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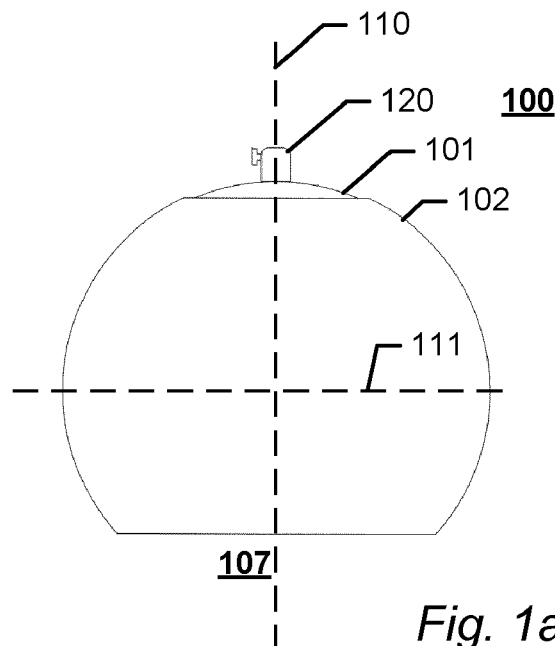
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(54) **Pendant light**

(57) Disclosed is a pendant light for hanging from a ceiling along a central axis. The pendant light comprises: a first element having an upper surface for facing the ceiling and an lower surface for facing a floor; a second element having an inner surface and an outer surface; and first electrical circuitry connected to the first element for providing electricity to a light source. At least a part

of the inner surface of the second element is resting on at least a part of the upper surface of the first element and the second element is rotatably arranged relative to the first element around a first axis, being perpendicular to the central axis, between a first orientation and a second orientation whereby light may be directional guided.



Description

Field

[0001] The present invention relates to a pendant light and a method of assembling a pendant light.

Background

[0002] Pendant lights are widely used both in industrial environments and in private homes. Pendant lights are typically hung from the ceiling, thereby making them ideal for lighting tables.

[0003] However, classical pendant light have the disadvantage that the light they emit cannot be guided. Thus, classical pendant lights cannot be adapted to special situations, e.g. if a dinning table lit by a classical pendant light is to be used for working with a laptop an additional light source it typically needed to create a pleasant working environment.

[0004] US5249107 discloses a ceiling canopy for a pendant light fixture comprising a cup shaped enclosure which serves to conceal the ceiling box and electrical connections and means of suspension of the fixture, with the additional feature of containing a low voltage power supply like e.g. a toroidal transformer surrounding the pendant suspension cord and having, on its external surface, means for mounting one or several individually adjustable lamp holders for low voltage reflector lamps which are powered from said power supply and may be directed towards individual objects in the room.

[0005] Consequently, the adjustable lamps may be used to adapt the light to special situations.

[0006] However, the addition of the adjustable lamps makes the device more complex to manufacture.

[0007] Consequently, there is a need for a simpler pendant light which be adapted to special lighting needs.

Summary

[0008] According to a first aspect, the invention relates to a pendant light for hanging from a ceiling along a central axis, the pendant light comprises:

- a first element having an upper surface for facing the ceiling and an lower surface for facing a floor;
- a second element having an inner surface and an outer surface; and
- first electrical circuitry connected to the first element for providing electricity to a light source;

wherein at least a part of the inner surface of the second element is resting on at least a part of the upper surface of the first element and the second element is rotatably arranged relative to the first element around a first axis, being perpendicular to the central axis, between a first orientation and a second orientation whereby light may be directional guided.

[0009] Consequently, a simple pendant light is provided that can be adapted to special lighting needs.

[0010] The pendant light may comprise a light source connected to the first electric circuitry. Alternatively / additionally the first electric circuitry may comprise a light socket for holding a light source and allow for its replacement. The pendant light may comprise a cable for attaching the pendant light to the ceiling. Alternatively, the pendant light may be attached to the ceiling by an electric wire connected to the first electric circuitry. The second element may be rotatably arranged relative to the first element by securing that both the upper surface of the first element and the inner surface of the second element is curved at least in a first direction with a matching curvature. The first element and the second element may be thin shell like structures having a thickness less than 10% of their respective widest width. The second element may be a lamp shade configured for guiding light.

[0011] The second element may have a lower opening for allowing light to be emitted. The second element may be made of an opaque material such as a metal material or an opaque plastic material. The pendant light may be configured to emit the primary amount of light generated through the lower opening of the second element such as at least 70%, 80%, 90%, or 95% of the light generated.

[0012] This will allow the rotatability of the second element to effectively guide the generated light as the lower opening may be faced in a desired direction by rotating the second element relative to the first element.

[0013] In some embodiments, the angle between the local centre axis of the second element when the second element is oriented in the first orientation and the local centre axis of the second element when second element is oriented in the second orientation is at least 15 degrees, 25 degrees, 35 degrees, or 40 degrees.

[0014] Consequently, the generated light may be efficiently guided.

[0015] In some embodiments, the second element is further rotatably arranged relative to the first element around a second axis between a third orientation and a fourth orientation, wherein the second axis is perpendicular to the central axis and the first axis.

