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(54) METAL HALIDE LAMP FOR AUTOMOTIVE HEADLAMP AND HEADLAMP WITH SAID LAMP

METALLHALOGENIDLAMPE FÜR KRAFTFAHRZEUGSCHEINWERFER UND SCHEINWERFER MIT EINER SOLCHEN LAMPE

LAMPE AUX HALOGÉNURES POUR PHARE D'AUTOMOBILE ET PHARE ÉQUIPÉ DE LADITE LAMPE

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Description

TECHNICAL FIELD

[0001] The present invention relates to a discharge lamp and to an automotive headlamp including a discharge lamp.

BACKGROUND ART

[0002] High intensity discharge lamps are used today in headlighting systems of automobiles. Light is generated from an electrical arc in a discharge vessel. Within a headlamp, the light is reflected by a reflector to form a resulting light distribution pattern.

[0003] High intensity discharge lamps used in automotive head lights today include within the discharge vessel a filling comprising at least a rare gas, such as Xenon, and metal halides.

[0004] US5299101 describes an automotive headlamp with a metal halide discharge bulb as a light source arranged within a reflector. During operation of the discharge lamp, a part of the light emitted is scattered by metal halide sediment at the bottom of the discharge vessel. In order to eliminate flaring light resulting from this scattering, a lens with diffusing lens steps is arranged in the front opening of the reflector to diffuse light emitted through the metal halide sediment and reflected by lower reflecting surfaces of the reflector.

DISCLOSURE OF INVENTION

[0005] It is an object of the present invention to propose a discharge lamp and a headlamp for providing a desired homogenous light distribution pattern.

[0006] This object is solved by a discharge lamp according to claim 1 and by a headlamp according to claim 7. Dependent claims relate to preferred embodiments of the invention.

[0007] The discharge lamp according to the invention includes a discharge vessel with electrodes for generating an electrical arc. Within the discharge vessel, a filling is present comprising a rare gas, such as Xenon, and metal halides.

[0008] In operation of the lamp, a part of the metal halides present in liquid form may deposit at the bottom of the discharge vessel. Light emitted from the electrical arc between the electrodes may be scattered at the thus formed "salt pool". However, this optical scattering effect is not constant. The exact size and position of the salt pool may vary, e.g. for different operation of a motor vehicle (such as e.g. different acceleration etc.). Also, the optical scattering effect may differ over the lamp lifetime, e.g. due to burn back of the electrodes.

[0009] The scattering effect may lead to an inhomogeneity within the light distribution pattern generated from an optical system of a headlamp (which may include, besides a reflector, other optical elements such as e.g. a shutter and a projection lens). Moreover, since the scattering effect is not constant, it is not easy to design an optical system using the amount of light emitted from the arc into the general direction of the salt pool, but without generating noticeable inhomogeneities in the resulting light distribution pattern. The current invention describes a measure which significantly improves the homogeneity in the resulting light distribution pattern, independent of the varying geometry, size and spatial transmittance of the salt pool.

[0010] To this end, the discharge lamp comprises a diffusing portion for diffusing light emitted from the electrical arc.

[0011] An optical diffusing effect may be obtained e.g. by providing a roughened surface on a transparent part of the lamp, such as on the discharge vessel itself or, more preferred, on an outer enclosure provided around the discharge vessel. The diffusing portion serves to scatter light transmitted through it. However, this scattering effect, as opposed to the scattering effect at the salt pool, is constant and reliable, and may therefore be accounted for in the design of the optical system of a headlamp. The optical diffusing effect may be achieved by stochastically distributed surface modifications, such as e.g. obtained by a blasting treatment, or alternatively also by any regular surface pattern differing from the usual flat surface.

[0012] However, since the optical diffusing effect related to a large diffusing portion also leads to a loss of focus, the current invention proposes that not all light emitted from the discharge lamp should be diffused at the diffusing portion, but that the diffusing portion should be arranged such that only light emitted below a horizontal is diffused at the diffusing portion, and that light emitted above the horizontal is not diffused at the same diffusing portion. Thus, a large amount of the light emitted from the electrical arc, such as at least the light emitted above the horizontal, but preferably even a part of the light emitted below the horizontal, is not subject to diffusion at the diffusing portion. Thus, the diffusing portion has a size and position to allow that light emitted from the discharge lamp according to the invention still comprises portions with well-focussed light for the optical system of the headlamp. Due to the diffusing portion, at least for a portion of the light emitted below the horizontal, (constant) scattering is used to obtain light which is not subject to variation due to different size, position and geometry of the salt pool.

[0013] In the present context, references such as "horizontal" and "vertical" relate to possible orientations of the lamp within a reflector for generating a resulting light distribution pattern emitted generally horizontally from the front of a motor vehicle. As the skilled person will appreciate, generally discharge lamps used in automotive headlamps are operated in horizontal orientation.

[0014] The diffusing portion provided according to the invention in a position below the horizontal does not exclude the possibility to provide further, separate diffusing elements at other positions, e.g. above the horizontal.

[0015] According to a preferred embodiment, the diffusing portion is continuous and delimited, i.e. a non-diffusing portion, where light emitted from the arc is not diffused, is arranged around the diffusing portion. While there may be other diffusing parts present at the lamp serving other purposes, these are preferably separated from the diffusing portion according to the invention.

[0016] According to the invention, the diffusing portion is provided on the outside of the discharge vessel, or on the inside or outside of a transparent outer envelope provided around the discharge vessel. This outer envelope, also referred to as an outer bulb, is already present in many discharge lamps today and serves purposes such as thermal stabilization and/or UV filtering. According to the preferred embodiment, the diffusing portion is provided on the outer envelope. While it is possible to provide the diffusing portion on the inside of the outer envelope, it is especially preferred to be provided as a film or coating or as a surface modification of the outside of the outer envelope. In the preferred case of a delimited diffusing portion, i.e. with a non-diffusing portion arranged around it, the thus formed diffusing portion is preferably a diffusing window provided on a surface, where the surface around it remains smooth and non-diffusing.

