



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.08.2017 Bulletin 2017/31

(51) Int Cl.:
F21V 7/00 (2006.01) **F21S 4/28** (2016.01)
F21V 19/00 (2006.01) **F21Y 103/00** (2016.01)
F21Y 115/10 (2016.01) **F21V 15/01** (2006.01)

(21) Application number: **16153227.0**

(22) Date of filing: **28.01.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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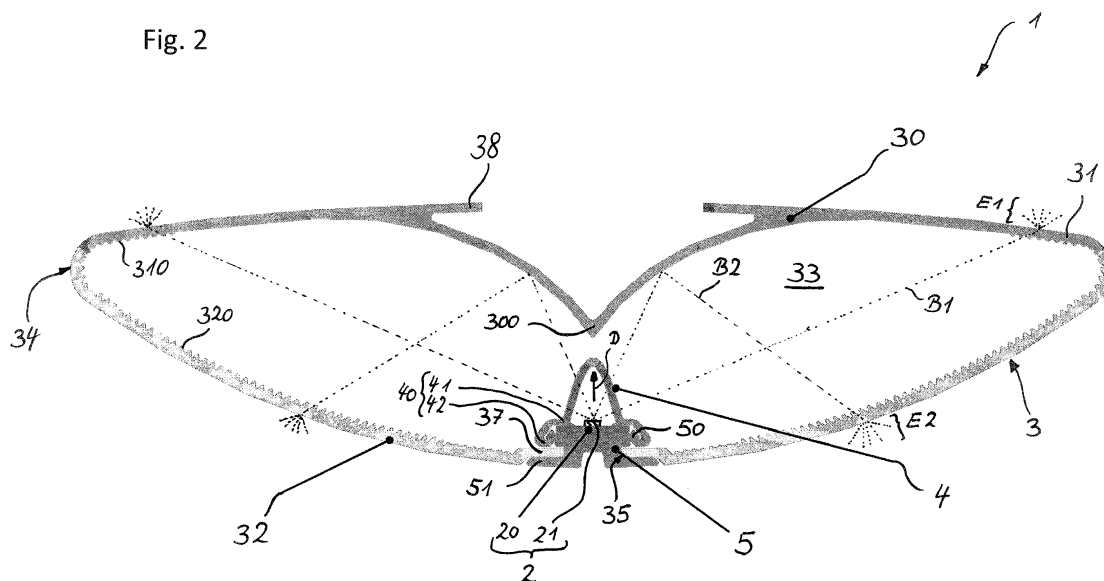
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(54) **LUMINAIRE**

(57) The present invention relates to a luminaire (1) comprising at least one LED module (2), and a housing (3) enclosing the LED module (2). The housing (3) comprises as optical housing areas (30-32) a reflection area (30) opposite to and facing the LED module (2), a first

light emitting area (31) for emitting direct light of the LED module (2), and a second light emitting area (32) for emitting light of the LED module (2) being reflected by the reflection area (30), wherein the second light emitting area (32) is opposite to the reflection area (30).

Fig. 2



Description

Field of invention

[0001] The present invention relates to a luminaire comprising at least one LED module as well as an optical housing enclosing the LED module. In particular, the present invention is directed to a luminaire using LEDs as light sources and allowing for a homogeneous light distribution or emission of the luminaire.

Background of the invention

[0002] In the prior art, there are known luminaires using a punctual light source like an LED. Such luminaires having such a direct light source are usually provided to emit light directly into a specific application (e.g. office, meeting room, etc.). This, however, often results in a more complex brightness management necessary to minimize the visual impact of the LEDs (e.g. by glare) and to achieve a required distribution for specific applications. This particularly applies for luminaires having a more or less homogeneous light distribution. To allow for a light distribution over a wide range around the luminaire, a complex light management is required for distributing the light of the punctual light source - which can usually emit light mainly in a particular direction in front of the LED module - into different directions of the luminaire; particularly to a front and rear direction of the luminaire, e.g., for a combined direct and indirect illumination.

[0003] To allow for a wide range of light distribution, present luminaires usually use two LED modules which are arranged such that they emit light in opposite directions, e.g. towards a front and rear direction with respect to the luminaire. This requires a plurality of LED modules only to allow for a homogeneous light emission over a comparably wide range around the luminaire which inherently adds cost and complexity.