[0016] Consequently, the second element may be rotated relative to the first element in any direction. This makes it easier to adapt the light to special lighting needs. Furthermore, it becomes simpler to install the pendant light as the relative orientation of the first element relative to the room it is installed in becomes of less importance.

[0017] In some embodiments, the angle between the local centre axis of the second element when the second element is oriented in the third orientation and the local centre axis of the second element when second element is oriented in the fourth orientation is at least 15 degrees, 25 degrees, 35 degrees, or 40 degrees.

[0018] In some embodiments, the upper surface of the first element and the inner surface of the second element both have a spherical shape with a curvature of a common reference sphere, whereby the first axis is intersect-

ing the second axis in the centre of the common reference sphere.

[0019] Consequently, by using a matching spherical shape for the first and second element, the second element may be rotated in any direction relative to the first element, and it prevents

[0020] This furthermore secures that no cavity is formed between the first element and the second element. Such a cavity can be problematic as it may collect dirt that can limit the rotatability of the second element relative to the first element and furthermore damage the first element and second element of the pendant light.

[0021] In some embodiments, the second element has an upper opening having a rim, wherein the first element is arranged to close the upper opening of the second element.

[0022] In some embodiments, the second element has a lower opening, wherein the first element has a width smaller than the width of the lower opening of the second element whereby the first element may be inserted into the second element through the lower opening of the second element.

[0023] In some embodiments, the width of the first element is between 100% and 50 % of the width of the lower opening of the second element.

[0024] In some embodiments, the width of the first element is between 100% and 75 % of the width of the lower opening of the second element.

[0025] In some embodiments, the width of the first element is between 100% and 90 % of the width of the lower opening of the second element.

[0026] By matching the width of the first element with the width of the lower opening of the second element a high degree of rotatability of the second element relative to the first element is achieved while securing that the first element still may be inserted into the second element through the lower opening of the second element.

[0027] In some embodiments, a blocking element is protruding from the upper surface of the first element, the blocking element being configured to limit the rotatability of the second element relative to the first element by abutting the rim of the upper opening of the second element when the second element is oriented in the first orientation and the second orientation relative to the first element.

[0028] Consequently, the blocking element may both protect electric wires and secure that the first and the second element are not disconnected by over-rotating the second element relative to the first element.

[0029] In some embodiments, the blocking element is further configured to limit the rotatability of the second element relative to the first element by abutting the rim of the upper opening of the second element when the second element is oriented in the third orientation and the fourth orientation relative to the first element.

[0030] In some embodiments, the first element is configured to for all possible orientations of the second element relative to the first element, close the upper opening

of the second element.

[0031] Consequently, it may dust and dirt may be prevented from entering the pendant light.

[0032] In some embodiments, the first element has a size configured to fit the upper opening of the second so that whenever the second element is arranged in the first, second, third, or fourth orientation a rim of the upper opening of the second element is arranged adjacent to an outer edge of the first element.

[0033] Consequently, less material is needed for the first element. This further reduces the frictional resistance between the first element and the second element, as the interface between the first element and the second element is reduced.

[0034] In some embodiments, the second element is a shell of a sphere cut off in the top and the bottom.

[0035] In some embodiments, wherein the cut off in the top (upper opening) is arranged in the top 20%, top 15% or to 10% of the sphere.

[0036] In some embodiments, the cut off in the bottom (lower opening) is arranged in the bottom 50%, bottom 40%, bottom 30% of the sphere.

[0037] In some embodiments, the second element is a first lamp shade configured for guiding light, wherein the pendant light further comprises a second lamp shade configured for guiding light and a first connection element, the first connection element connecting the first lamp shade with the second lamp shade.

[0038] Consequently, more complex shade designs may be used without limiting the rotatability of the shade with respect to the first element.

[0039] In some embodiments, the widest width of the first lamp shade is wider than the widest width of the second lamp shade.

[0040] In some embodiments, the second lamp shade is arranged below and concentric with the first lamp shade.

[0041] In some embodiments, the pendant light further comprises a third lamp shade configured for guiding light and a second connection element, wherein the second connection element connects the third lamp shade with the first lamp shade and / or the second lamp shade.

[0042] In some embodiments, the widest width of the first lamp shade is wider than the widest width of the third lamp shade.

[0043] In some embodiments, the widest width of the second lamp shade is wider than the widest width of the third lamp shade.

[0044] In some embodiments, the third lamp shade is arranged below and concentric with the first lamp shade.

[0045] In some embodiments, the third lamp shade is arranged below and concentric with the second lamp shade.

[0046] In some embodiments, the first lamp shade is a first surface of revolution having a first profile curve and a first axis of revolution, the second lamp shade is a second surface of revolution having a second profile curve and a second axis of revolution.

[0047] In some embodiments, the third lamp shade is a third surface of revolution having a third profile curve and a third axis of revolution.

[0048] The first profile curve, the second profile curve and the third profile curve may be different curves. The first axis, the second axis, and the third axis may be all be coincident.

[0049] According to a second aspect the invention relates to a method of assembling a pendant light as disclosed in relation to the first aspect of the invention, wherein the first element is inserted into the second element through the lower opening of the second element.

[0050] The different aspects of the present invention can be implemented in different ways including as pendant lights and methods for assembling pendant lights described above and in the following, each yielding one or more of the benefits and advantages described in connection with at least one of the aspects described above, and each having one or more preferred embodiments corresponding to the preferred embodiments described in connection with at least one of the aspects described above and/or disclosed in the dependant claims. Furthermore, it will be appreciated that embodiments described in connection with one of the aspects described herein may equally be applied to the other aspects.