[0017] The discharge vessel may be made out of quartz glass. Also, an outer envelope, if present, may be made out of quartz glass. A diffusing portion may be provided as a roughened surface of quartz glass. Such a surface, or "frosting" may be provided e.g. by a blasting treatment. In particular, it is preferred to provide a roughened surface by a laser treatment, such as by a preferred pulsed laser for providing a roughened surface structure. In this context, even if surface structures such as holes etc. are formed next to each other with small distances, this is still understood as a continuous diffusing portion. The roughness of the surface should be strong enough to achieve a diffusion effect. The roughness Ra should be above 6gm. Preferred values of surface roughness are 10-20 urn.

[0018] While the diffusing portion is effective to eliminate varying optical effects from the salt pool, it is generally preferred to provide only a neceessary minimum amount of scattering at the diffusing portion in order to limit the loss of focus. Thus, generally the size of the diffusing portion should be limited as far as possible while still obtaining the desired degree of homogeneity in the resulting light distribution.

[0019] According to a preferred embodiment, the diffusing portion is arranged as a diffusing window provided over only a part of the lower portion of the discharge vessel of the outer enclosure. Thus, not all light emitted below the horizontal is diffused. The diffusing window is preferably a surface region on an at least substantially cylindrical body around the arc, such as preferably the outer envelope.

[0020] The diffusing window may be arranged to cover a lower portion of the discharge vessel or outer enclosure, such that all light emitted from the arc which passes through a potential position of the salt pool is diffused. In this way, any variant optical effects of the salt pool would be eliminated, while still reasonably limiting the amount of scattering, and thus preserving focus.

[0021] However, according to a further preferred embodiment, the diffusing window may be restricted even further. This is, because, as will become apparent in connection with preferred embodiments, different portions of the light emitted from the arc may be used quite differently in the resulting light distribution pattern formed in a vehicle headlamp. In advantageous reflector designs, for the most important region in terms of homogeneity, namely the region close to the center of the light distribution, light emitted directly vertically from the center of the arc is not used. In these advantageous designs, light used to be projected into the center of the light distribution pattern is emitted from the lamp under an angle with the vertical direction. Consequently, according to a preferred embodiment, the diffusing window may be arranged axially offset, so as to cover only a part of the region between the electrodes. Thus, the extent of the diffusing window is limited, such that at least a portion of light emitted from the arc into a lower vertical direction may pass by the diffusing portion. However, a portion of the light emitted from the arc under defined angles with the lower vertical direction will pass through the diffusing window. It is this portion of the light that is preferably used to generated center images of the arc in the resulting light distribution pattern.

[0022] The size of the diffusing window should be large enough to provide a desired degree of homogeneity in the resulting light distribution pattern, but should otherwise be as small as possible. According to preferred embodiments of the invention, the diffusing window has an axial length corresponding to 1-3 times the (axial) distance between the electrodes. The width of the diffusing window is preferably such that light emitted under +/- 45° to +/- 85° from the lower vertical direction is diffused.

[0023] The headlamp according to the invention comprises, besides the discharge lamp as described above, at least a reflector and, optionally, further optical elements such as a shutter and a projection lens.

[0024] The lamp is arranged within the reflector such that light emitted from the lamp is reflected by the reflector. The reflector comprises different reflector portions, comprising at least an upper reflector portion for reflecting light emitted from the lamp above a horizontal and a lower reflector portion reflecting light emitted from the lamp below a horizontal.

[0025] The diffusing portion of the lamp is arranged such that at least a portion of light reflected from the lower reflector portion is diffused, and such that light reflected at the upper reflector portion is not diffused.

[0026] It is preferred that the headlamp provides a resulting light distribution pattern comprising a light/dark cut-off line. Such a light/dark cut-off line, which is oriented generally horizontally (and, as the skilled person knows, may comprise a portion under a defined, small angle with

the horizontal) is required for different lighting functions, such as, most importantly, low beam lighting. The light/dark cut-off line has a strong contrast between low intensity above the cut-off line and high intensity below. While a light/dark cut-off line may be generated by the shape of a reflector alone, it is preferred in the context of the present invention that the light/dark cut-off is generated by a shutter providing an edge for cutting off part of the light distribution.

[0027] According to a preferred embodiment of the invention, the lower reflector portion comprises different portions or regions used to form different parts of the resulting light distribution pattern. Preferably, the lower reflector portion comprises a first lower reflector portion reflecting light from the discharge lamp for forming center images. Center images are reflected images of the electrical arc that are projected into a region close to the center of the resulting light distribution. The first lower reflector portion may be defined as being part of the lower reflector portion, but axially located between the base of the lamp and the center of the interspace between the electrodes of the lamp.

[0028] It is preferred that the diffusing portion is arranged such that light emitted from the lamp into such a direction that it is reflected at at least a part of the first lower reflector portion is diffused. Thus, the diffusing portion is arranged at a position corresponding to the direction of the light used to form the center images. This center region of the resulting light distribution pattern is the most critical with regard to inhomogeneities, in particular time-variant inhomogeneities. Since the scattering effect introduced by the diffusing portion is constant, the optical system, and in particular the shape of the reflector can preferably be designed to form center images out of diffused images of the arc. Thus, an advantageously homogenous center of the resulting light distribution pattern may be achieved.

