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(54) **HEADLAMP DEVICE FOR A VEHICLE**

SCHEINWERFERVORRICHTUNG FÜR EIN FAHRZEUG

PHARE POUR UN VÉHICULE

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(73) Proprietor: **Hua Xin Optronics Co.**

East Dist. 300 Hsinchu City (TW)

(72) Inventors:

- **HUANG, I-Liang**
Hsinchu City 300 (TW)
- **GUAN, You-Kang**
Miaoli County 352 (TW)

(74) Representative: **V.O.**

P.O. Box 87930
2508 DH Den Haag (NL)

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Description

[0001] The invention relates to a headlamp device for a vehicle capable of emitting low beam and high beam light rays.

[0002] Referring to Figures 7 and 8, a conventional headlamp device disclosed in Taiwanese Utility Model Patent No. M248960 includes a headlamp 80 and a headlight function switching device 90. The headlamp 80 includes a light emitting member 81, a reflecting member 82 and a lens 83. The light emitting member 81 generates light beams. The reflecting member 82 and the lens 83 are respectively located at two opposite sides of the light emitting member 81. The headlight function switching device 90 is disposed between the light emitting member 81 and the lens 83, and includes a fixed plate 901, a solenoid valve 902 and a blocking board 903. The solenoid valve 902 is fixedly mounted to the fixed plate 901. The blocking board 903 is operable by the solenoid valve 902 to move relative to the light emitting member 81 in an up-down direction between an upper position and a lower position. When the blocking board 903 is at the upper position, the light beams generated by the light emitting member 81 are reflected by the reflecting member 82 and propagate in such a manner that some of the light beams are blocked by the blocking board 903 while the remaining light beams pass through the lens 83 to serve as low beam light rays (see Figure 8) which form a light distribution pattern that has a clear cut-off line. When the blocking board 903 is at the lower position, the light beams generated by the light emitting member 81 are reflected by the reflecting member 82 and pass through the lens 83 without being blocked by the blocking board 903, so as to serve as high beam light rays (see Figure 7).

[0003] By virtue of the solenoid valve 902 controlling the blocking board 903 to move between the upper position and the lower position, the conventional headlamp device is switchable between a low beam mode where the low beam light rays are generated and a high beam mode where the high beam light rays are generated. However, the solenoid valve 902 may be slow to react to user input and is prone to malfunction. Once the solenoid valve 902 has malfunctioned, the conventional headlamp device can no longer switch between the low beam mode and the high beam mode.

[0004] Furthermore, U.S. Patent Publication No. 17/016710 and Japanese Patent Publication No. 2017-016819 are considered to be the prior art that can be further improved as well.

[0005] Therefore, an object of the invention is to provide a headlamp device that can alleviate at least one of the drawbacks of the prior art.

[0006] According to the disclosure, the headlamp device includes a compound lens unit, a low-beam reflector, a high-beam reflector, a blocking board and a light emitting unit. The compound lens unit includes an upper lens and a lower lens assembly. The upper lens has a low-

beam optical axis, an upper light-incident surface, an upper light-emergent surface and an upper focal point. The upper light-incident surface and the upper light-emergent surface are respectively located at two opposite sides of the upper lens in a direction of the low-beam optical axis. The upper focal point is located at one side of the upper light-incident surface opposite to the upper light-emergent surface. The lower lens assembly is located below the upper lens, includes a plurality of lower lenses, and has a lower light-incident surface, a lower light-emergent surface and a lower focal point. The lower light-incident surface is cooperatively formed by the lower lenses, faces in a direction that is the same as that of the upper light-incident surface, and is offset from the upper light-incident surface. The lower light-emergent surface is cooperatively formed by the lower lenses, and is opposite to the lower light-incident surface in the direction of the low-beam optical axis. The lower focal point is located at one side of the lower light-incident surface opposite to the lower light-emergent surface. The low-beam reflector is located at one side of the upper focal point opposite to the upper light-incident surface, and has a low-beam reflecting surface that is arc-shaped and that has a first low-beam reflecting focal point and a second low-beam reflecting focal point. The first low-beam reflecting focal point and the second low-beam reflecting focal point are respectively distal from and proximate to the upper light-incident surface of the upper lens. The second low-beam reflecting focal point coincides with the upper focal point of the upper lens. The high-beam reflector is located at one side of the lower focal point opposite to the lower light-incident surface, and has a reflector axis and a high-beam reflecting surface. The high-beam reflecting surface is arc-shaped, and has a first high-beam reflecting focal point and a second high-beam reflecting focal point. The first high-beam reflecting focal point and the second high-beam reflecting focal point are respectively distal from and proximate to the lower light-incident surface of the lower lens assembly. The second high-beam reflecting focal point coincides with the lower focal point of the lower lens assembly. The first high-beam reflecting focal point and the second high-beam reflecting focal point are located on and cooperatively define the reflector axis. The blocking board has a top end at which the second low-beam focal point is located. The light emitting unit includes a first light source and a second light source. The first light source substantially coincides with the first low-beam reflecting focal point of the low-beam reflector. The second light source substantially coincides with the first high-beam reflecting focal point of the high-beam reflector. Each of the first light source and the second light source is operable to switch between an on-state in which light beams are generated, and an off-state in which light beams cease to be generated. When the first light source is in the on-state and when the second light source is in the off-state, the light beams generated by the first light source are reflected by the low-beam reflecting surface of the low-beam reflector such that some

of the light beams are blocked by the blocking board while the remaining light beams travel into the upper lens through the upper light-incident surface and exit the upper lens through the upper light-emergent surface to serve as low beam light rays. When the second light source is in the on-state, the light beams generated by the second light source are reflected by the high-beam reflecting surface of the high-beam reflector such that the light beams travel into the lower lens assembly through the lower light-incident surface and exit the lower lens assembly through the lower light-emergent surface to serve as high beam light rays.

[0007] Other features and advantages of the invention will become apparent in the following detailed description of the embodiment with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of an embodiment of a headlamp device according to the disclosure;

Figure 2 is a sectional view taken along line II - II in Figure 1;

Figure 3 is a sectional view taken along line III - III in Figure 2;

Figure 4 is a sectional view, similar to Figure 2, illustrating several representative light beams that are generated by the embodiment;

Figure 5 is a contour plot illustrating light distribution that is formed by low beam light rays generated by the embodiment;

Figure 6 is a contour plot illustrating light distribution that is formed by high beam light rays generated by the embodiment;

Figure 7 is a sectional view illustrating a conventional headlamp device when emitting high beam light rays; and

Figure 8 is another sectional view illustrating the conventional headlamp device when emitting low beam light rays.

[0008] Referring to Figures 1 to 4, an embodiment of a headlamp device according to the disclosure is adapted for a vehicle, and includes a compound lens unit 4, a base 2, a low-beam reflector 5, a high-beam reflector 6, a blocking board 7 and a light emitting unit 9.

[0009] The compound lens unit 4 includes an upper lens 41 and a lower lens assembly 42. The upper lens 41 has a low-beam optical axis (A), an upper light-incident surface 411, an upper light-emergent surface 412 and an upper focal point 413. The upper light-incident surface 411 and the upper light-emergent surface 412 are respectively located at two opposite sides of the upper lens 41 in a direction (X) of the low-beam optical axis (A). In this embodiment, the upper light-emergent surface 412 is in front of the upper light-incident surface 411 with "front" being the forward-facing side of the headlamp device. The upper focal point 413 is located at one side of the upper light-incident surface 411 opposite to the upper light-emergent surface 412.

[0010] The lower lens assembly 42 is located below the upper lens 41, includes a plurality of lower lenses 421, and has a lower light-incident surface 422, a lower light-emergent surface 423 and a lower focal point 424. In this embodiment, the lower lenses 421 and the upper lens 41 are formed as one-piece. The lower light-incident surface 422 is cooperatively formed by the lower lenses 421, faces in a direction that is the same as that of the upper light-incident surface 411 of the upper lens 41, and is offset from the upper light-incident surface 411 in the direction (X) of the low-beam optical axis (A) (i.e., the lower light-incident surface 422 is not flush with the upper light-incident surface 411). Specifically, the upper light-incident surface 411 is forwardly offset from the lower light-incident surface 422. The lower light-emergent surface 423 is cooperatively formed by the lower lenses 421, is opposite to the lower light-incident surface 422 in the direction (X) of the low-beam optical axis (A) of the upper lens 41, and has a first section 425 and two second sections 426 located below the low-beam optical axis (A). The second sections 426 are respectively located at two opposite sides of the first section 425 in a transverse direction (Y) transverse to the direction (X) of the low-beam optical axis (A) and are offset from the first section 425 in the direction (X) of the low-beam optical axis (A) (i.e., the lower light-emergent surface 423 is configured to not be a smooth surface). The lower focal point 424 is located at one side of the lower light-incident surface 422 opposite to the lower light-emergent surface 423. In this embodiment, the lower lens assembly 42 of the compound lens unit 4 includes four lower lenses 421. The first section 425 of the lower light-emergent surface 423 is formed by two of the lower lenses 421, and the second sections 426 of the lower light-emergent surface 423 are respectively formed by the other two of the lower lenses 421. In this embodiment, each of the upper lens 41 and the lower lenses 421 of the lower lens assembly 42 of the compound lens unit 4 is a plano-convex lens.