Brief description of the drawings

[0051] The above and/or additional objects, features and advantages of the present invention, will be further elucidated by the following illustrative and nonlimiting detailed description of embodiments of the present invention, with reference to the appended drawings, wherein:

Fig. 1a-c show a pendant light according to an embodiment of the invention.

Fig. 2a-d show an element of a pendant light according to an embodiment of the invention.

Fig. 3a-d show an element of a pendant light according to an embodiment of the invention.

Fig. 4a-d illustrate the rotatability of a pendant light according to an embodiment of the invention.

Fig. 5a-f show a pendant light according to an embodiment of the invention.

Detailed description

[0052] In the following description, reference is made to the accompanying figures, which show by way of illustration how the invention may be practiced.

[0053] Fig. 1a-c show a pendant light 100 for hanging from a ceiling along a central axis 110 according to an embodiment of the invention. Fig. 1a shows a side view, Fig. 1b shows a cross-section along the central axis 110, and Fig. 1c shows a perspective view. The pendant light 100 comprises a first element 101 and a second element 102. The first element 101 is shown in more detail in Figs. 3a-d, where Fig. 3a shows a side view, Fig. 3b shows a

central cross-section, Fig. 3c shows a top view, and Fig. 3d shows a bottom view. The second element 102 is shown in more detail in Figs. 2a-d, where Fig. 2a shows a side view, Fig. 2b shows a central cross-section, Fig. 2c shows a top view, and Fig. 2d shows a bottom view. In the following reference will be made to Figs. 1-3.

[0054] The first element 101 is connected to first electric circuitry 114 for providing electricity to a light source 115. In this embodiment the first electric circuitry 114 comprises a light socket 114. However, in other embodiments the electric circuitry may be permanently connected to a light source.

[0055] The first element 101 has an upper surface 103 for facing the ceiling and an lower surface 104 for facing a floor, i.e. when the pendant light 100 is hanging from a ceiling the upper surface 103 will be facing the ceiling and the lower surface 104 will be facing the floor. The second element 102 comprises an inner surface 106 and an outer surface 105. The first element 101 may have additional surfaces in addition to the upper surface 103 and the lower surface 104. Correspondingly, the second element 102 may have additional surfaces in addition to the outer surface 105 and the inner surface 106. A part of the inner surface 106 of the second element 102 is resting on a part of the upper surface 103 of the first element 101, and the second element 102 is rotatably arranged relative to the first element 101 around a first axis 111 between a first orientation and a second orientation. The second element 102 is further rotatably arranged relative to a second axis 112 between a third orientation and fourth orientation. The first axis 111 is perpendicular to the central axis 110 and the second axis 112, and the second axis 112 is perpendicular to the central axis 110. The rotatability of the second element 102 relative to the first element 101 allows the second element 102 to guide light in a desired direction. This allows light emitted from the pendant light 100 to be adapted to special situations.

[0056] The second element 102 has a lower opening 107 for allowing light to be emitted and an upper opening 108 having a rim 116, and the first element 101 is arranged to close the upper opening 108.

[0057] In this embodiment, the upper surface 103 of the first element 101 and the inner surface 106 of the second element 102 both have a spherical shape with a curvature of a common reference sphere 113 (see Figs. 2a and 3a), whereby the first axis 111 is intersecting the second axis 112 (and the central axis 110) in the centre of the reference sphere 113. This secures that the second element 102 may be rotated in any direction relative to the first element 101. The pendant light 100 further comprises a blocking element 120. The blocking element 120 is protruding from the upper surface 103 of the first element 101. The blocking element 120 is configured to limit the rotatability of the second element 102 relatively to the first element 101 by abutting the rim 116 of the upper opening 108 of the second element 102 both when the second element 102 is oriented in the first orientation

(see Fig. 4a), the second orientation (see Fig. 4b), the third orientation, and the fourth orientation relative to the first element 101.

[0058] The blocking element 120 may be part of the first electric circuitry 114 e.g. the blocking element 120 may be configured to receive an electric wire (not shown) and electrically connect the electric wire with a light socket 114 or a permanent light source. In this embodiment, the blocking element 120 is attached to a central opening 109 of the first element 101.

[0059] The first element 101 has a width 117 (see Fig. 3b) being smaller than the width 118 of the lower opening 107 (see Fig. 2b), whereby the first element 101 may be inserted into the second element 102 through the lower opening 107 of the second element 102.

[0060] In this embodiment, the width 117 of the first element 101 is only slightly smaller than the width 118 of the second element 102. This provides a high degree of rotatability of the second element 102 relative to the first element 101 while securing that the first element 101 still can be inserted into the second element 102 through the lower opening of the second element 107.

[0061] Fig. 1a-c show a pendant light 100 for hanging from a ceiling along a central axis 110 according to an embodiment of the invention. Fig. 1a shows a side view, Fig. 1b shows a cross-section along the central axis 110, and Fig. 1c shows a perspective view. The pendant light 100 comprises a first element 101 and a second element 102.