[0004] The present invention seeks to address the above-described problems. In particular, the present invention has the object to provide a luminaire having a homogeneous light distribution over a wide range around the luminaire by using only one punctual light source, like an LED, or at least by using LEDs emitting light in only one spatial direction. The invention also aims at other objects and particularly the solution of other problems as will appear in the rest of the present description.

Summary of the invention

[0005] In a first aspect, the present invention relates to a luminaire comprising at least one LED module and a housing enclosing the LED module. The LED module usually has a main light emitting direction. The housing comprises particular optical housing areas (in the following the housing is thus also referred to as "optical housing") which are as follows: a reflection area opposite to and facing the LED module, a first light emitting area for

emitting direct light of the LED module and a second light emitting area for emitting light of the LED module being reflected by the reflection area, wherein the second light emitting area is opposite to the reflection area.

[0006] The term "direct light" means light being emitted from the LED module and not being reflected by the reflection area. The "direct light" can be further optically controlled (e.g. diffused) in the "direct" light path between the LED module and the first light emitting area.

[0007] In other words, unlike usual LED luminaires for providing direct light emission, the present luminaire provides the LED module in an inverted way, i.e., upside down, so that the main light emitting direction is directed to the inside of the luminaire housing. The light being emitted from the punctual light source (LED) is thus directed to an inside of the luminaire housing where part of the light is reflected by the reflection area and emitted via the second light emitting area while another part of the light is directly emitted via the first light emitting area. This results in a homogeneous light emission over a wide range around the luminaire and ideally up to 360 degrees at least in a cross sectional view of the luminaire. Hence, the need for a secondary light source (e.g. for indirect light emission of the luminaire) can be eliminated as the primary light source (LED module) allows for a direct and direct/indirect distribution due to the particular layout and arrangement of the respective optical housing areas with respect to the LED module and its emission direction towards an inside of the housing. In particular, the optical assembly is simplified due to the LED module being inverted with respect to presently known luminaires thus also preventing the end-user having direct sight onto the light source when being installed. In other words, light distribution is managed through a uniquely designed primary optic profile (i.e. the optical housing having the respective optical housing areas) to allow for a widely ranged and homogeneous light emission at least partially around the luminaire. The optical housing thus provides for a controlled optical performance while the profile dictates the unique aesthetic of the overall luminaire as the housing forms the optical feature of the luminaire as well. The inverted light source enables a reduction of its visibility (e.g. reduction of glare), enhances a homogeneous aesthetic, and enables the direct/indirect light distribution of the luminaire without the need of a secondary LED module.

[0008] In a preferred embodiment, the housing can have a longitudinal extension to thus form a longitudinal luminaire. Alternatively, the housing can also have a rotationally symmetric layout or any other layout to allow for a correspondingly designed optic profile.

[0009] The housing, at least the optical housing areas, is/are preferably integrally formed. The housing or the respective optical housing areas can be formed by way of co-extrusion (particularly for longitudinal luminaires) or injection molding. The housing is thus preferably made up of a corresponding plastic material well known in the art. For instance, co-extrusion elements allow for part

rationalization and enable flexibility with material alteration while allowing different distributions/aesthetics dependent on the particular layout of the respective optical housing areas. Hence, a housing can be provided being formed with (only) rounded corners while omitting angled portions, e.g., for aesthetic reasons.

[0010] The first light emitting area can at least be partially provided opposite to the LED module and the second light emitting area. In other words, the LED module is preferably provided on a side of the optical housing of the second light emitting area while the first light emitting area - for emitting "direct light" received from the LED module - is provided opposite thereto. By this arrangement, a preferred light emission over a wide range around the luminaire can be achieved.

[0011] In a preferred embodiment, the first light emitting area and the second light emitting area are designed and provided such that they emit the light from the LED module into substantially opposite directions. "Substantially opposite" means that the main emission direction of the respective light emitting areas is not parallel while there might be an overlap of the whole light being distributed over the respective light emitting areas to thus result in a more or less closed and thus homogeneous light emission area over a wide range around the luminaire.

[0012] The first light emitting area may laterally enclose the reflection area, at least in a cross sectional view of the housing preferably when viewed in a longitudinal direction of the luminaire. In other words, the reflection area is surrounded by the first light emitting area and the former is preferably positioned in a central position of the respective side of the luminaire housing. Hence, light emitted from the LED module can be reliably reflected by the reflection area being positioned opposite to and facing the LED module while the neighboring first light emitting area securely allows for a corresponding emission of direct light of the LED module.