[0011] The base 2 is located rearwardly of the upper lens 41 and the lower lens assembly 42, and is where the low-beam reflector 5, the high-beam reflector 6, the blocking board 7 and the light-emitting unit 9 are disposed on.

[0012] The low-beam reflector 5 and the high-beam reflector 6 are respectively disposed at two opposite sides of the base 2. The low-beam reflector 5 is located at one side of the upper focal point 413 of the upper lens 41 opposite to the upper light-incident surface 411 of the upper lens 41, and has a low-beam reflecting surface 51 that is arc-shaped and that faces the upper light-incident surface 411. The low-beam reflecting surface 51 has a first low-beam reflecting focal point 511 and a second low-beam reflecting focal point 512. The first low-beam reflecting focal point 511 and the second low-beam reflecting focal point 512 are respectively distal from and proximate to the upper light-incident surface 411 of the upper lens 41. The second low-beam reflecting focal point 512 coincides with the upper focal point 413 of the

upper lens 41.

[0013] The high-beam reflector 6 is located at one side of the lower focal point 424 of the lower lens assembly 42 opposite to the lower light-incident surface 422 of the lower lens assembly 42, and has a reflector axis (B) and a high-beam reflecting surface 61. The high-beam reflecting surface 61 is arc-shaped, faces the lower light-incident surface 422, and has a first high-beam reflecting focal point 611 and a second high-beam reflecting focal point 612. The first high-beam reflecting focal point 611 and the second high-beam reflecting focal point 612 are respectively distal from and proximate to the lower light-incident surface 422 of the lower lens assembly 42. The second high-beam reflecting focal point 612 coincides with the lower focal point 424 of the lower lens assembly 42. The first high-beam reflecting focal point 611 and the second high-beam reflecting focal point 612 are located on and cooperatively define the reflector axis (B). In this embodiment, the low-beam optical axis (A) of the upper lens 41 and the reflector axis (B) of the high-beam reflector 6 intersect, and cooperatively form an angle (θ) of intersection. In this embodiment, the angle (θ) of intersection of the low-beam optical axis (A) and the reflector axis (B) is greater than 0 degree, but is not greater than 60 degrees.

[0014] The blocking board 7 has a top end at which the second low-beam focal point 512 is located.

[0015] The light emitting unit 9 includes a first light source 91 and a second light source 92. The first light source 91 substantially coincides with the first low-beam reflecting focal point 511 of the low-beam reflector 5. The second light source 92 substantially coincides with the first high-beam reflecting focal point 611 of the high-beam reflector 6. Each of the first light source 91 and the second light source 92 is operable to switch between an on-state in which light beams are generated, and an off-state in which light beams cease to be generated. Each of the first light source 91 and the second light source 92 is a light-emitting diode made of at least one semiconductor die.

[0016] Referring further to Figure 5, when the first light source 91 is in the on-state and when the second light source 92 is in the off-state, the light beams generated by the first light source 91 are reflected by the low-beam reflecting surface 51 of the low-beam reflector 5 such that some of the light beams are blocked by the blocking board 7 (i.e., some of the reflected light beams that do not perfectly pass through the second low-beam reflecting focal point 512 of the low-beam reflecting surface 51 are blocked by the blocking board 7) while the remaining light beams travel into the upper lens 41 through the upper light-incident surface 411 and exit the upper lens 41 through the upper light-emergent surface 412 to serve as low beam light rays. By virtue of the blocking board 7 blocking some of the light beams, light distribution pattern formed by the low beam light rays has a clear cut-off line as shown in Figure 5.

[0017] Referring further to Figure 6, when the second

light source 92 is in the on-state, the light beams generated by the second light source 92 are reflected by the high-beam reflecting surface 61 of the high-beam reflector 6 such that the light beams travel into the lower lens assembly 42 through the lower light-incident surface 422 and exit the lower lens assembly 42 through the lower light-emergent surface 423 to serve as high beam light rays. Light distribution pattern formed by the high beam light rays is shown in Figure 6.

[0018] It is noted that, by virtue of the upper light-incident surface 411 of the upper lens 41 being forwardly offset from the lower light-incident surface 422 of the lower lens assembly 42, the compound lens unit 4 may provide relatively good stray-light rejection when the low beam light rays are generated. That is to say, when the first light source 91 is in the on-state and when the second light source 92 is in the off-state, the light beams generated by the first light source 91 but traveling in undesirable paths (namely, stray light) may be prevented from exiting the lower lens assembly 42 through the lower light-emergent surface 423. Therefore, stray light will not substantially affect the light distribution pattern formed by the low beam light rays. In this embodiment, a distance between the upper light-incident surface 411 of the upper lens 41 and the lower light-incident surface 422 of the lower lens assembly 42 in the direction (X) of the low-beam optical axis (A) ranges from 1 to 30 millimeters.

[0019] Since each individual one of the lower lenses 421 of the lower lens assembly 42 constitutes only one of the first section 425 and the second sections 426, curvature of each of the first section 425 and the second sections 426 is individually adjustable by adjusting the curvature of the corresponding lower lens(es) 421. In addition, the high-beam reflector 6 may prevent the light beams generated by the second light source 92 from dispersing. Therefore, by virtue of the high-beam reflector 6, and by virtue of the curvature of each of the first section 425 and the second sections 426 being individually adjustable, the lower lens assembly 42 may achieve a better effect of focusing light so that the light beams exiting the lower lens assembly 42 through the lower light-emergent surface 423 may be adjusted to serve as the high beam light rays even when only the second light source 92 is in the on-state (i.e., for the high beam light rays to be generated, it is not necessary for the first light source 91 and the second light source 92 to simultaneously be in the on-state to create overlapping light beams or patterns). Consequently, the embodiment may be relatively energy-saving.

[0020] Referring back to Figures 1 to 4, the embodiment further includes a heat dissipating member 8 and a fixing frame 3. The heat dissipating member 8 is disposed on the base 2 and serves the purpose of heat dissipation. The fixing frame 3 is disposed in front of the base 2, connects the base 2 to the compound lens unit 4, and has the compound lens unit 4 disposed thereon. In this embodiment, the upper lens 41 and the lower lens assembly 42 of the compound lens unit 4 are held fixedly

by the fixing frame 3.

[0021] In summary, by virtue of each of the first light source 91 and the second light source 92 being operable to switch between the on-state and the off-state, the embodiment of the headlamp device is capable of emitting low beam light rays and high beam light rays and is switchable between the low-beam mode and the high-beam mode without a solenoid valve. Therefore, the headlamp device according to the disclosure may react relatively quickly when operated and may have a relatively long service life so reliability of the headlamp device is improved. Consequently, the drawbacks of the prior art have been alleviated and the purpose of the invention can certainly be fulfilled.

[0022] In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiment. It will be apparent, however, to one skilled in the art, that one or more other embodiments may be practiced without some of these specific details. It should also be appreciated that reference throughout this specification to "one embodiment," "an embodiment," an embodiment with an indication of an ordinal number and so forth means that a particular feature, structure, or characteristic may be included in the practice of the disclosure. It should be further appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects, and that one or more features or specific details from one embodiment may be practiced together with one or more features or specific details from another embodiment, where appropriate. However, in any case the scope of the invention is defined by the appended claims.