[0062] Fig. 4a-d illustrate the rotatability of a pendant light 400 for hanging from a ceiling along a central axis 110, according to an embodiment of the invention. The pendant light 400 comprises a first element 401, a second element 402, and first electrical circuitry 430 (only schematically shown). Figs. 4a-b both show a central cross-section and Figs. 4c-d both show a side view. The second element 402 is rotatably arranged relative to the first element 401 around a first axis 411, being perpendicular to the central axis 410, between a first orientation and a second orientation. The first axis 411 is only shown as a dot since it is perpendicular arranged relative the plane of the cross-sections. The second element 402 is shown in the first orientation in Figs. 4a and 4c and in the second orientation in Figs. 4b and 4d. The angle 440 between the local centre axis 441 of the second element 402 when the second element 402 is oriented in the first orientation and the local centre axis 442 of the second element 402 when second element 402 is oriented in the second orientation is approximately 45 degrees. However, in other embodiments the angle 440 is at least 15 degrees, 25 degrees, 35 degrees, or 40 degrees.

[0063] Fig. 5a-f show a pendant light 500 for hanging from a ceiling along a central axis 510, according to an embodiment of the invention. The pendant light 500 comprises a first element 501, a second element 502, and first electrical circuitry. Figs. 5a, 5c, and 5e show a side view, and Figs. 5b, 5d, and 5f show a central cross-section. The first element 501 has an upper surface for facing

the ceiling and a lower surface for facing a floor, i.e. when the pendant light 500 is hanging from a ceiling the upper surface will be facing the ceiling and the lower surface will be facing the floor. The second element 502 comprises an inner surface and an outer surface. A part of the inner surface 563 of the second element 502 is resting on a part of the upper surface of the first element 501 (see Fig. 5b), and the second element 502 is rotatably arranged relative to the first element 501 around a first axis between a first orientation and a second orientation. The second element 502 is shown in the first orientation in Figs. 5e-f and in intermediate orientations in Figs. 5a-d. The second element 502 is further rotatably arranged relative to a second axis between a third orientation and fourth orientation. The first axis is perpendicular to the central axis 510 and the second axis, and the second axis is perpendicular to the central axis 510. In this embodiment, the upper surface of the first element 501 and the inner surface of the second element 502 both have a spherical shape with a curvature of a common reference sphere, whereby the first axis is intersecting the second axis (and the central axis 510) in the centre of the reference sphere. In this embodiment, the second element 502 is a first lamp shade configured for guiding light, wherein the pendant light 500 further comprises a second lamp shade 550 and a third lamp shade 551 configured for guiding light and a first connection element 561 and a second connection element 562, the first connection element 561 connecting the second lamp shade 550 with the first lamp shade 502 and the second connection element 562 connecting the third lamp shade 551 with the first lamp shade 502. The widest width of the first lamp shade 502 is wider than the widest width of the second lamp shade 550, and the widest width of the second lamp shade 550 is wider than the widest width of the third lamp shade 551. All the lamp shades 502 550 551 are arranged concentric, the second lamp shade 550 is arranged below the first lamp shade 502 and the third lamp shade 551 is arranged below the second lamp shade 550. The first lamp shade 502 is a first surface of revolution having a first profile curve and a first axis of revolution (being the central axis 510), the second lamp shade 550 is a second surface of revolution having a second profile curve and a second axis of revolution (being the central axis 510), and the third lamp shade 551 is a third surface of revolution having a third profile curve and a third axis of revolution (being the central axis 510).

[0064] Although some embodiments have been described and shown in detail, the invention is not restricted to them, but may also be embodied in other ways within the scope of the subject matter defined in the following claims. In particular, it is to be understood that other embodiments may be utilised and structural and functional modifications may be made without departing from the scope of the present invention.

[0065] In device claims enumerating several means, several of these means can be embodied by one and the same item of hardware. The mere fact that certain meas-

ures are recited in mutually different dependent claims or described in different embodiments does not indicate that a combination of these measures cannot be used to advantage.

[0066] It should be emphasized that the term "comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Claims

1. A pendant light 100 for hanging from a ceiling along a central axis 110, the pendant light 100 comprises:

- a first element 101 having an upper surface 103 for facing the ceiling and an lower surface 104 for facing a floor;
- a second element 102 having an inner surface 106 and an outer surface 105; and
- first electrical circuitry 1114 connected to the first element 101 for providing electricity to a light source 115;

wherein at least a part of the inner surface of the second element 106 is resting on at least a part of the upper surface of the first element 103 and the second element 102 is rotatably arranged relative to the first element 101 around a first axis 111, being perpendicular to the central axis 110, between a first orientation and a second orientation whereby light may be directional guided.

2. A pendant light according to claim 1, wherein the angle between the local centre axis of the second element when the second element is oriented in the first orientation and the local centre axis of the second element when second element is oriented in the second orientation is at least 15 degrees, 25 degrees, 45 degrees or 60 degrees.
3. A pendant light according to any one of claims 1 or 2, wherein the second element is further rotatably arranged relative to the first element around a second axis between a third orientation and a fourth orientation, wherein the second axis is perpendicular to the central axis and the first axis.
4. A pendant light according to claim 3, wherein the angle between the local centre axis of the second element when the second element is oriented in the third orientation and the local centre axis of the second element when second element is oriented in the fourth orientation is at least 15 degrees, 25 degrees, 45 degrees, or 60 degrees.