[0029] Since in advantageous reflector designs the first lower reflector portion is arranged axially behind the electrodes, the diffusing portion is preferably arranged axially offset from the electrodes into a direction closer to the base of the lamp. According to a particularly preferred embodiment, the axial position of the diffusing portion is chosen such it extends axially at most up to the center of the interspace between the electrodes, but not beyond. Thus, a direction from the center between the electrodes up to an edge of the diffusing window may form a angle with the lower horizontal direction that is preferably 0° (i.e. the diffusing portion extends right up to the center) to 10° (i.e. an edge of the diffusing portion is located at an axial distance to the center).

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] These and other aspects, features and advantages of the present invention will be apparent from and elucidated with reference to the description of preferred embodiments in conjunction to the enclosed figures, in which:

- fig. 1 shows a side view of an embodiment of a discharge lamp;
- fig. 2a shows an enlarged view of a discharge vessel and outer bulb of the lamp according to fig. 1;
- fig. 2b shows a sectional view of the discharge vessel and outer bulb of fig. 2a with the section taken along the line B..B in fig. 2a;
- fig. 3 shows a schematic side view of an embodiment of a headlamp;
- fig. 4 shows in a schematic view a projection of a light distribution emitted from the headlamp of fig. 3 projected on a screen.

DESCRIPTION OF EMBODIMENTS

[0031] Fig. 1 shows a high intensity discharge lamp for use in a motor vehicle headlamp. The discharge lamp 10 includes a base 12 including mechanical and electrical connections and a burner 14 for generating light, mechanically and electrically connected to the base 12. The burner 14 includes a quartz glass discharge vessel 16, and, provided around the discharge vessel 16, a cylindrical outer bulb 18 made of quartz glass.

[0032] Within the discharge vessel 16, electrodes 20 are provided within a discharge space with their electrode tips arranged axially at a distance d (fig. 2a). According to most automotive regulations, the electrode distance d is about 4 mm, but may vary according to different lamp types and regulations.

[0033] Provided within the discharge space is a filing of Xenon and metal halides, such that an electrical arc may be ignited between the tips of the electrodes 20 by applying a high voltage. After ignition, the arc will be sustained by applying electrical power via the electrical connections at the base 12 and sealed electrical contacts within the discharge vessel 16. Generally, discharge lamps for automotive headlamps are operated at steady-state operating powers of 20-40 W.

[0034] Since generally the construction of a corresponding discharge lamp, as well as the different available fillings for the discharge vessel 16 are known per se to the skilled person, the following description will focus on the object of the present invention, namely possible scattering of light emitted from the arc.

[0035] In operation of the discharge lamp 10 in the shown horizontal orientation, a salt pool 22 of liquid metal halides will form in the lower part of the discharge space. Light emitted from the arc into directions below may thus be scattered depending on the size, position and optical properties of the salt pool 22. However, these properties of the salt pool may change, e.g. due to external forces or over the lifetime of the lamp 10. Further, the position and size of the salt pool may vary between different lamps with different inner shapes of the discharge vessel. Thus, the scattering effect will vary, too. In the embodiment of the discharge lamp 10 shown in fig. 1, a diffusing window

24 is provided in the outer surface of the outer bulb 18. While the outer bulb 18 itself, made out of quartz glass, is transparent, the diffusing window 24 renders a portion thereof diffusive, so that light is transmitted, but scattered to a certain amount. In fig. 1, this is schematically shown by comparison of a first example of a light beam 26 emitted from the arc into a direction to pass by the diffusing window 24, so that it may be scattered at the salt pool 22, but is not scattered by the diffusing window 24, and by a second light beam 28 emitted from the arc, which passes through the diffusing window 24 and is scattered there.

[0036] The diffusing window 24 with its size and arrangement relative to the tips of the electrodes 20 and therefore to the electrical arc is shown in more detail in the enlarged views of fig. 2a and fig. 2b. As visible, the diffusing window 24 is continuous, i.e. the covered surface area is completely diffusive. Further, the diffusing window 24 is delimited, i.e. around it the surface of the outer bulb 18 remains smooth and non-diffusive. In the embodiment shown, the axial length L of the diffusing window 24 is about 2.5 times the distance d between the electrodes 20. The diffusing window 24 axially is not arranged centrally underneath the interspace between the electrodes 20, but is axially arranged offset towards the base 12. In the example shown, the axial offset of the diffusing window 24 is such that the right edge 25 of the diffusing window 24 is arranged closer to the base 12 than the center of the interspace between the electrodes 20. An angle β defined in a vertical plane through the central longitudinal axis of the lamp 10 from a center of the interspace between the electrodes between the lower vertical direction and the edge of the diffusing window 24 in the shown example is about 3°. In different embodiments, the axial offset of the window 24 may be different, such that the angle β may vary e.g. between 0° and 10°.

[0037] In circumferential extension, as visible from fig. 2b, the diffusing window 24 is arranged to cover directions in an angular range of +/- α = 70° with the lower vertical direction.

[0038] Thus, the diffusing window 24 only covers a portion of the lower half of light emission directions. Specifically, the angular range α does not extend up to +/- 90°, i.e. up to horizontal directions, but the diffusing window 24 remains a distance h below the horizontal as shown in fig. 2a. Thus, light emitted into horizontal directions is not diffused.

[0039] Fig. 3 show an automotive headlamp 30 including a reflector 32 with a socket 34 in which the base 12 of a lamp 10 is received. The reflector 32 comprises an inner reflective surface with an upper reflector portion 36 and a lower reflector portion 38. Further, the headlamp comprises a shutter 40 and a projection lens 42.

[0040] In operation of the headlamp 30, the lamp 10 emits light that is reflected by the reflector 32, partly shielded by the shutter 40 and then projected through projection lens 42 to form a resulting light distribution pattern.

[0041] The reflector 32 is a complex shape reflector, where the shape of the upper and lower reflective surfaces 36, 38 is numerically designed to form the light distribution pattern from a superposition of differently reflected images of the arc.