Claims

1. A headlamp device adapted for a vehicle, said headlamp device comprising:

a compound lens unit (4) including

an upper lens (41) that has

a low-beam optical axis (A),
an upper light-incident surface (411),
an upper light-emergent surface (412),
and
an upper focal point (413), said upper light-incident surface (411) and said upper light-emergent surface (412) being respectively located at two opposite sides of said upper lens (41) in a direction (X) of the low-beam optical axis (A), said upper focal point (413) being located at one side of said upper light-

incident surface (411) opposite to said upper light-emergent surface (412), and

a lower lens assembly (42) that is located below said upper lens (41), that includes a plurality of lower lenses (421), and that has

a lower light-incident surface (422) cooperatively formed by said lower lenses (421), facing in a direction that is the same as that of said upper light-incident surface (411), and offset from said upper light-incident surface (411),

a lower light-emergent surface (423) cooperatively formed by said lower lenses (421), and opposite to said lower light-incident surface (422) in the direction (X) of the low-beam optical axis (A), and

a lower focal point (424) located at one side of said lower light-incident surface (422) opposite to said lower light-emergent surface (423);

a low-beam reflector (5) located at one side of said upper focal point (413) opposite to said upper light-incident surface (411), and having a low-beam reflecting surface (51) that is arc-shaped and that has

a first low-beam reflecting focal point (511) and a second low-beam reflecting focal point (512) respectively distal from and proximate to said upper light-incident surface (411) of said upper lens (41), said second low-beam reflecting focal point (512) coinciding with said upper focal point (413) of said upper lens (41);

a high-beam reflector (6) located at one side of said lower focal point (424) opposite to said lower light-incident surface (422), and having

a reflector axis (B), and

a high-beam reflecting surface (61) that is arc-shaped and that has

a first high-beam reflecting focal point (611) and a second high-beam reflecting focal point (612) respectively distal from and proximate to said lower light-incident surface (422) of said lower lens assembly (42), said second high-beam reflecting focal point (612) coinciding with said lower focal point (424) of said lower lens assembly (42), said first high-beam reflecting focal point (611) and said second high-beam reflecting focal point (612) being located on and cooperatively defining said reflector axis (B);
a blocking board (7) having a top end at which said second low-beam focal point

- (512) is located; and
- a light emitting unit (9);
said headlamp device being **characterized in that:**
said light emitting unit (9) including
- a first light source (91) that substantially coincides with said first low-beam reflecting focal point (511) of said low-beam reflector (5), and
a second light source (92) that substantially coincides with said first high-beam reflecting focal point (611) of said high-beam reflector (6), each of said first light source (91) and said second light source (92) being operable to switch between an on-state in which light beams are generated, and an off-state in which light beams cease to be generated;
- wherein, when said first light source (91) is in the on-state and when said second light source (92) is in the off-state, the light beams generated by said first light source (91) are reflected by said low-beam reflecting surface (51) of said low-beam reflector (5) such that some of the light beams are blocked by said blocking board (7) while the remaining light beams travel into said upper lens (41) through said upper light-incident surface (411) and exit said upper lens (41) through said upper light-emergent surface (412) to serve as low beam light rays; and
when said second light source (92) is in the on-state, the light beams generated by said second light source (92) are reflected by said high-beam reflecting surface (61) of said high-beam reflector (6) such that the light beams travel into said lower lens assembly (42) through said lower light-incident surface (422) and exit said lower lens assembly (42) through said lower light-emergent surface (423) to serve as high beam light rays.
2. The headlamp device as claimed in claim 1, **characterized in that** the low-beam optical axis (A) of said upper lens (41) and the reflector axis (B) of said high-beam reflector (6) intersect, and cooperatively form an angle (θ) of intersection.
 3. The headlamp device as claimed in claim 2, **characterized in that** said angle (θ) of intersection of the low-beam optical axis (A) and the reflector axis (B) is greater than 0 degree, and is less than or equal to 60 degrees.
 4. The headlamp device as claimed in claim 1, **characterized in that:**

- said upper light-emergent surface (412) is in front of said upper light-incident surface (411) of said upper lens (41) of said compound lens unit (4); and
said upper light-incident surface (411) of said upper lens (41) of said compound lens unit (4) is forwardly offset from said lower light-incident surface (422).
5. The headlamp device as claimed in claim 4, **characterized in that** a distance between said upper light-incident surface (411) of said upper lens (41) and said lower light-incident surface (422) of said lower lens assembly (42) in the direction (X) of the low-beam optical axis (A) ranges from 1 to 30 millimeters.
 6. The headlamp device as claimed in claim 1, **characterized in that** said lower light-emergent surface (423) has
a first section (425), and
two second sections (426) respectively located at two opposite sides of said first section (425) in a transverse direction (Y) transverse to the direction (X) of the low-beam optical axis (A), said second sections (426) being offset from said first section (425).
 7. The headlamp device as claimed in claim 6, **characterized in that:**
said lower lens assembly (42) of said compound lens unit (4) includes four of said lower lenses (421); and
said first section (425) of said lower light-emergent surface (423) of said lower lens assembly (42) is formed by two of said lower lenses (421), and said second sections (426) of said lower light-emergent surface (423) are respectively formed by the other two of said lower lenses (421).
 8. The headlamp device as claimed in claim 1, **characterized in that** said upper lens (41) and said lower lenses (421) are formed as one-piece.
 9. The headlamp device as claimed in claim 1, **characterized in that** each of said first light source (91) and said second light source (92) of said light emitting unit (9) is a light-emitting diode made of at least one semiconductor die.
 10. The headlamp device as claimed in claim 1, further **characterized by** a base (2) on which said low-beam reflector (5), said high-beam reflector (6), said blocking board (7) and said light-emitting unit (9) are disposed.

Patentansprüche

1. Für ein Fahrzeug angepasste Scheinwerfervorrichtung, wobei die Scheinwerfervorrichtung umfasst:

eine Verbundlinseneinheit (4) einschließlich
eine obere Linse (41), mit
einer optischen Abblendlichtachse (A),
einer oberen Lichteinfallfläche (411),
einer oberen Lichtausfallfläche (412), und
einem oberen Brennpunkt (413), wobei die obere
Lichteinfallfläche (411) und die obere Lichtausfallfläche (412) jeweils an zwei gegenüberliegenden Seiten der oberen Linse (41) in einer Richtung (X) der optischen Abblendlichtachse (A) angeordnet sind, wobei sich der obere Brennpunkt (413) an einer Seite der oberen Lichteinfallfläche (411) gegenüber der oberen Lichtausfallfläche (412) befindet, und
eine untere Linsenanordnung (42), die unterhalb der oberen Linse (41) angeordnet ist, die mehrere untere Linsen (421) aufweist, mit

einer unteren Lichteinfallfläche (422), die durch die unteren Linsen (421) gemeinsam gebildet wird, die in eine Richtung weist, die die gleiche ist wie die der oberen Lichteinfallfläche (411), und die von der oberen Lichteinfallfläche (411) versetzt ist,
einer unteren Lichtausfallfläche (423), die durch die unteren Linsen (421) gemeinsam gebildet wird und der unteren Lichteinfallfläche (422) in der Richtung (X) der optischen Abblendlichtachse (A) gegenüberliegt, und
einem unteren Brennpunkt (424), der sich auf einer Seite der unteren Lichteinfallfläche (422) gegenüber der unteren Lichtausfallfläche (423) befindet;

einem Abblendlichtreflektor (5), der sich an einer Seite des oberen Brennpunkts (413) gegenüber der oberen Lichteinfallfläche (411) befindet und eine bogenförmige abblendlichtreflektierende Oberfläche (51) aufweist, mit
einem ersten abblendlichtreflektierenden Brennpunkt (511) und einem zweiten abblendlichtreflektierenden Brennpunkt (512), die jeweils distal von und in der Nähe der oberen Lichteinfallfläche (411) der oberen Linse (41) liegen, wobei der zweite abblendlichtreflektierende Brennpunkt (512) mit dem oberen Brennpunkt (413) der oberen Linse (41) zusammenfällt;
einem Fernlichtreflektor (6), der sich auf einer Seite des unteren Brennpunkts (424) gegenüber der unteren Lichteinfallfläche (422) befindet, mit

einer Reflektorachse (B) und
einer fernlichtreflektierenden Oberfläche (61), die bogenförmig ist und
einen ersten fernlichtreflektierenden Brennpunkt (611) und einen zweiten fernlichtreflektierenden Brennpunkt (612) aufweist, die jeweils distal von und in der Nähe der unteren Lichteinfallfläche (422) der unteren Linsenanordnung (42) liegen, wobei der zweite fernlichtreflektierende Brennpunkt (612) mit dem unteren Brennpunkt (424) der unteren Linsenanordnung (42) zusammenfällt, wobei sich der erste fernlichtreflektierende Brennpunkt (611) und der zweite fernlichtreflektierende Brennpunkt (612) auf der Reflektorachse (B) befinden und diese gemeinsam definieren;
eine Sperrplatte (7) mit einem oberen Ende, an dem sich der zweite Abblendlichtbrennpunkt (512) befindet; und

eine lichtemittierende Einheit (9);
die Scheinwerfervorrichtung **dadurch gekennzeichnet ist, dass:**
die lichtemittierende Einheit (9) mit

einer ersten Lichtquelle (91), die im Wesentlichen mit dem ersten abblendlichtreflektierenden Brennpunkt (511) des Abblendlichtreflektors (5) übereinstimmt, und
einer zweiten Lichtquelle (92), die im Wesentlichen mit dem ersten fernlichtreflektierenden Brennpunkt (611) des Fernlichtreflektors (6) übereinstimmt, wobei sowohl die erste Lichtquelle (91) als auch die zweite Lichtquelle (92) so betrieben werden können, dass sie zwischen einem Ein-Zustand, in dem Lichtstrahlen erzeugt werden, und einem Aus-Zustand, in dem keine Lichtstrahlen mehr erzeugt werden, umschalten;

wobei, wenn die erste Lichtquelle (91) im Ein-Zustand ist und wenn die zweite Lichtquelle (92) im Aus-Zustand ist, die von der ersten Lichtquelle (91) erzeugten Lichtstrahlen von der abblendlichtreflektierenden Oberfläche (51) des Abblendlichtreflektors (5) reflektiert werden, so dass einige der Lichtstrahlen von der Sperrplatte (7) blockiert werden, während die verbleibenden Lichtstrahlen durch die obere Lichteinfallfläche (411) in die obere Linse (41) eintreten und durch die obere Lichtausfallfläche (412) aus der oberen Linse (41) austreten, um als Abblendlichtstrahlen zu dienen; und
wenn sich die zweite Lichtquelle (92) im Ein-Zustand befindet, die von der zweiten Lichtquelle (92) erzeugten Lichtstrahlen von der fernlichtreflektierenden Oberfläche (61) des Fernlichtre-