5. A pendant light according to any one of claims 1 to 4, wherein the upper surface of the first element and the inner surface of the second element both have a spherical shape with a curvature of a common reference sphere, whereby the first axis is intersecting the second axis in the centre of the common reference sphere.

6. A pendant light according to any one of claims 1 to 5, wherein the second element has an upper opening having a rim, wherein the first element is arranged to close the upper opening of the second element.

7. A pendant light according to any one of claims 1 to 6, wherein the second element has a lower opening, and the first element has a width smaller than the width of the lower opening of the second element whereby the first element may be inserted into the second element through the lower opening of the second element.

8. A pendant light according to claim 6, wherein a blocking element is protruding from the upper surface of the first element, the blocking element being configured to limit the rotatability of the second element relatively to the first element by abutting the rim of the upper opening of the second element when the second element is oriented in the first orientation and the second orientation relative to the first element.

9. A pendant light according to claim 8, wherein the blocking element is further configured to limit the rotatability of the second element relatively to the first element by abutting the rim of the upper opening of the second element when the second element is oriented in the third orientation and the fourth orientation relative to the first element.

10. A pendant light according to any one of claims 1 to 9, wherein the second element is a shell of a sphere cut off in the top and the bottom.

11. A pendant light according to claim 10, wherein the cut off in the top (upper opening) is arranged in the top 20%, top 15% or to 10% of the sphere.

12. A pendant light according to any one of claims 10 or 11, wherein the cut off in the bottom (lower opening) is arranged in the bottom 50%, bottom 40%, bottom 30% of the sphere

13. A pendant light according to any one of claims 1 to 12, wherein the second element is a first lamp shade configured for guiding light, wherein the pendant light further comprises a second lamp shade configured for guiding light and a first connection element, the first connection element connecting the first lamp shade with the second lamp shade.

14. A pendant light according to claim 13, wherein the pendant light further comprises a third lamp shade configured for guiding light and a second connection element, wherein the second connection element connects the third lamp shade with the first lamp shade and / or the second lamp shade. 5
15. A method of assembling a pendant light according to any one of claims 1 to 14, wherein the first element is inserted into the second element through the lower opening of the second element. 10

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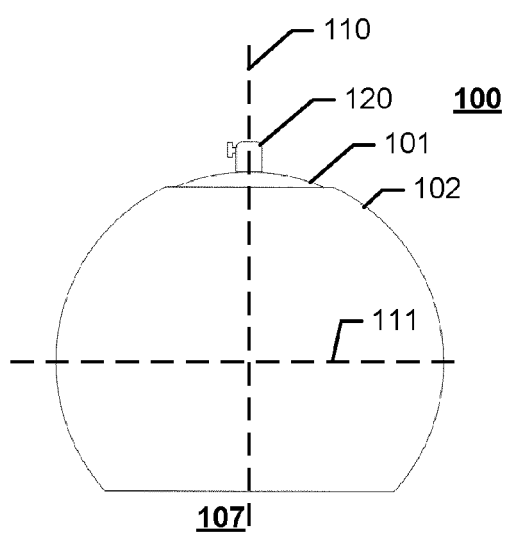