[0042] Fig. 4 shows in a symbolic representation a projection of this resulting light distribution pattern on a screen. The light distribution pattern comprises a light/dark cut-off line 44 which runs generally horizontally, with an inclined portion forming an angle with the horizontal.

[0043] The reflector 32 is shaped to generate images of the arc within the discharge lamp 10 to be projected into different portions of the resulting light distribution pattern. As shown in Fig. 4, the light distribution pattern is formed by images of the arc arranged under different angles. The reflector 32 is shaped such that the angular orientation of each image is indicative of the reflector region on which the light is reflected: light emitted from the lamp 10 into the lower vertical direction will form images of the arc oriented vertically, whereas light emitted horizontally will form images of the arc oriented horizontally.

[0044] As shown symbolically in fig. 3, the reflector 32 comprises an upper reflector portion 36, reflecting light emitted from the arc into peripheral portions 54 of the resulting light distribution pattern. In fig. 3 and fig. 4, examples of corresponding beams as well as peripheral images 46 created therefrom are represented as dotted lines.

[0045] As further shown in fig. 3, a part of the lower reflector portion 38 is a first lower reflector portion 48, which reflects the light from the arc of the discharge lamp 10 into a central portion 52 of the light distribution pattern, forming center images 50. The center images 50 and the corresponding beams are represented as dashed lines. The first lower reflector portion 48 is axially located between the base 12 and the center of the interspace between the electrodes 20 of the lamp 10.

[0046] As understandable from a comparison of fig. 1 and fig. 3, the light emitted from the lamp 10 into the direction of the first lower reflector portion 48 passes through the diffusing window 24. Correspondingly, the first lower reflector portion 48 is designed to project slightly diffused center images 50 into the central portion 52 of the resulting light distribution pattern.

[0047] Thus, in the resulting light distribution pattern, shown in fig. 4, the central portion 52, arranged close to the center of the light distribution pattern, is illuminated by the diffused center images 50, whereas the peripheral region 54, located further from the center, is illuminated by peripheral images 46, which are not diffused. Within the center region 52 illumination is homogenous and not subject to variation of the position, size and optical properties of the salt pool 22.

[0048] While the invention has been illustrated and described in detail in the drawings and the foregoing description, such illustration and description are to be con-

sidered illustrative or exemplary and not restrictive; the invention is not limited to the disclosed embodiments. In particular, while the described preferred diffusing window 24 is not arranged symmetrically between the electrodes 20, and does not cover the complete distance between the electrodes, it is alternatively also possible to provide a diffusing window which is symmetrical, or one with a greater extension in longitudinal direction.

[0049] Further, in the embodiment shown the light of the lamp 10 is emitted into all spatial directions without diffusion or shading, except for the diffusing window 24. As known to the skilled person, there are various modifications known to discharge lamps in general, including diffusing surface modifications or shading elements, such as pin stripes. It should be emphasized that the present inventions differs from these further diffusive/shading elements in that it is arranged to diffuse light possibly scattered at the salt pool 22, i.e. that the diffusing window 24 is arranged below the horizontal. However, this is not intended to exclude alternative lamps, which - besides the diffusing window 24 below the electrodes - further comprise other shading elements or diffusive elements, arranged in different locations. In particular, it is preferred that the diffusing window 24 is delimited from those other diffusing or shading elements, i.e. that a non-diffusing portion remains around it.

[0050] Other variations to the disclosed embodiment can be understood and effected by those skilled in the art in practising the claimed invention from a study of the drawings, the disclosure and the appended claims.

[0051] In the claims, the word "comprising" or "including" does not exclude other elements and the indefinite article "a" or "an" does not exclude a plurality. The mere fact that certain measured are recited in mutually different dependent claims or different embodiments does not indicate that a combination of these measures cannot be used to advantage. Any reference signs in the claims should not be construed as limiting the scope.

Claims

1. Discharge lamp, suitable for use in automotive headlamps, including

   - a discharge vessel (16) with electrodes (20) for generating an electrical arc,
   - where said discharge vessel (16) includes a filling comprising at least a rare gas and metal halides,
   - a transparent outer envelope (18) provided around said discharge vessel (16),
   - where said discharge lamp further comprises a diffusing portion (24),
   - where said diffusing portion (24) is provided on the outside of said discharge vessel (16), or on the inside or outside of said outer envelope (18), and
   - where the diffusing portion is arranged such that at least a portion of light emitted below a horizontal, the horizontal defined by the operational position of the discharge lamp in a headlamp, is diffused at said diffusing portion, and that light emitted above said horizontal is not diffused at said diffusing portion.

2. Discharge lamp according to claim 1, where

   - said diffusing portion (24) is continuous,
   - and where around said diffusing portion a non-diffusing portion is arranged.

3. Discharge lamp according to claim 1 or 2, where

   - said discharge vessel (16) and/or said outer envelope (18) is made of quartz glass,
   - and said diffusing portion (24) includes a roughened surface of quartz glass.

4. Discharge lamp according to one of the above claims, where

   - said diffusing portion (24) is arranged as a diffusing window (24) provided over only a part of a lower portion of said discharge vessel (16) or outer envelope (18).

5. Discharge lamp according to claim 4, where

   - said diffusing window (24) is arranged to cover only a part of a space between said electrodes (20).

6. Discharge lamp according to one of claims 4 and 5, where

   - said diffusing window (24) has an axial length which is 1-3 times the distance (d) between the electrodes (20).