- flektors (6) reflektiert werden, so dass die Lichtstrahlen durch die untere Linsenordnung (42) durch die untere Lichteinfallfläche (422) eintreten und die untere Linsenordnung (42) durch die untere Lichtausfallsfläche (423) verlassen, um als Fernlicht-Lichtstrahlen zu dienen.
2. Scheinwerfervorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die optische Abblendlichtachse (A) der oberen Linse (41) und die Reflektorachse (B) des Fernlichtreflektors (6) sich schneiden und gemeinsam einen Schnittwinkel (θ) bilden.
 3. Scheinwerfervorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** der Schnittwinkel (θ) der optischen Abblendlichtachse (A) und der Reflektorachse (B) größer als 0 Grad und kleiner oder gleich 60 Grad ist.
 4. Scheinwerfervorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass:**

die obere Lichtausfallsfläche (412) vor der oberen Lichteinfallfläche (411) der oberen Linse (41) der Verbundlinseneinheit (4) liegt; und

die obere Lichteinfallfläche (411) der oberen Linse (41) der Verbundlinseneinheit (4) gegenüber der unteren Lichteinfallfläche (422) nach vorne versetzt ist.
 5. Scheinwerfervorrichtung nach Anspruch 4, **dadurch gekennzeichnet, dass** ein Abstand zwischen der oberen Lichteinfallfläche (411) der oberen Linse (41) und der unteren Lichteinfallfläche (422) der unteren Linsenordnung (42) in Richtung (X) der optischen Abblendlichtachse (A) im Bereich von 1 bis 30 Millimetern liegt.
 6. Scheinwerfervorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die untere Lichtausfallsfläche (423)

einen ersten Abschnitt (425), und

zwei zweite Abschnitte (426) aufweist, die jeweils an zwei gegenüberliegenden Seiten des ersten Abschnitts (425) in einer Querrichtung (Y) quer zur Richtung (X) der optischen Abblendlichtachse (A) angeordnet sind, wobei die zweiten Abschnitte (426) gegenüber dem ersten Abschnitt (425) versetzt sind.
 7. Scheinwerfervorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass:**

die untere Linsenordnung (42) der Verbundlinseneinheit (4) vier der unteren Linsen (421) einschließt; und

der erste Abschnitt (425) der unteren Lichtausfallsfläche (423) der unteren Linsenordnung (42) durch zwei der unteren Linsen (421) gebildet wird,

und die zweiten Abschnitte (426) der unteren Lichtausfallsfläche (423) jeweils durch die anderen zwei der unteren Linsen (421) gebildet werden.
 8. Scheinwerfervorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die obere Linse (41) und die unteren Linsen (421) einteilig ausgebildet sind.
 9. Scheinwerfervorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Lichtquelle (91) und die zweite Lichtquelle (92) der lichtemittierenden Einheit (9) jeweils eine lichtemittierende Diode ist, die aus wenigstens einem Halbleiterchip besteht.
 10. Scheinwerfervorrichtung nach Anspruch 1, ferner **gekennzeichnet durch** einen Sockel (2), auf dem der Abblendlichtreflektor (5), der Fernlichtreflektor (6), die Sperrplatte (7) und die lichtemittierende Einheit (9) angeordnet sind.

Revendications

1. Dispositif de phare prévu pour un véhicule, ledit dispositif de phare comprenant :

une unité de lentille composée (4) comprenant une lentille supérieure (41) qui a un axe optique de feu de croisement (A), une surface supérieure de lumière incidente (411), une surface supérieure de lumière émergente (412), et un point focal supérieur (413), ladite surface supérieure de lumière incidente (411) et ladite surface supérieure de lumière émergente (412) étant situées de manière respective aux deux côtés opposés de ladite lentille supérieure (41) dans une direction (X) de l'axe optique de feu de croisement (A), ledit point focal supérieur (413) étant situé sur un côté de ladite surface supérieure de lumière incidente (411) à l'opposé de ladite surface supérieure de lumière émergente (412), et un ensemble de lentille inférieur (42) qui se trouve au-dessous de ladite lentille supérieure (41), qui comprend une pluralité de lentilles inférieures (421), et qui a une surface inférieure de lumière incidente (422) formée de manière coopérative par lesdites lentilles inférieures (421), faisant face dans une direction qui est la même que celle de ladite surface supérieure de lumière incidente (411), et décalée par rapport à ladite surface supérieure de lumière incidente (411), une surface inférieure de lumière émergente (423) formée de manière coopérative par lesdites lentilles inférieures (421), et à l'opposé de

ladite surface inférieure de lumière incidente (422) dans la direction (X) de l'axe optique de feu de croisement (A), et
 un point focal inférieur (424) situé sur un côté de ladite surface inférieure de lumière incidente (422) à l'opposé de ladite surface inférieure de lumière émergente (423) ;
 un réflecteur de feu de croisement (5) situé sur un côté dudit point focal supérieur (413) à l'opposé de ladite surface supérieure de lumière incidente (411), et ayant une surface réfléchissante de feu de croisement (51) qui est en forme d'arc et qui a
 un premier point focal de réflexion de feu de croisement (511) et un deuxième point focal de réflexion de feu de croisement (512) respectivement à distance et à proximité de ladite surface supérieure de lumière incidente (411) de ladite lentille supérieure (41), ledit deuxième point focal de réflexion de feu de croisement (512) coïncidant avec ledit point focal supérieur (413) de ladite lentille supérieure (41) ;
 un réflecteur de feu de route (6) situé sur un côté dudit point focal inférieur (424) à l'opposé de ladite surface inférieure de lumière incidente (422), et ayant
 un axe de réflecteur (B), et
 une surface réfléchissante de feu de route (61) qui est en forme d'arc et qui a
 un premier point focal de réflexion de feu de route (611) et un deuxième point focal de réflexion de feu de route (612) respectivement à distance et à proximité de ladite surface inférieure de lumière incidente (422) dudit ensemble de lentille inférieur (42), ledit deuxième point focal de réflexion de feu de route (612) coïncidant avec ledit point focal inférieur (424) dudit ensemble de lentille inférieur (42), ledit premier point focal de réflexion de feu de route (611) et ledit deuxième point focal de réflexion de feu de route (612) se trouvant sur et définissant de manière coopérative ledit axe de réflecteur (B) ;
 une plaque de blocage (7) ayant une extrémité supérieure au niveau de laquelle se trouve ledit deuxième point focal de feu de croisement (512) ; et
 une unité d'émission de lumière (9) ;
 ledit dispositif de phare étant **caractérisé en ce que** :

ladite unité d'émission de lumière (9) comprend
 une première source de lumière (91) qui coïncide sensiblement avec ledit premier point focal de réflexion de feu de croisement (511) dudit réflecteur de feu de croisement (5), et
 une deuxième source de lumière (92) qui

coïncide sensiblement avec ledit premier point focal de réflexion de feu de route (611) dudit réflecteur de feu de route (6), chacune de ladite première source de lumière (91) et de ladite deuxième source de lumière (92) pouvant fonctionner pour commuter entre un état allumé dans lequel des faisceaux de lumière sont générés, et un état éteint dans lequel des faisceaux de lumière cessent d'être générés ;
 les faisceaux de lumière générés par ladite première source de lumière (91) étant réfléchis par ladite surface réfléchissante de feu de croisement (51) dudit réflecteur de feu de croisement (5) de telle sorte que certains des faisceaux de lumière sont bloqués par ladite plaque de blocage (7) tandis que les faisceaux de lumière restants se déplacent dans ladite lentille supérieure (41) à travers ladite surface supérieure de lumière incidente (411) et sortent de ladite lentille supérieure (41) à travers ladite surface supérieure de lumière émergente (412) pour servir de rayons de lumière de feu de croisement, quand ladite première source de lumière (91) est dans l'état allumé et quand ladite deuxième source de lumière (92) est dans l'état éteint ; et
 les faisceaux de lumière générés par ladite deuxième source de lumière (92) étant réfléchis par ladite surface réfléchissante de feu de route (61) dudit réflecteur de feu de route (6) de telle sorte que les faisceaux de lumière se déplacent dans ledit ensemble de lentille inférieur (42) à travers ladite surface inférieure de lumière incidente (422) et sortent dudit ensemble de lentille inférieur (42) à travers ladite surface inférieure de lumière émergente (423) pour servir de rayons de lumière de feu de route, quand ladite deuxième source de lumière (92) est dans l'état allumé.