[0013] The second light emitting area can be designed and provided to only emit light of the LED module being reflected by the reflection area. In other words, no direct light reaches the second light emitting area. In case the second light emitting area forms the side of the luminaire being directed to the user - i.e. for direct light emission into a room - (direct) glare by the light source can be avoided.

[0014] In a preferred embodiment of the present invention, the second light emitting area extends laterally from the LED module, e.g. with respect to a main light emitting direction of the LED module, and passes into the first light emitting area which converges into the reflection area opposite to the LED module to form the closed housing. In a preferred embodiment, the first and second light emitting areas are provided on opposite sides of the housing, i.e. on an upper and lower portion thereof, respectively. By means of this arrangement, a simple but effective design of an optical housing can be provided which allows for a homogeneous light emission over a wide range around the luminaire.

[0015] The housing may be designed such that, in a cross sectional view of the housing, the light path of light beams from the LED module to the first light emitting area forming a V-shape when being symmetrically mirrored with respect to the housing (or the LED module or the main light emitting direction), and the light path of light beams from the LED module to the second light emitting area and being reflected by the reflection area forming an M-shape when being symmetrically mirrored with respect to the housing (or the LED module or the main light emitting direction). In other words, the respective light paths of the light emitted by the LED module form an M-V-shaped light path or light emission to allow for a light emission preferably on both opposing sides (e.g. upper and lower side) of the optical luminaire housing. The combination of this M-V-shaped light emission thus allows for a combined direct and indirect light emission of the luminaire with only one light source emitting light in one (main) direction (preferably a rear direction) of the luminaire.

[0016] The LED module can be provided on the housing on the second light emitting area side thus being oriented to emit light into the inside of the housing. In particular, the LED module is preferably oriented to emit light into the inside of the housing towards the first light emitting area and particularly the reflection area. By positioning the LED module onto the housing, the whole inner space of the housing can be used for the dedicated (inner) light distribution. This allows for a space efficient layout so that the light emitted by the LED module reaches a large surface area of the housing - and particularly of the optical housing areas.

[0017] The first light emitting area and/or the second light emitting area are designed to optically control, e.g. diffuse and/or direct (at least in dedicated zones of the respective areas, i.e. partially), the light of the LED module being emitted via the respective optical housing area. The respective optical housing area can preferably be structured and/or contoured for obtaining the optical control, e.g. it comprises a roughen surface and/or prism optic or the like. The respective areas can also be provided with a corresponding optical control element like a light distribution layer. Thus, a specifically controlled light emission/distribution can be obtained while providing glare control (omission) and defined illumination management.

[0018] The luminaire can further comprise an optical element which is associated with the LED module to optically control, e.g. diffuse and/or direct, the light inside the housing before reaching the respective optical housing areas. This optical element is thus also provided inside the housing. The optical element may at least partially surround the LED module to be positioned in the light path of the light emitted by the LED module. Hence, this "secondary" optic profile allows for a defined light distribution inside the luminaire housing to thus preferably allow for a homogeneous light distribution inside the housing to provide the light of the LED module to a sur-

face area of the respective light emitting areas - being as large as possible - for light emission of the luminaire.

[0019] The luminaire can further comprise a heat sink being in (direct) thermal contact with the LED module and preferably being arranged rearwards of the LED module, i.e. with respect to a main light emitting direction of the LED module. In other words, the heat sink is preferably provided on a second light emitting area side with respect to the LED module - preferably at a center portion thereof in a cross sectional view - and may thus also be used as a glare protection to eliminate a light path for direct light from the LED module to at least a (major) part of the second light emitting area. Of course, the heat sink also provides for sufficient heat transfer and thus heat dissipation.

[0020] In a preferred embodiment, the optical element comprises retaining elements for retaining the LED module onto the heat sink. Thus, the respective features of the luminaire are mechanically simplified thus having a direct influence on cost and complexity reduction. As the optical element can additionally be used as a mechanical fixing component for retaining the LED module to the heat sink, the layout can be simplified and the number of parts can be reduced with respect to present luminaires usually using separate fixing means like screws or pins. The retaining elements can comprise a clamping portion and a fixing element sandwiching at least a part of the heat sink and the LED module.

[0021] In a preferred embodiment, the luminaire may comprise a plurality of LED modules which are preferably arranged in a row along or substantially in parallel to the longitudinal axis of the housing. Taking into consideration the general layout of the luminaire according to the present invention, the LED modules are all oriented such that they emit light in the same spatial direction (here: rearwards) so that the advantages which apply for a single LED module luminaire also apply for the mentioned multi LED module luminaire having a plurality of LED modules.