7. A headlamp including at least

   - a discharge lamp (10) according to one of the above claims,
   - and a reflector (32), where said lamp (10) is arranged within said reflector (32) such that light emitted from said lamp (10) is reflected by said reflector (32) to form a resulting light distribution pattern,
   - where said reflector (32) comprises at least an upper reflector portion (36) reflecting light emitted from said lamp (10) above a horizontal, and a lower reflector portion (38) reflecting light emitted from said lamp (10) below a horizontal,
   - and where said diffusing portion (24) is arranged, such that at least a portion of light re-

flected at said lower reflector portion (38) is diffused, and such that light reflected at said upper reflector portion (36) is not diffused.

8. Headlamp according to claim 7, where

- said headlamp is disposed to form light emitted from said lamp (10) into a resulting light distribution pattern including a light/dark cut-off line.

9. Headlamp according to claim 8, said headlamp further comprising a shutter (40) arranged to provide said light/dark cut-off line.

10. Headlamp according to one of claims 7-9, where

- said reflector (32) is shaped such that a first lower reflector portion (48) of said lower reflector portion (38) reflects light emitted from said lamp (10) to form center images (50) projected into a center region of said light distribution pattern,
- where said diffusing portion (24) is arranged, such that light emitted from said lamp (10) to be reflected at said first lower reflector portion (48) is diffused.

11. Headlamp according to claim 10, where

- said first lower reflector portion (48) is arranged in a position axially behind an interspace between said electrodes (20).

Patentansprüche

1. Entladungslampe, die zur Verwendung in Kraftfahrzeugscheinwerfern geeignet ist, einschließend:

- ein Entladungsgefäß (16) mit Elektroden (20) zum Erzeugen eines Elektrolichtbogens,
- wobei das Entladungsgefäß (16) eine Füllung einschließt, die mindestens ein Edelgas und Metallhalogenide umfasst,
- eine transparente Außenhülle (18), die um das Entladungsgefäß (16) herum bereitgestellt ist,
- wobei die Entladungslampe ferner einen Streulichtabschnitt (24) umfasst,
- wobei der Streulichtabschnitt (24) an der Außenseite des Entladungsgefäßes (16) oder an der Innenseite oder Außenseite der Außenhülle (18) bereitgestellt wird, und
- wobei der Streulichtabschnitt so angeordnet ist, dass mindestens ein Teil des Lichts unterhalb einer Horizontalen emittiert wird, wobei die Horizontale durch die Betriebsposition der Entladungslampe in einem Scheinwerfer definiert ist, in dem Streulichtabschnitt gestreut wird, und das oberhalb der Horizontale emittierte Licht nicht an dem Streulichtabschnitt gestreut wird.

2. Entladungslampe nach Anspruch 1, wobei

- der Streulichtabschnitt (24) kontinuierlich ist,
- und wobei um den Streulichtabschnitt herum ein Nicht-Streulichtabschnitt angeordnet ist.

3. Entladungslampe nach Anspruch 1 oder 2, wobei

- das Entladungsgefäß (16) und/oder die Außenhülle (18) aus Quarzglas gefertigt ist/sind,
- und der Streulichtabschnitt (24) eine aufgeraute Oberfläche des Quarzglases einschließt.

4. Entladungslampe nach einem der obigen Ansprüche, wobei

- der Streulichtabschnitt (24) als Streulichtfenster (24) angeordnet ist, das nur über einem Teil eines unteren Abschnitts des Entladungsgefäßes (16) oder der Außenhülle (18) bereitgestellt wird.

5. Entladungslampe nach Anspruch 4, wobei

- das Streulichtfenster (24) angeordnet ist, um nur einen Teil eines Raums zwischen den Elektroden (20) zu bedecken.

6. Entladungslampe nach einem der Ansprüche 4 oder 5, wobei

- das Streulichtfenster (24) eine axiale Länge aufweist, die das 1- bis 3-fache des Abstands (d) zwischen den Elektroden (20) beträgt.

7. Scheinwerfer, der mindestens einschließt:

- eine Entladungslampe (10) nach einem der obigen Ansprüche,
- und einen Reflektor (32), wobei die Lampe (10) derart innerhalb des Reflektors (32) angeordnet ist, dass von der Lampe (10) emittiertes Licht durch den Reflektor (32) reflektiert wird, um ein resultierendes Lichtverteilungsmuster zu bilden,
- wobei der Reflektor (32) mindestens einen oberen Reflektorabschnitt (36), der von der Lampe (10) oberhalb einer Horizontalen emittiertes Licht reflektiert, und einen unteren Reflektorabschnitt (38) umfasst, der von der Lampe (10) unterhalb einer Horizontalen emittiertes Licht reflektiert,
- und wobei der Streulichtabschnitt (24) so angeordnet ist, dass mindestens ein Teil des an dem unteren Reflektorabschnitt (38) reflektierten Lichts gestreut wird und dass Licht, das an

dem oberen Reflektorabschnitt (36) reflektiert wird, nicht gestreut wird.

8. Scheinwerfer nach Anspruch 7, wobei

- der Scheinwerfer so angeordnet ist, dass von der Lampe (10) emittiertes Licht zu einem resultierenden Lichtverteilungsmuster geformt wird, das eine Licht/Dunkel-Trennlinie einschließt.

9. Scheinwerfer nach Anspruch 8, wobei der Scheinwerfer ferner eine Blende (40) umfasst, die angeordnet ist, um die Licht/Dunkel-Trennlinie bereitzustellen.

10. Scheinwerfer nach einem der Ansprüche 7 bis 9, wobei

- der Reflektor (32) so gestaltet ist, dass ein erster unterer Reflektorabschnitt (48) des unteren Reflektorabschnitts (38) von der Lampe (10) emittiertes Licht reflektiert, um Zentrumsbilder (50) zu bilden, die in eine Zentrumsregion des Lichtverteilungsmusters projiziert werden,
- wobei der Streulichtabschnitt (24) so angeordnet ist, dass von der Lampe (10) emittiertes Licht, das an dem ersten unteren Reflektorabschnitt 48) reflektiert werden soll, gestreut wird.