2. Dispositif de phare selon la revendication 1, **caractérisé en ce que** l'axe optique de feu de croisement (A) de ladite lentille supérieure (41) et l'axe de réflecteur (B) dudit réflecteur de feu de route (6) se coupent, et forment de manière coopérative un angle (Θ) d'intersection.
3. Dispositif de phare selon la revendication 2, **caractérisé en ce que** ledit angle (Θ) d'intersection de l'axe optique de feu de croisement (A) et de l'axe de réflecteur (B) est supérieur à 0 degré, et est inférieur ou égal à 60 degrés.
4. Dispositif de phare selon la revendication 1, **caractérisé en ce que** :

ladite surface supérieure de lumière émergente (412) est devant ladite surface supérieure de lumière incidente (411) de ladite lentille supérieure (41) de ladite unité de lentille composée (4) ; et

ladite surface supérieure de lumière incidente (411) de ladite lentille supérieure (41) de ladite unité de lentille composée (4) est décalée vers l'avant par rapport à ladite surface inférieure de lumière incidente (422).

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5. Dispositif de phare selon la revendication 4, **caractérisé en ce qu'**une distance entre ladite surface supérieure de lumière incidente (411) de ladite lentille supérieure (41) et ladite surface inférieure de lumière incidente (422) dudit ensemble de lentille inférieur (42) dans la direction (X) de l'axe optique de feu de croisement (A) s'étend de 1 à 30 millimètres.

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6. Dispositif de phare selon la revendication 1, **caractérisé en ce que** ladite surface inférieure de lumière émergente (423) a

une première section (425), et
deux deuxième sections (426) respectivement situées aux deux côtés opposés de ladite première section (425) dans une direction transversale (Y) transversale à la direction (X) de l'axe optique de feu de croisement (A), lesdites deuxième sections (426) étant décalées par rapport à ladite première section (425).

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7. Dispositif de phare selon la revendication 6, **caractérisé en ce que** :

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ledit ensemble de lentille inférieur (42) de ladite unité de lentille composée (4) comprend quatre desdites lentilles inférieures (421) ; et
ladite première section (425) de ladite surface inférieure de lumière émergente (423) dudit ensemble de lentille inférieur (42) est formée par deux desdites lentilles inférieures (421), et lesdites deuxième sections (426) de ladite surface inférieure de lumière émergente (423) sont formées de manière respective par les deux autres lentilles desdites lentilles inférieures (421).

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8. Dispositif de phare selon la revendication 1, **caractérisé en ce que** ladite lentille supérieure (41) et lesdites lentilles inférieures (421) sont formées comme une seule pièce.

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9. Dispositif de phare selon la revendication 1, **caractérisé en ce que** chacune de ladite première source de lumière (91) et de ladite deuxième source de lumière (92) de ladite unité d'émission de lumière (9) est une diode électroluminescente composée d'au

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moins une plaquette de semi-conducteur.

10. Dispositif de phare selon la revendication 1, **caractérisé en outre par** une base (2) sur laquelle ledit réflecteur de feu de croisement (5), ledit réflecteur de feu de route (6), ladite plaque de blocage (7) et ladite unité d'émission de lumière (9) sont disposés.