Fig. 1a

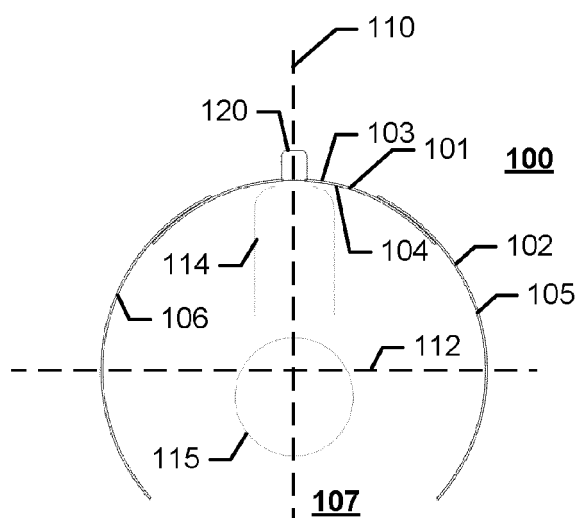


Fig. 1b

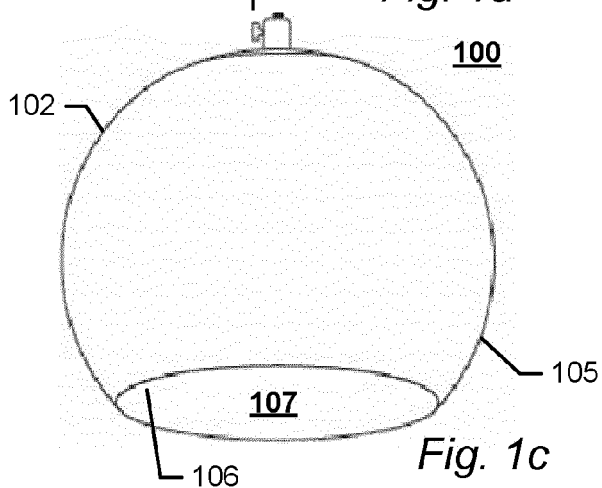


Fig. 1c

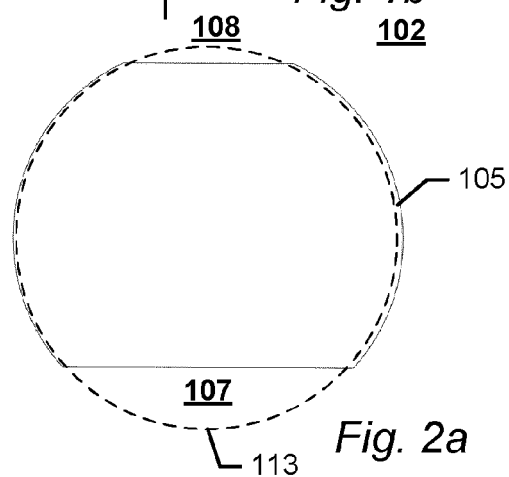


Fig. 2a

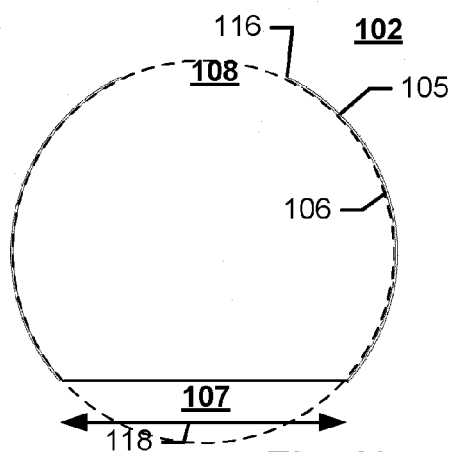


Fig. 2b

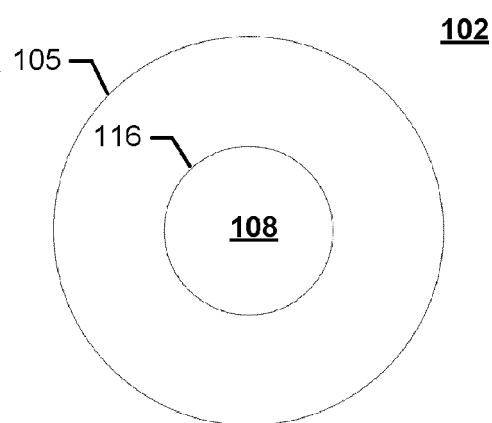


Fig. 2c

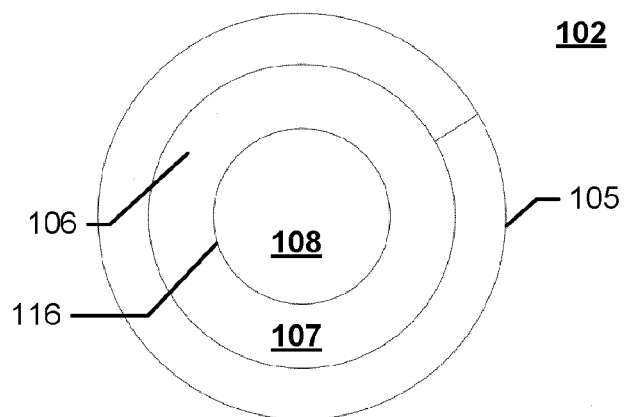


Fig. 2d