11. Scheinwerfer nach Anspruch 10, wobei

- der erste untere Reflektorabschnitt (48) in einer Position axial hinter einem Zwischenraum zwischen den Elektroden (20) angeordnet ist.

Revendications

1. Lampe à décharge, appropriée pour une utilisation dans des phares d'automobile, comprenant :

- un récipient de décharge (16) avec des électrodes (20) pour générer un arc électrique,
- où ledit récipient de décharge (16) comprend une charge comprenant au moins un gaz rare et des halogénures,
- une enveloppe extérieure transparente (18) prévue autour dudit récipient de décharge (16), où ladite lampe à décharge comprend en outre une partie de diffusion (24),
- où ladite partie de diffusion (24) est prévue sur l'extérieur dudit récipient de décharge (16), ou sur l'intérieur ou l'extérieur de ladite enveloppe extérieure (18), et
- où la partie de diffusion est agencée de sorte qu'au moins une partie de la lumière émise au-dessous d'une horizontale, l'horizontale étant définie par la position de fonctionnement de la lampe à décharge dans un phare, soit diffusée au niveau de ladite partie de diffusion, et de sorte que la lumière émise au-dessus de ladite horizontale ne soit pas diffusée au niveau de ladite partie de diffusion.

2. Lampe à décharge selon la revendication 1, où

- ladite partie de diffusion (24) est continue,
- et où une partie de non diffusion est agencée autour de ladite partie de diffusion.

3. Lampe à décharge selon la revendication 1 ou 2, où

- ledit récipient de décharge (16) et/ou ladite enveloppe extérieure (18) sont constitués de verre de quartz,
- et ladite partie de diffusion (24) comprend une surface rugueuse en verre de quartz.

4. Lampe à décharge selon l'une des revendications précédentes, où

- ladite partie de diffusion (24) est agencée en tant que fenêtre de diffusion (24) prévue uniquement sur une partie d'une partie inférieure dudit récipient de décharge (16) ou de l'enveloppe extérieure (18).

5. Lampe à décharge selon la revendication 4, où

- ladite fenêtre de diffusion (24) est agencée de manière à recouvrir uniquement une partie d'un espace entre lesdites électrodes (20).

6. Lampe à décharge selon l'une des revendications 4 et 5, où

- ladite fenêtre de diffusion (24) a une longueur axiale qui est égale à 1 à 3 fois la distance (d) entre les électrodes (20).

7. Phare comprenant au moins

- une lampe à décharge (10) selon l'une des revendications précédentes,
- et un réflecteur (32), où ladite lampe (10) est agencée dans ledit réflecteur (32) de sorte que la lumière émise par ladite lampe (10) soit réfléchie par ledit réflecteur (32) pour former un motif de répartition de lumière résultant,
- où ledit réflecteur (32) comprend au moins une partie supérieure de réflecteur (36) réfléchissant la lumière émise par ladite lampe (10) au-dessus d'une horizontale, et une partie inférieure de réflecteur (38) réfléchissant la lumière émise par ladite lampe (10) au-dessous d'une horizontale,
- et où ladite partie de diffusion (24) est agencée

de sorte qu'au moins une partie de la lumière réfléchie au niveau de ladite partie inférieure de réflecteur (38) soit diffusée, et de sorte que la lumière réfléchie au niveau de ladite partie supérieure de réflecteur (36) ne soit pas diffusée.

8. Phare selon la revendication 7, où

- ledit phare est disposé de manière à former la lumière émise par ladite lampe (10) en un motif de répartition de lumière résultant comprenant une ligne de coupure clair/sombre.

9. Phare selon la revendication 8, ledit phare comprenant en outre un obturateur (40) agencé pour réaliser ladite ligne de coupure clair/sombre.

10. Phare selon l'une des revendications 7 à 9, où

- ledit réflecteur (32) est formé de sorte qu'une première partie inférieure de réflecteur (48) de ladite partie inférieure de réflecteur (38) réfléchisse la lumière émise par ladite lampe (10) pour former des images centrales (50) projetées dans une région centrale dudit motif de répartition de lumière,
- où ladite partie de diffusion (24) est agencée de sorte que la lumière émise par ladite lampe (10) devant être réfléchie au niveau de ladite première partie inférieure de réflecteur (48) soit diffusée.

11. Phare selon la revendication 10, où

- ladite première partie inférieure de réflecteur (48) est agencée à une position axialement derrière un interstice entre lesdites électrodes (20).