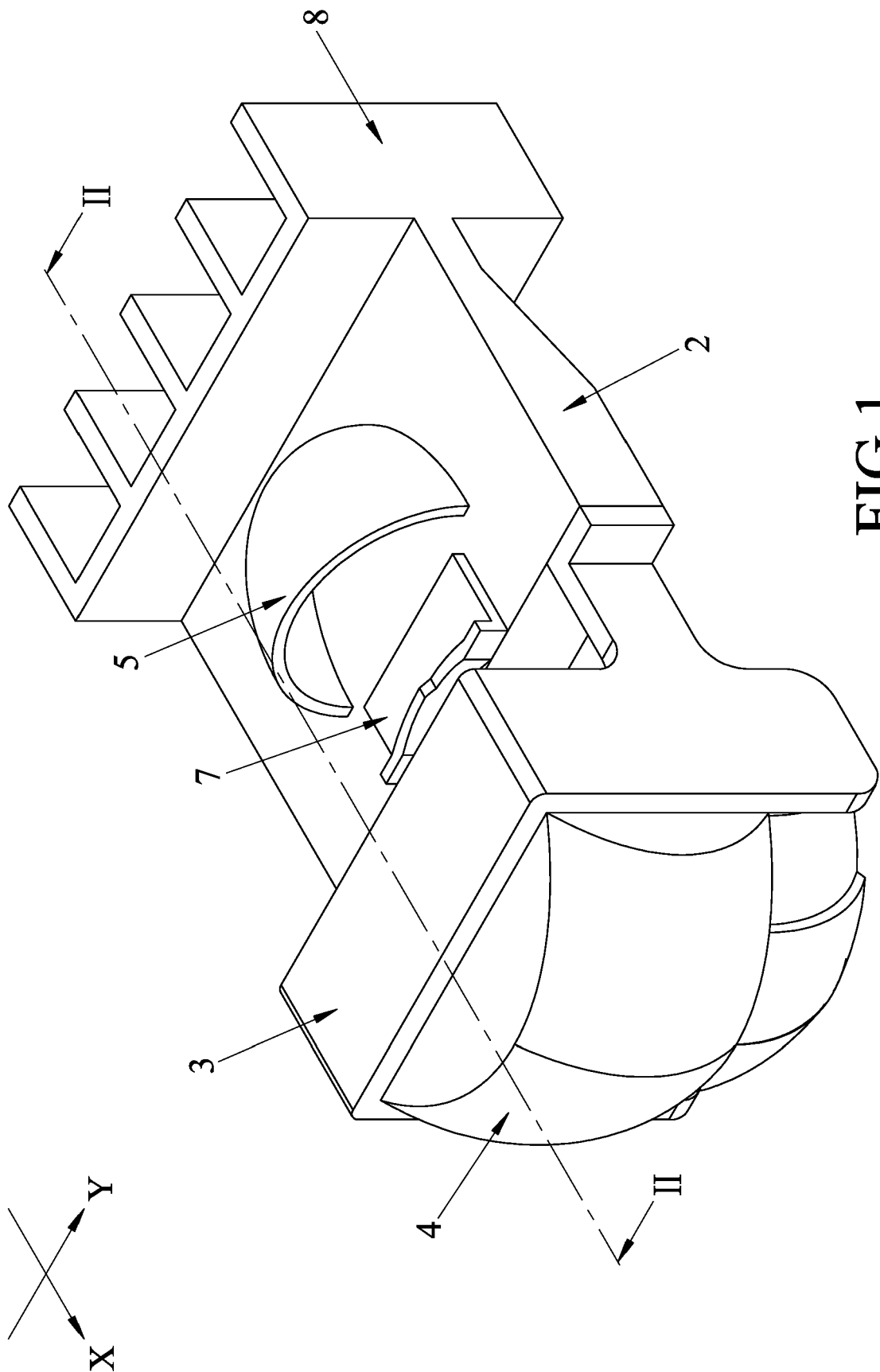


FIG. 1

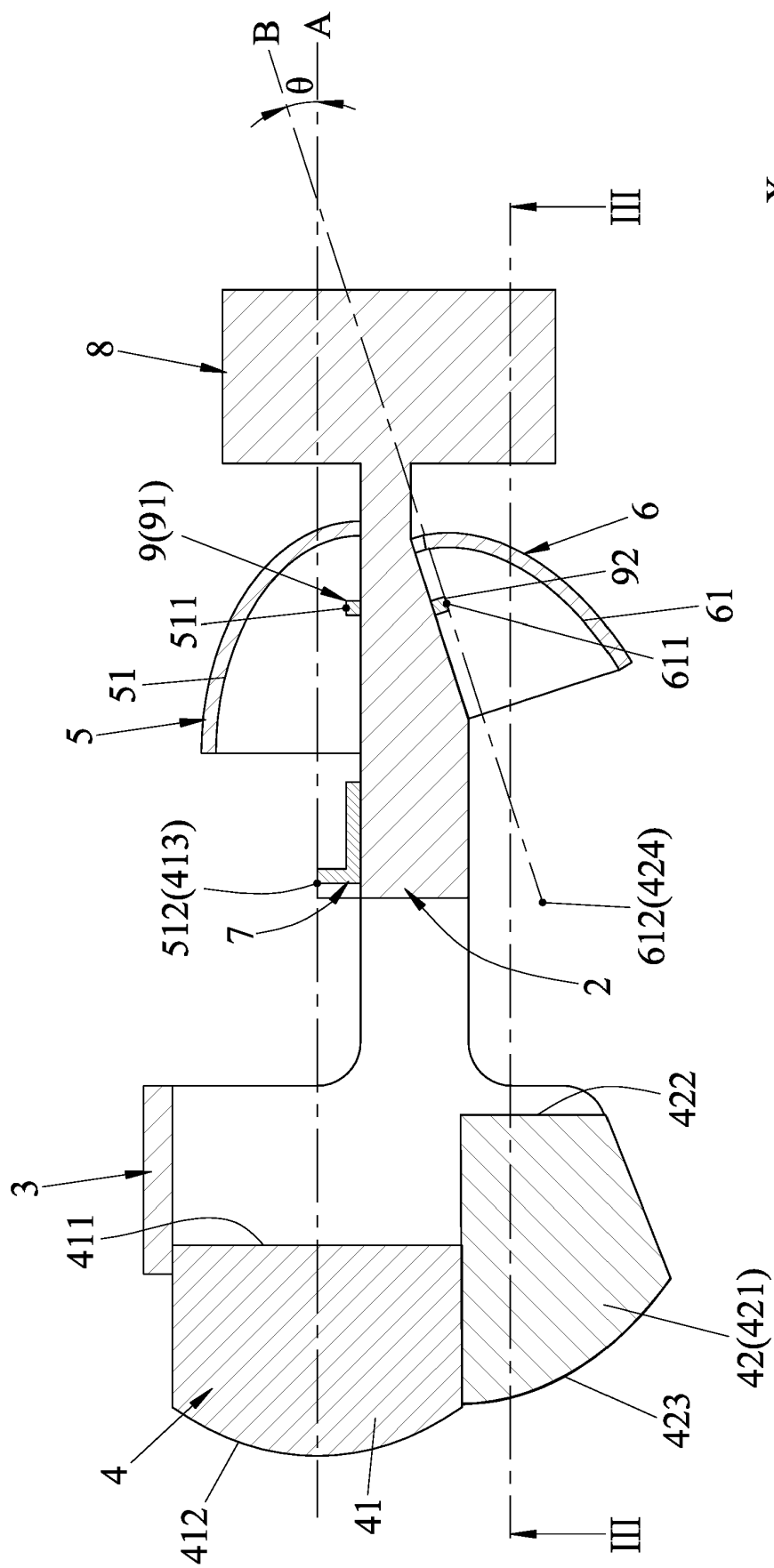


FIG. 2

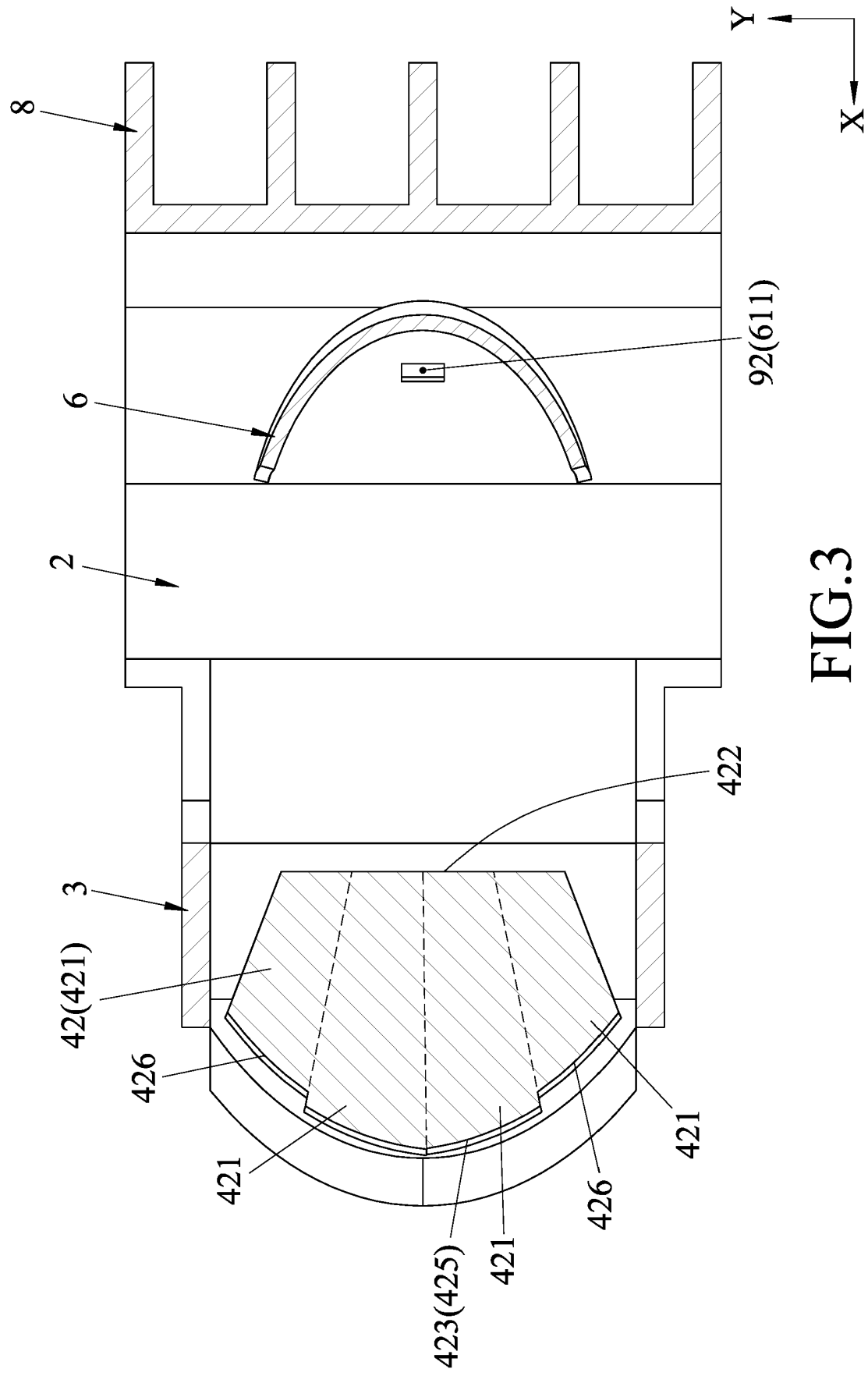


FIG.3