[0022] The plurality of LED modules may be associated with an integral heat sink for the plurality of LED modules. In other words, the heat sink can be designed such that a plurality of LED modules can be provided thereon in a manner as already described herein above thus resulting in a reduction of components and costs and thus in a simplified assembly.

[0023] The LED module or the heat sink can be provided in and/or attached to an opening of the housing. Thus, the attachment of the electronic components of the luminaire is simplified. In a preferred embodiment, the opening is provided on the second light emitting area side. The opening can be formed as a longitudinal slit in the housing having a longitudinal extension. If so, a corresponding integral heat sink for a plurality of LED modules can be designed geometrically conforming to the layout of the opening to thus allow for an easy attachment of the electronic components (LED modules) including the heat sink. The heat sink might form an aesthetic el-

ement of the luminaire at least on an outer side of the luminaire, i.e. at least on a side of the heat sink being opposite to the LED module thermally connected therewith. In case the housing is produced by co-extrusion, the opening in form of a slit can be easily provided during this co-extrusion process so that the production of a respective optical housing is simplified.

[0024] The reflection area may substantially have a V-shape in a cross sectional view of the housing having its tapered end projecting towards the LED module. Hence, the light emitted from the LED module towards the reflection area can be easily directed or distributed, i.e. reflected, as required towards the respective second light emitting area to be provided there for light emission of the luminaire.

[0025] The reflection area may be provided by a reflective coating which can be subsequently provided onto the respective area of the optical housing. Alternatively, the reflection area can also be provided by attachment of a separate reflector in the respective area.

Brief description of the drawings

[0026] Further features, advantages and objects of the present invention will become apparent for a skilled person when reading the following detailed description of the embodiments of the present invention, when taking in conjunction with the figures of the enclosed drawings.

Figure 1 shows a perspective view of a luminaire according to an embodiment of the present invention, and

Figure 2 shows a cross sectional side view of the luminaire of figure 1.

Detailed description of the figures

[0027] Figures 1 and 2 show an embodiment of a luminaire 1 according to the present invention. The luminaire 1 comprises at least one LED module 2. The LED module 2 usually comprises a PCB (printed circuit board) 20 having one or a plurality of LED chips 21 for emitting light. Such an LED module usually has a main light emitting direction D while the overall light emission of an LED module 2 is generally hemispherical.

[0028] The luminaire 1 further comprises a housing 3. The housing 3 can, as shown in the embodiment of figures 1 and 2, have a longitudinal extension preferably with a mirror symmetrical layout in a cross-sectional (see figure 2). However, the present invention is not limited to such a layout. The housing 3 can also be rotationally symmetric or can have another layout. The housing 3 is preferably integrally formed. If the housing 3 has a longitudinal extension as shown in the figures, said housing 3 can, for instance, be produced by way of co-extrusion. Alternatively and in particular when the housing 3 has not a longitudinal extension, the housing 3 can also be

produced by injection molding. The housing 3 is preferably made of a corresponding plastic material being transparent/translucent to allow for light emission. In a preferred embodiment, the housing 3 can also be produced by a multi component injection molding process to provide an integral housing 3 while at the same time a defined material composition for respective areas of the housing for optimization of the luminaire characteristics.

[0029] As can be seen from figures 1 and 2, the housing 3 comprises different optical housing areas 30, 31, 32.

[0030] One of these optical housing areas is a reflection area 30 being provided opposite to and facing the LED module 2 (i.e. the effective side of the LED module 2 (or LED chip 21) for light emission). The reflection area 30 can substantially have a V-shape in a cross-sectional view as shown in figure 2 having its tapered end 300 projecting towards the LED module 2. This allows for a defined light distribution, particularly inside 33 the housing 3. The reflection area 30 can be provided by a reflective coating. Alternatively, a separate reflector can be attached to a respective area of the housing 3 to form the reflection area 30.

[0031] Another optical housing area of the housing 3 is a first light emitting area 31 for emitting direct light of the LED module 2. This means that the first light emitting area 31 is provided and arranged such that light which is not reflected by the reflective area 30 is provided at (i.e. can reach) the first light emitting area 31 for light emission of the luminaire 1.

