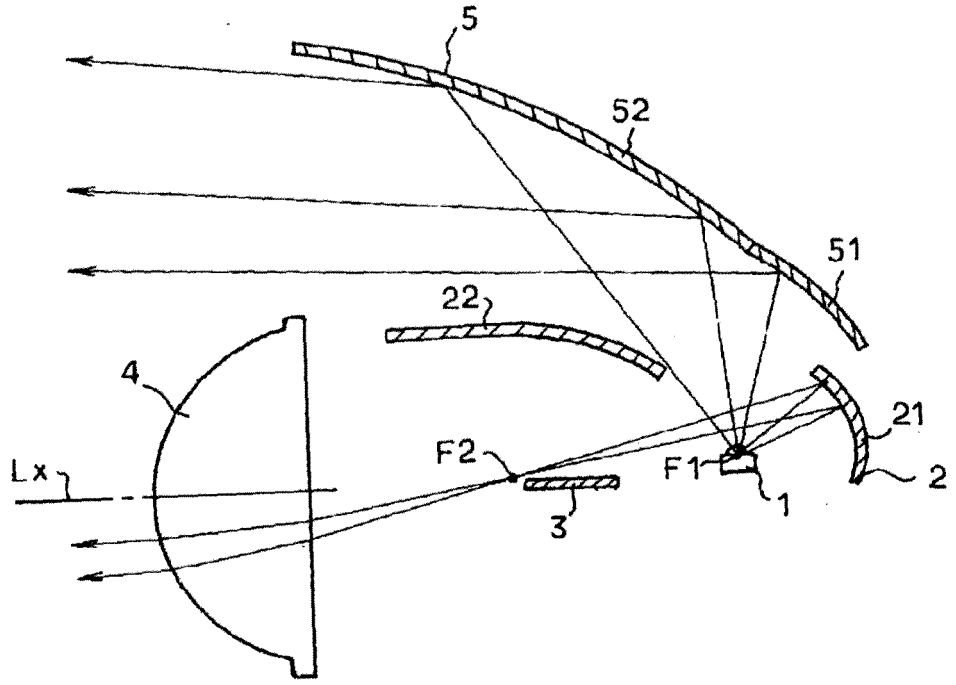
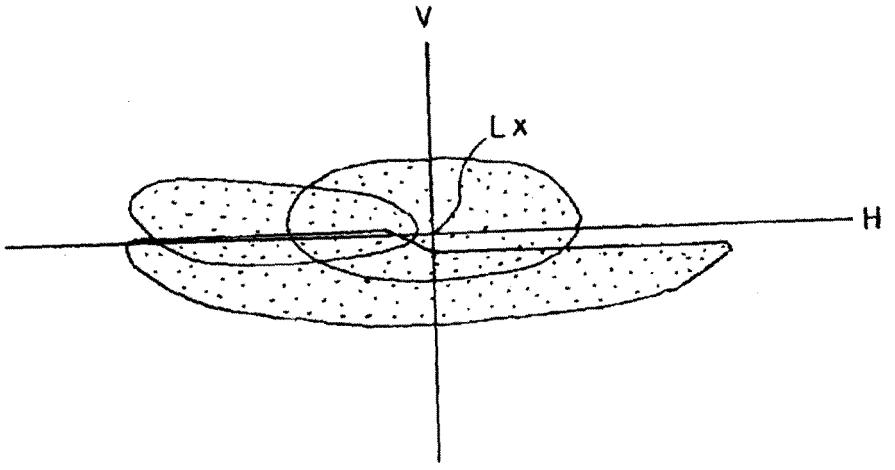


FIG. 11B



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Patent documents cited in the description

- JP 2007323839 A **[0002] [0003]**