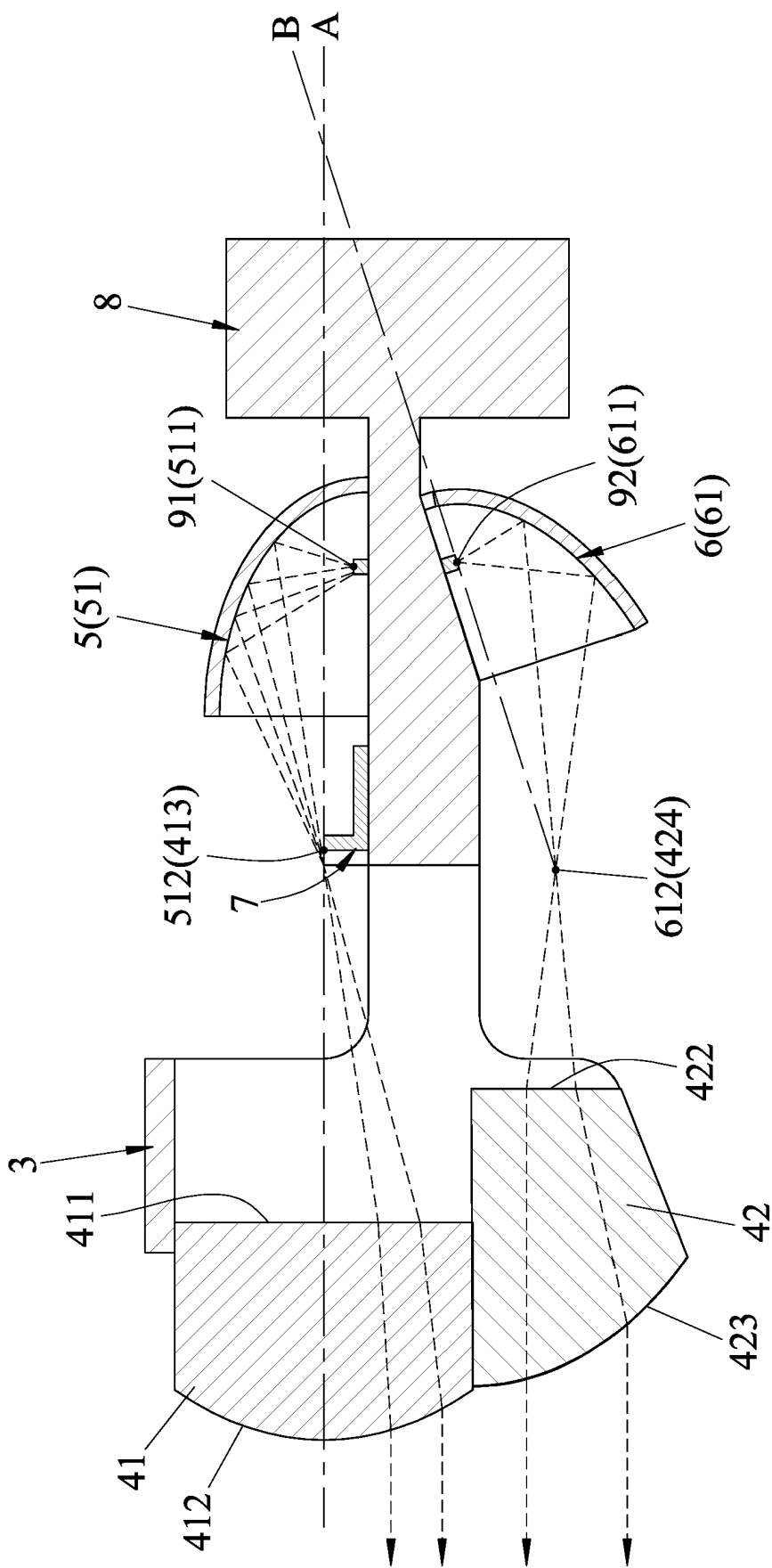


FIG.4

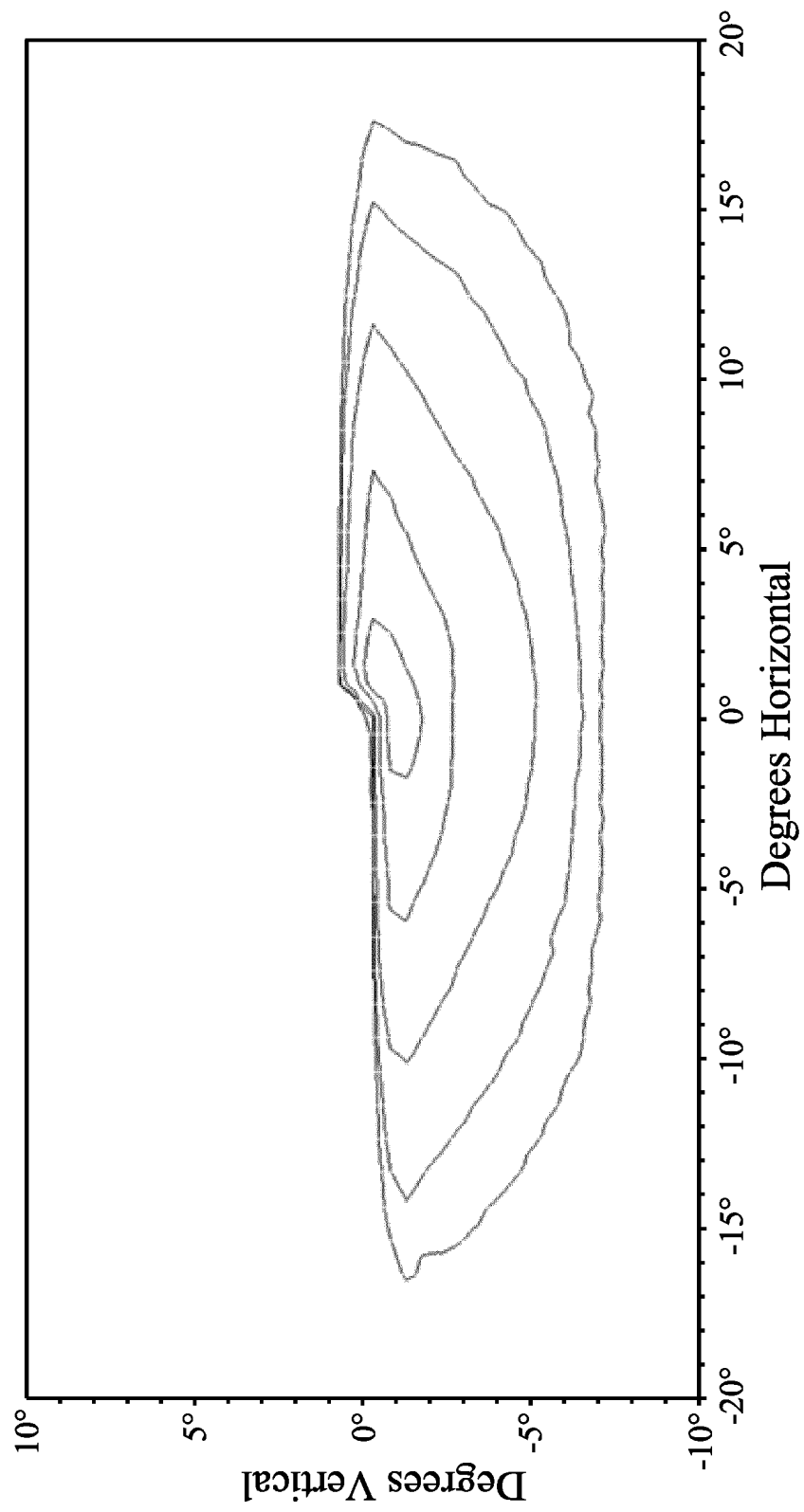


FIG.5

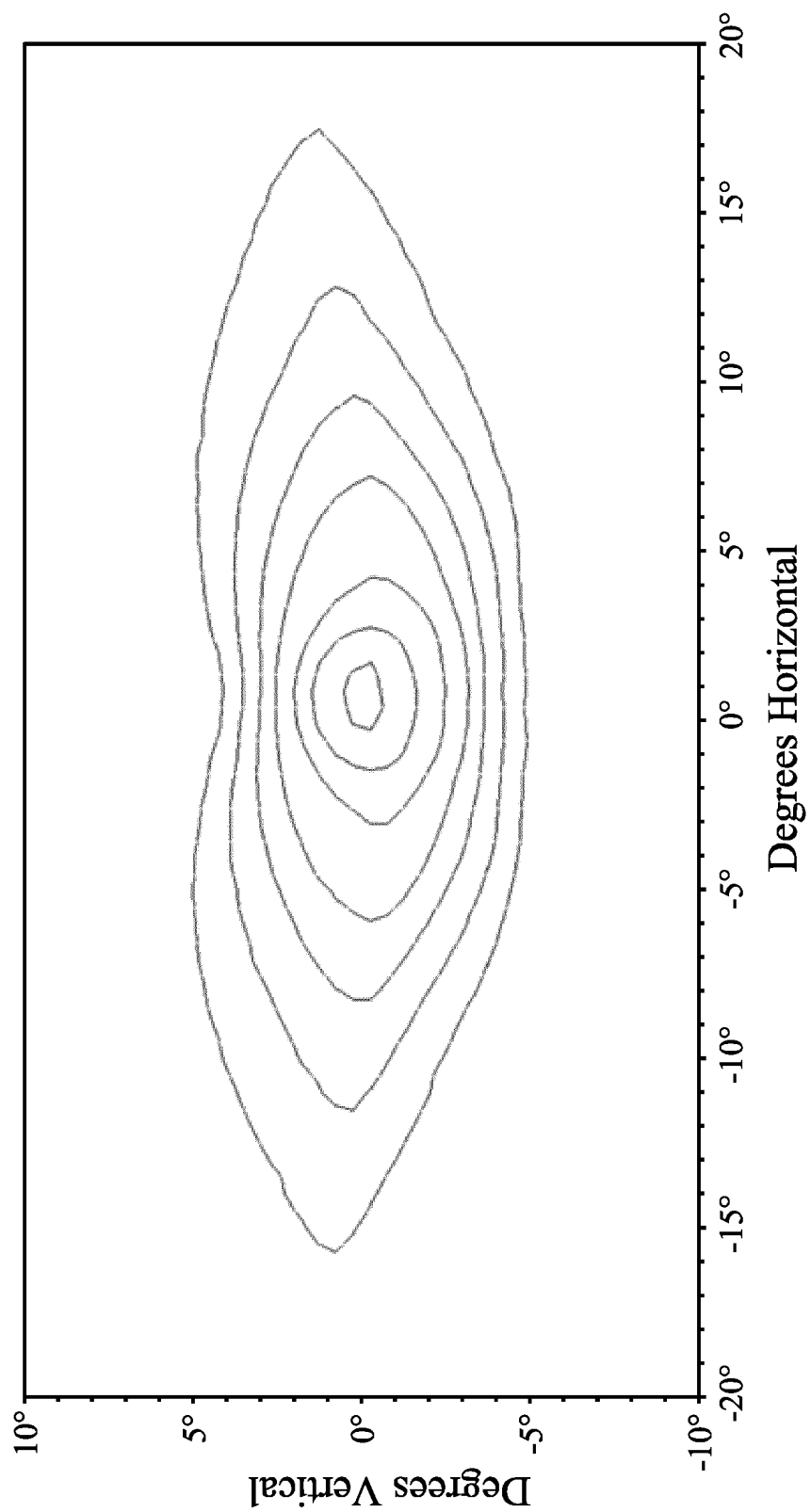


FIG.6

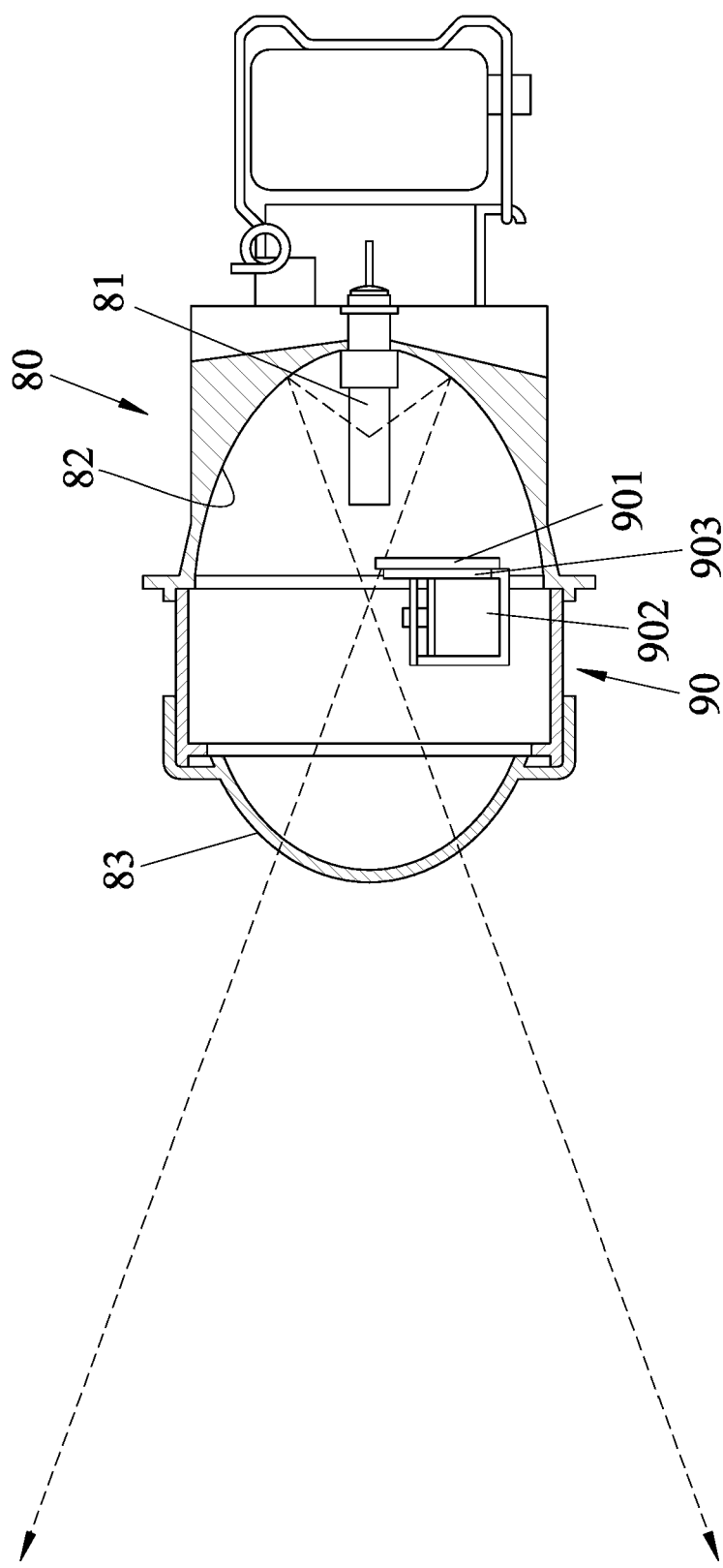