[0032] Another optical housing area of the housing 3 is a second light emitting area 32 for emitting light of the LED module 2 being reflected by the reflection area 30, wherein the second light emitting area 32 is provided opposite to the reflection area 30.

[0033] The arrangement of the respective optical areas 30-32 with respect to each other allows for supply of light emitted by the LED module 2 to an inside 33 of the housing 3 to a huge surface area of the optical housing 3 thus allowing for light distribution of the luminaire 1 over a wide range around said luminaire 1; preferably up to 360°.

[0034] The first light emitting area 31 can laterally enclose the reflection area 30 - as is apparent from figure 2 - at least in a cross-sectional view of the housing 3 preferably when viewed in a longitudinal direction of the luminaire 1. Hence, the reflection area 30 can be positioned right in front of the LED module 2 to allow for a reliable light reflection to guide the reflected light towards the second light emitting area 32 while at the same time the first light emitting area 31 is provided such that direct light can be easily directed towards this first light emitting area 31 from the LED module 2 as can be clearly gathered from figure 2.

[0035] The first light emitting area 31 is at least partially provided opposite to the LED module 2 and the second light emitting area 32 which allows for a homogenous light distribution over a wide range around the luminaire 1.

[0036] The first light emitting 31 and the second light

emitting area 32 are preferably designed and provided such that they emit the light from the LED module 2 into substantially opposite directions. As can be gathered from figure 2, the first and second light emitting areas 31, 32 are generally oriented into opposite directions so that light being emitted from these respective areas can be distributed over a comparably wide range - e.g. surface area - of the luminaire 1.

[0037] In a preferred embodiment, the second light emitting area 32 - which in the present embodiment forms a portion of the luminaire 1 for direct light emission into a space (room) to be illuminated - can be designed and provided to only emit light of the LED module 2 being reflected by the reflection area 30; i.e. no direct light of LED module 2 reaches the second light emitting area 32 unless it has been reflected by the reflection area 30 first. This allows for a glare control/omission of a user being positioned in a space of direct illumination of the luminaire 1.

[0038] As can be gathered from figure 2, the second light emitting area 32 may extend laterally from the LED module 2, preferably with respect to the main light emitting direction D of the LED module 2 (preferably from both opposite sides of the LED module 2 as depicted in figure 2), and pass into the first light emitting area 31 (here at a corner portion 34 of the optical housing 3) and which then converges in the reflection area 30 opposite to the LED module 2 to form the closed housing 3. This is a preferred layout of the optical housing 3 preferably having no angled portions (edges) thus positively affecting the aesthetics of the luminaire 1. Moreover, a housing 3 being designed as such can be easily produced by way of co-extrusion for a longitudinal luminaire 1.

[0039] As depicted in figure 2, the housing 3 and in particular its optical housing areas 30-32 can be designed such that, in a cross sectional view of the housing 3, the light path of light beams B1 from the LED module 2 to the first light emitting area 31 forms a V-shape when being symmetrically mirrored with respect to the housing 3 or the LED module 2 or the main light emitting direction D. Moreover, the housing 3 or better the optical housing areas 30-32 are designed such that, in a cross sectional view of the housing 3, the light path of light beams B2 from the LED module 2 to the second light emitting area 32 and being reflected by the reflection area 30 form an M-shape when being symmetrically mirrored with respect to the housing 3, the LED module 2 or the main light emitting direction D. This M-V-shaped light emission allows for a homogeneous wide light distribution of light emitted by the LED module 2 to an inside 33 of the housing 3 to thus provide the light emitted from the LED module 2 to a large surface of the housing 3 and in particular over (almost the whole) surface area of the first and second light emitting areas 31, 32 to allow for a homogeneous light distribution over a large area around the luminaire 1. Hence, direct light emission E1 and indirect light emission E2, as exemplarily shown in figure 2, can be easily achieved by using just a "primary" LED module 2

without the need of a "secondary" LED module emitting light in an opposite direction with respect to the "primary" LED module 2.

[0040] As can be seen in figure 2, the LED module 2 is provided on the housing 3 on the second light emitting area 32 side and is oriented to emit light into the inside 33 of the housing 3 towards the first emitting area 31 and particularly the reflection area 30. By placing the LED module 2 onto the housing 3, light distribution within the luminaire housing 3 can be optimized as the light emitted from the LED module 2 can be most efficiently provided to a large (inner) surface area of the housing 3.