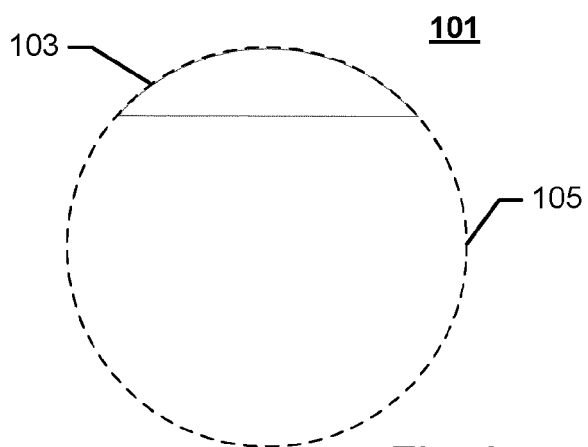


Fig. 3a

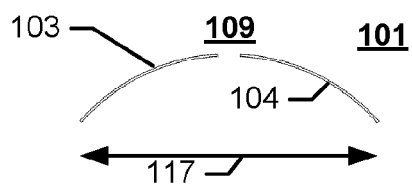


Fig. 3b

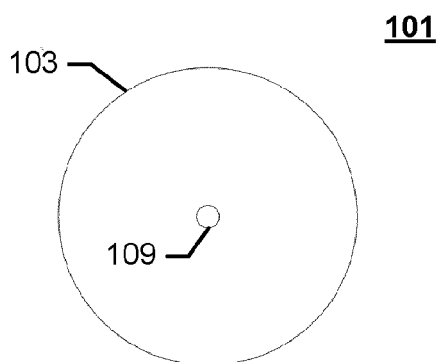


Fig. 3c

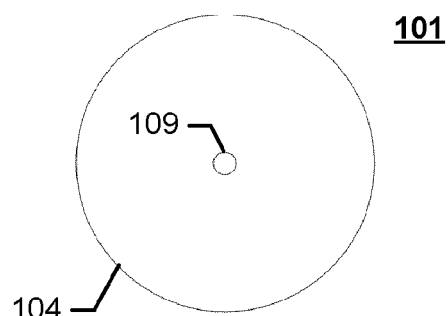
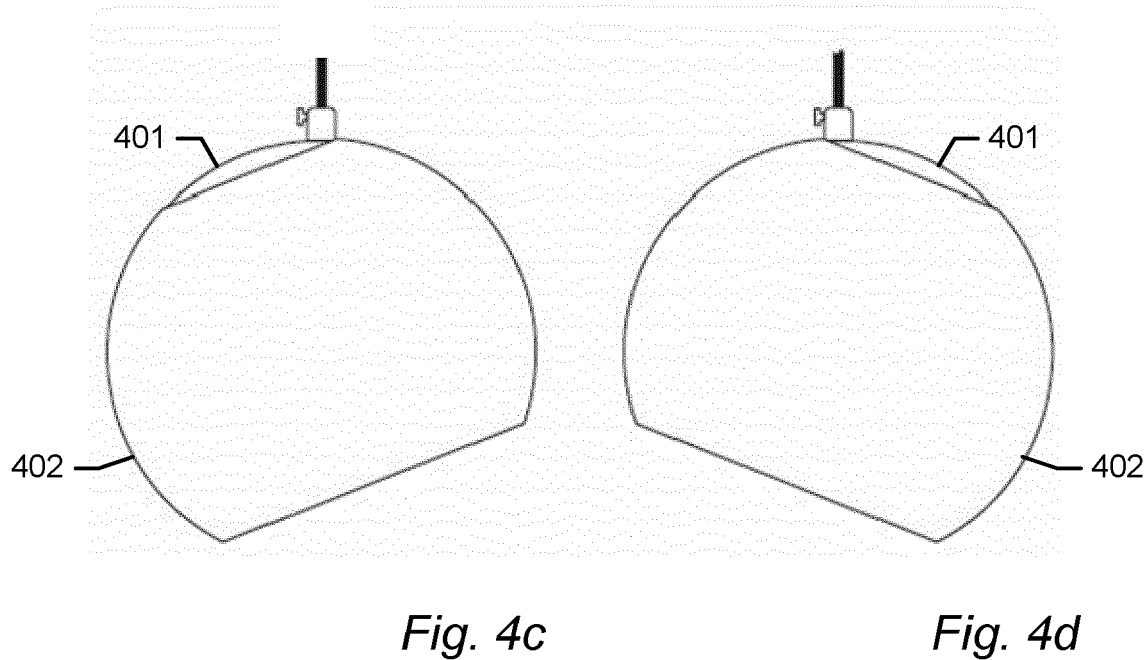
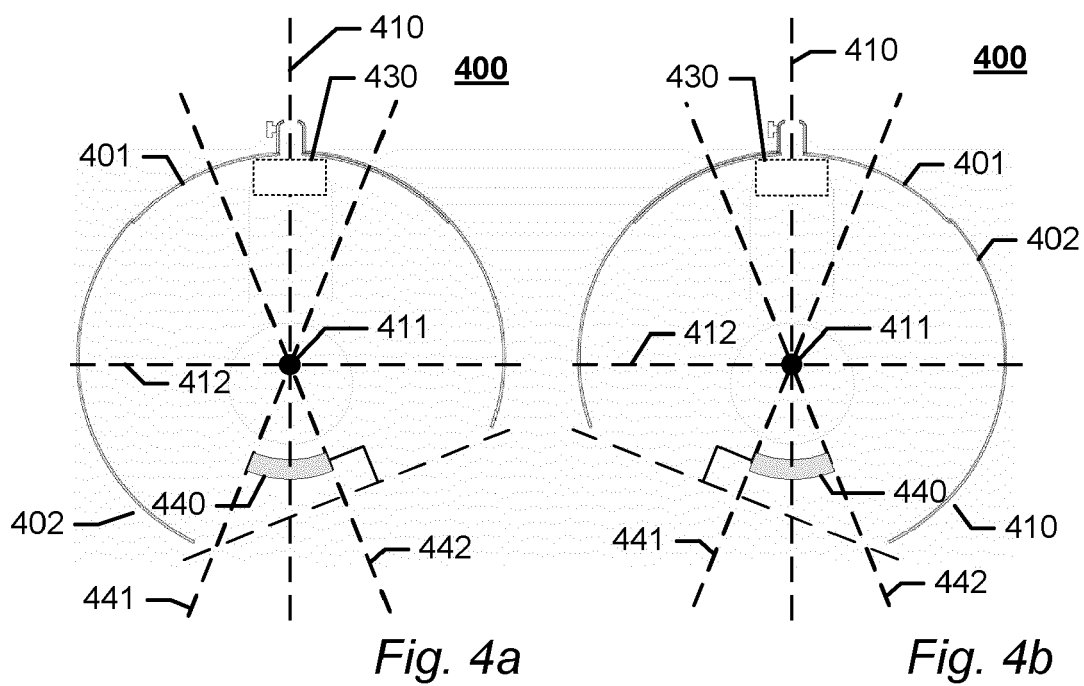
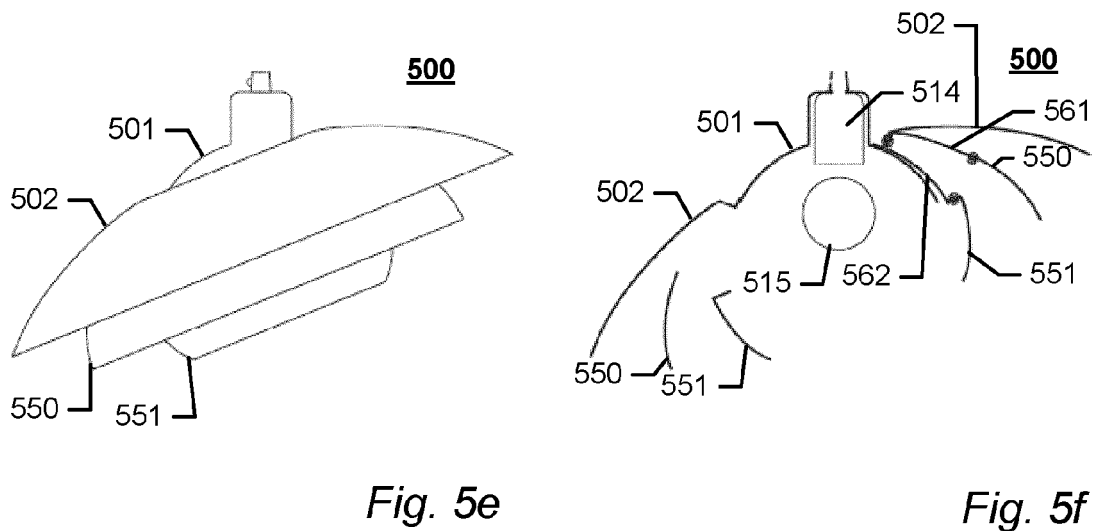
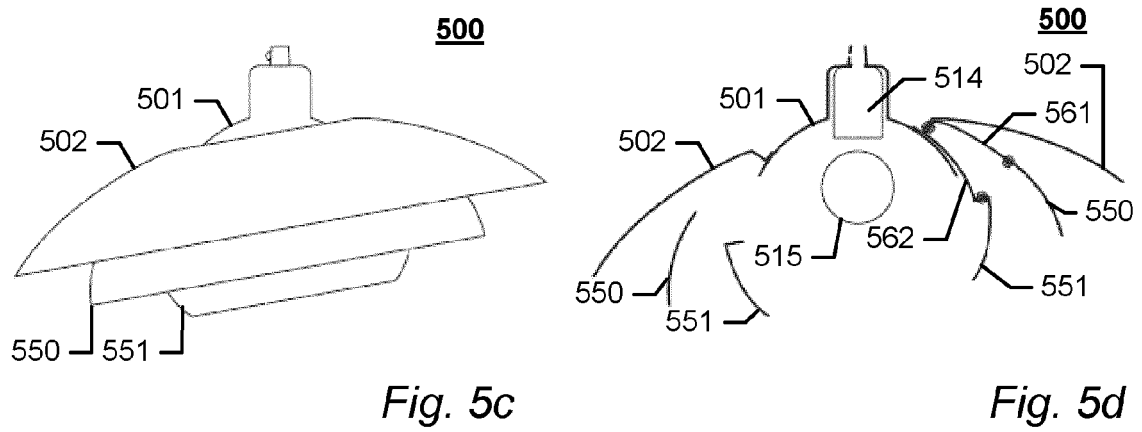