FIG.7
PRIOR ART

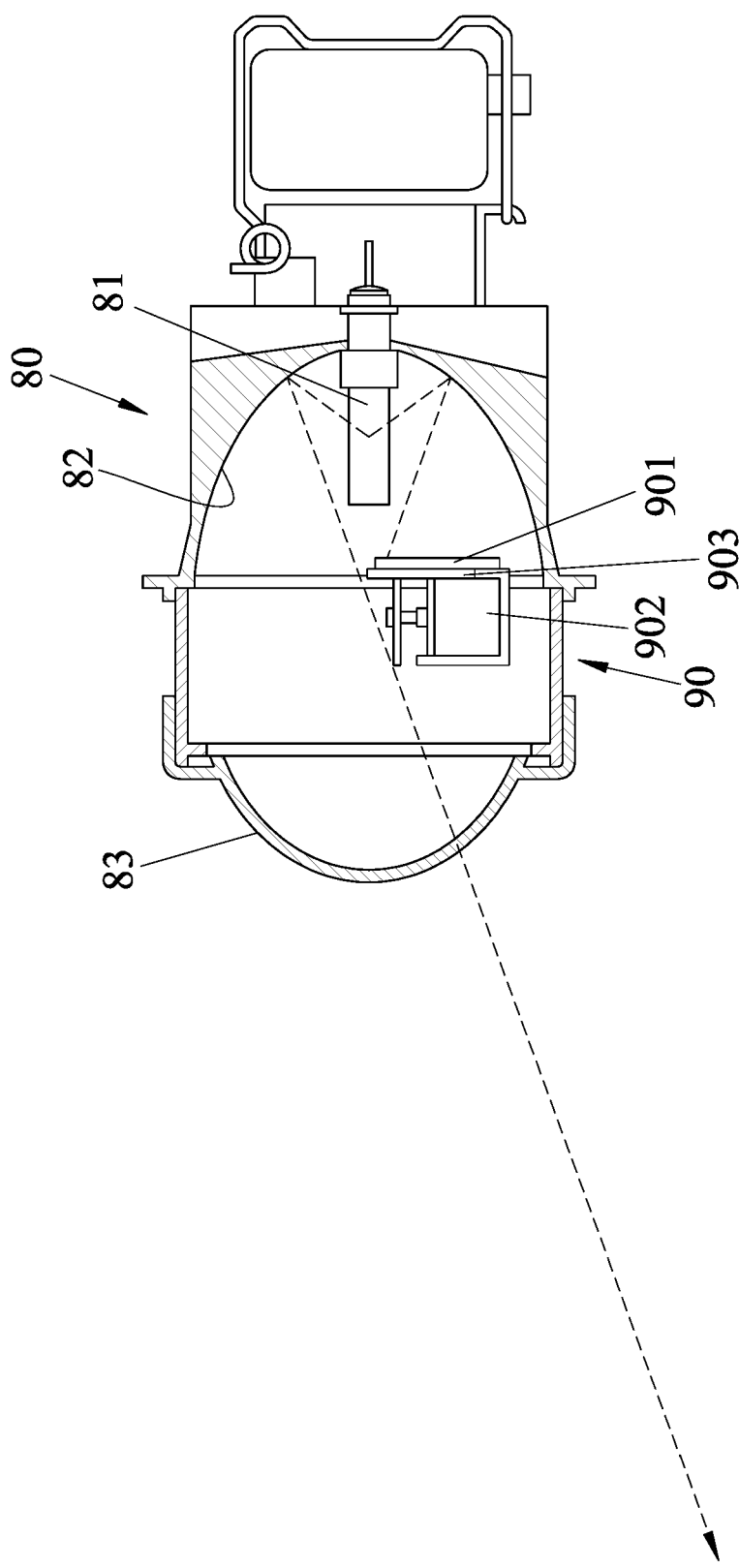


FIG. 8
PRIOR ART

REFERENCES CITED IN THE DESCRIPTION

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