[0041] The first light emitting area 31 and/or the second light emitting area 32 can preferably be designed to optically control the light of the LED module 2 being emitted E1, E2 via the respective optical housing area 31, 32. Optical control can be diffusion (see for demonstrating purposes E1 and E2) or directing of light. The respective light emitting areas 31, 32 can also be divided into particular zones each providing a different type or characteristic or value of optical control. The respective optical housing areas 31, 32 can preferably be structured and/or contoured for obtaining the optical control. As can be seen in figure 2, the respective surface can comprise prism optics 310, 320. The respective surface can also be roughened or any other kind of structure/contour for obtaining the optical control effect can be provided. The optical control is preferably integrally formed with the housing and respective structures may extend in a longitudinal direction of the housing 2 so that they can be provided by way of co-extrusion when producing the housing 3 of a longitudinal luminaire 1. It is also possible to provide/attach an additional element for performing the optical control (e.g. a diffusion layer or the like).

[0042] The luminaire 1 can further comprise an optical element 4 which is associated with the LED module 2 to optically control, e.g. diffuse and/or direct, the light inside the housing 3 before reaching the respective optical housing areas 30-32. As can be gathered from figure 2, the optical element 4 can at least partially surround the LED module 2 to be positioned in the light path of the light emitted by the LED module 2. In a preferred embodiment, the optical element 4 can comprise light influencing elements, like phosphor or scattering particles, to influence the light characteristics. For instance, the optical element 4 can thus be formed as a remote phosphor element.

[0043] The luminaire 1 can further comprise a heat sink 5 which is in (direct) thermal contact with the LED module 2. The heat sink 5 is preferably arranged rearwards of the LED module 2, i.e. with respect to the main light emitting direction D of the LED module 2. The arrangement of this heat sink 5 thus allows for sufficient heat dissipation.

[0044] In a preferred embodiment as depicted in figure 2, the optical element 4 comprises retaining elements 40 for retaining the LED module 2 onto the heat sink 5. These retaining elements 40 can comprise a clamping portion

41 and a fixing element 42 sandwiching at least a part of the heat sink 5 and the LED module 2. As can be seen in figure 2, corresponding fixing elements 42 are designed as latch portions which snap over protrusion elements 50 of the heat sink 5 for fixing the optical element 4 and allowing for retention of the LED module 2 onto the heat sink 5.

[0045] The luminaire 1 may further comprise a plurality of LED modules which are preferably arranged in a row along or substantially in parallel to the longitudinal axis A of the housing 3. As is apparent from the present invention, the LED modules 2 thus should have their main light emitting direction D being substantially directed into the same spatial direction (here: rearwards = upwards in figure 2) to allow for a corresponding homogeneous light distribution in the sense of the present invention.

[0046] The plurality of LED modules 2 may then be associated with an integral heat sink 5. In other words, one integral heat sink 5 can be provided to allow for thermal contact with the plurality of (e.g. all) LED modules 2 of the luminaire 1. As can be seen from figure 1, this integral heat sink 5 might form an aesthetic element of the luminaire 1.

[0047] As can be gathered from figure 2, the LED module 2 or the heat sink 5 can be provided in and/or attached to an opening 35 of the housing 3. Hence, no additional parts are required for attaching the electronic components (like the LED module 2 and related elements like the heat sink 5) to the luminaire housing 3. As the LED module 2 is preferably provided on a second light emitting area 32 side, the respective opening 35 is provided on this side as well. In a preferred embodiment as also depicted in figure 1, the opening 35 is preferably formed as a longitudinal slit in the housing 3 having a longitudinal extension. This allows for the respective element 2, 4, 5 to be provided in and/or attached to that opening 35 by simply sliding them into the opening from a side of the housing 3 in a longitudinal direction. The housing 3 as well as the corresponding element provided in the opening 35 (here the heat sink 5) may comprise corresponding structural elements 37, 51 to allow for a secure attachment of the respective element 5 to the housing 3.

[0048] The housing 3 may further comprise attachment elements 38 for attaching the luminaire 1 at a desired location. These attachment elements 38 can be integrally formed with the housing 3 and are preferably designed to extend in a longitudinal direction of the housing 3 so that they can be provided during a possible co-extrusion process of the housing 3.

[0049] The luminaire can be provided by producing/providing a corresponding housing 3 (e.g. by co-extrusion). If required, corresponding reflectors and/or light distribution layers or the like are provided at the respective optical housing areas. Then, the LED module 2 is provided, e.g. by providing it in the opening 35 preferably along with the heat sink 5 and optical element 4. The invention thus also covers a method for providing/producing a housing 3 as well as a luminaire 1 as described

herein.