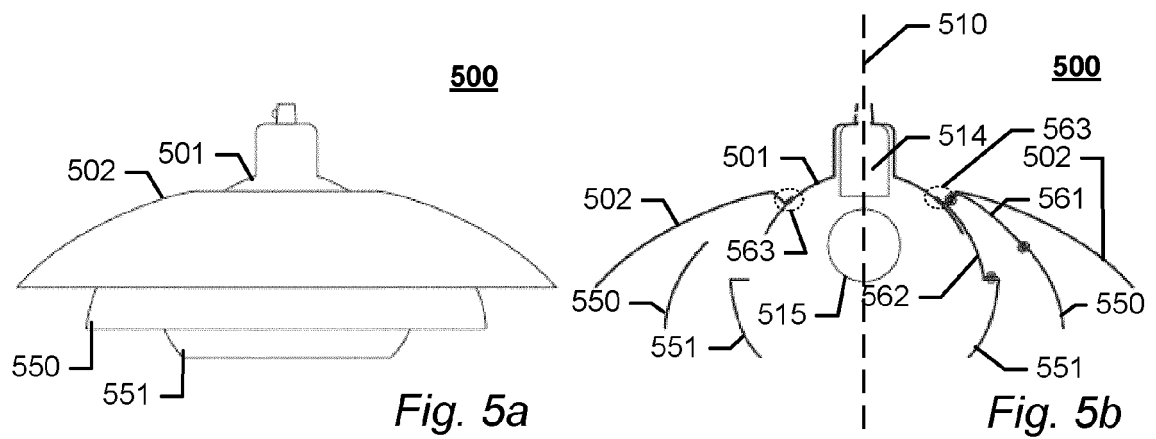


Fig. 3d







EUROPEAN SEARCH REPORT

Application Number
EP 14 18 4474

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 515 385 A (WILLIAM E. WARD) 27 February 1894 (1894-02-27) * the whole document *	1-15	INV. F21V1/10 F21S8/06
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