FIG. 1

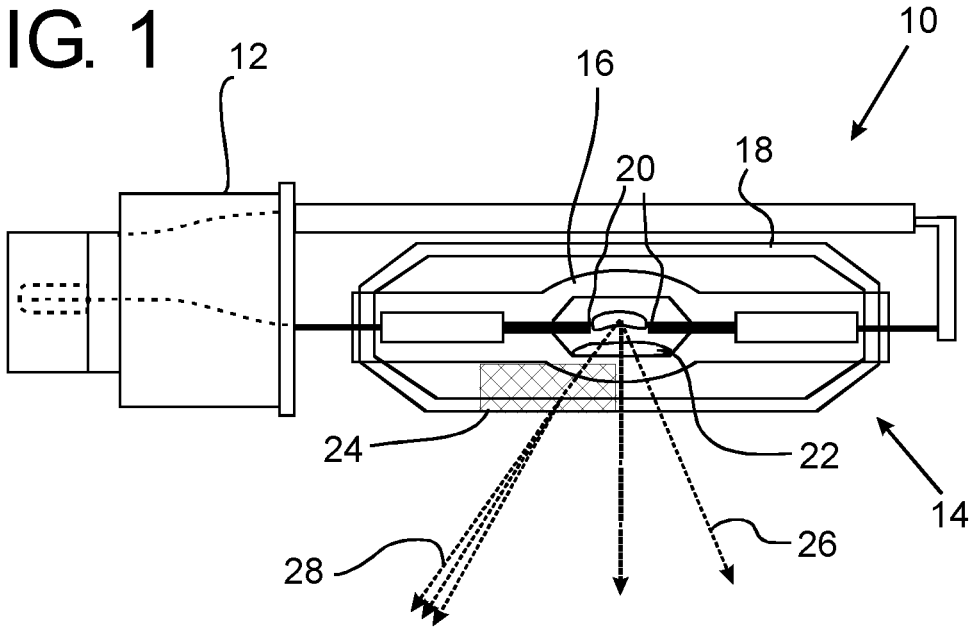


FIG. 2a

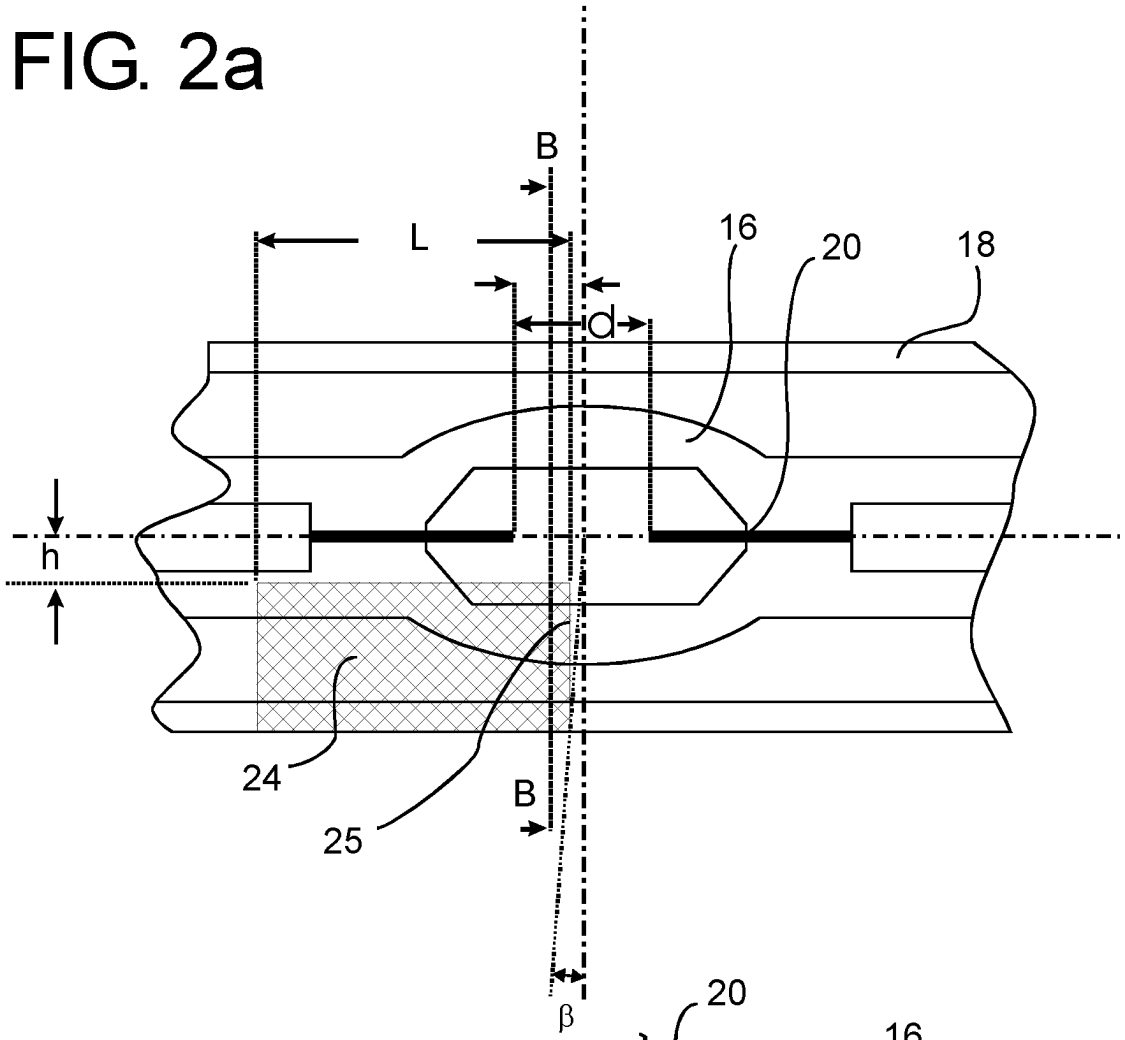


FIG. 2b

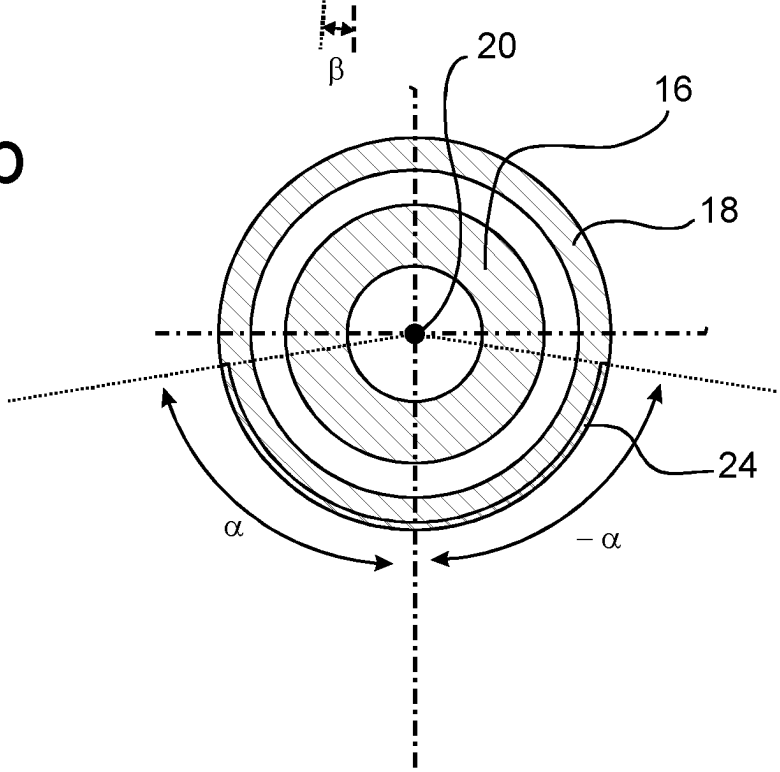


FIG. 3

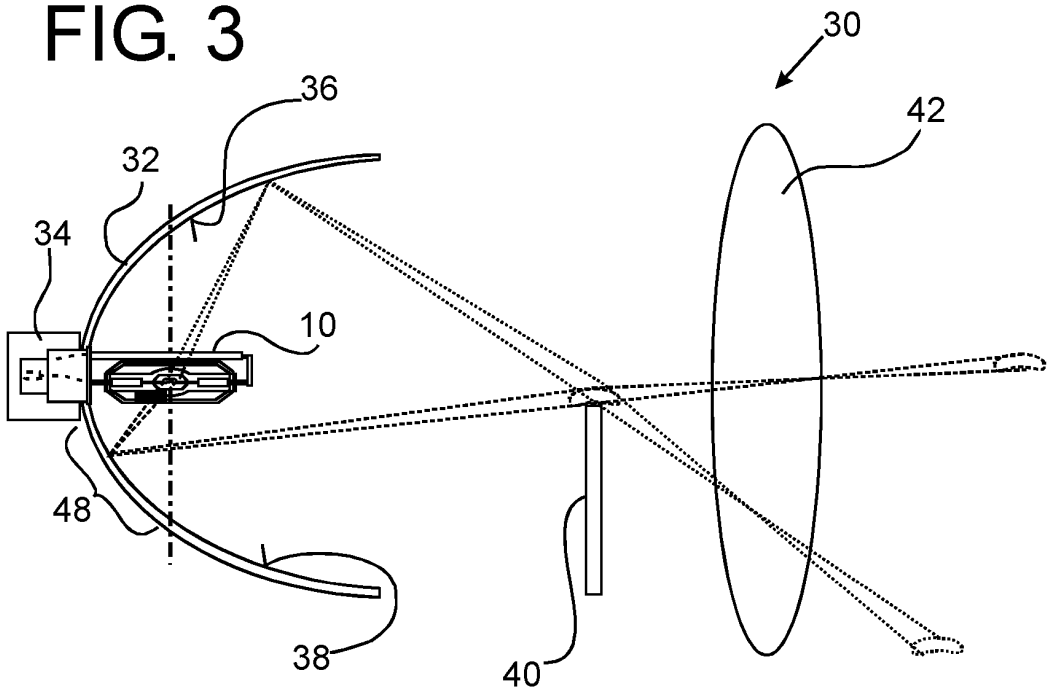
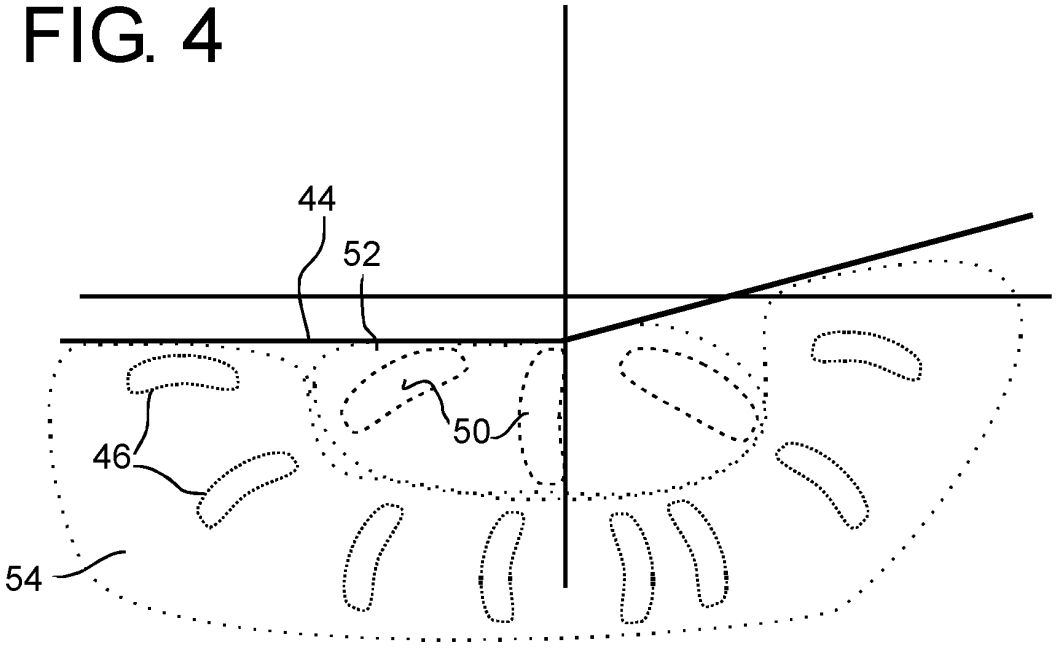


FIG. 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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