[0050] The present invention is not limited by the embodiments as described herein above. In particular, the features of the respective embodiments can be combined in any possible way as long as being covered by the appended claims. Particularly, the present invention is not limited to a particular design or material of the respective features. Also the amount of LED modules 2 is not limited by the present invention.

Claims

1. Luminaire (1) comprising:

at least one LED module (2), and
a housing (3) enclosing the LED module (2),
wherein the housing (3) comprises as optical
housing areas (30-32):

- a reflection area (30) opposite to and facing the LED module (2),
- a first light emitting area (31) for emitting direct light of the LED module (2), and
- a second light emitting area (32) for emitting light of the LED module (2) being reflected by the reflection area (30), wherein the second light emitting area (32) is opposite to the reflection area (30).

2. Luminaire (1) according to claim 1, wherein the housing (3) has a longitudinal extension or a rotationally symmetric layout, and wherein the housing (3), at least the optical housing areas (30-32), are preferably integrally formed, e.g., by way of co-extrusion or injection molding.

3. Luminaire (1) according to claim 1 or 2, wherein the first light emitting area (31) is at least partially provided opposite to the LED module (2) and the second light emitting area (32), and/or wherein the first light emitting area (31) and the second light emitting area (32) are designed and provided such that they emit the light from the LED module (2) into substantially opposite directions.

4. Luminaire (1) according to any one of the preceding claims, wherein the first light emitting area (31) laterally encloses the reflection area (30), at least in a cross sectional view of the housing (3) preferably when viewed in a longitudinal direction of the luminaire (1).

5. Luminaire (1) according to any one of the preceding claims, wherein the second light emitting area (32) is designed and provided to only emit light of the LED module (2) being reflected by the reflection area (30).

6. Luminaire (1) according to any one of the preceding claims, wherein the second light emitting area (32) extends laterally from the LED module (2), e.g. with respect to a main light emitting direction of the LED module (2), and passes into the first light emitting area (31) which converges in the reflection area (30) opposite to the LED module (2) to form the closed housing (3).

7. Luminaire (1) according to any one of the preceding claims, wherein the housing (3) is designed such that, in a cross sectional view of the housing (3), the light path of light beams (B₁) from the LED module (2) to the first light emitting area (31) forming a V-shape when being symmetrically mirrored with respect to the housing (3), and the light path of light beams (B₂) from the LED module (2) to the second light emitting area (32) and being reflected by the reflection area (30) forming an M-shape when being symmetrically mirrored with respect to the housing (3).

8. Luminaire (1) according to any one of the preceding claims, wherein the LED module (2) is provided on the housing (3) on the second light emitting area (32) side, wherein the LED module (2) is oriented to emit light into the inside (33) of the housing (3) towards the first light emitting area (31) and the reflection area (30).

9. Luminaire (1) according to any one of the preceding claims, wherein the first light emitting area (31) and/or the second light emitting area (32) are designed to optically control, e.g. diffuse and/or direct, the light of the LED module (2) being emitted via the respective optical housing area (31, 32), wherein the respective optical housing area (31, 32) is preferably structured and/or contoured for obtaining the optical control, e.g. comprising a roughened surface and/or prism optic (320).

10. Luminaire (1) according to any one of the preceding claims, further comprising an optical element (4) being associated with the LED module (2) to optically control, e.g. diffuse and/or direct, the light inside (33) the housing (3) before reaching the respective optical housing areas (30-32), wherein the optical element (4) preferably at least partially surrounds the LED module (2) to be positioned in the light path of the light emitted by the LED module (2).

11. Luminaire (1) according to any one of the preceding claims, further comprising a heat sink (5) being in thermal contact with the LED module (2) and preferably arranged rearwards of the LED module (2).

12. Luminaire (1) according to any one of the preceding claims, wherein the optical element (4) comprises

retaining elements for retaining the LED module (2) onto the heat sink (5), wherein the retaining elements (40) preferably comprise a clamping portion (41) and a fixing element (42) sandwiching at least a part (50) of the heat sink (5) and the LED module (2). 5

13. Luminaire (1) according to any one of the preceding claims, further comprising a plurality of LED modules (2) which are preferably arranged in a row along or substantially in parallel to the longitudinal axis (A) of the housing (3), and which are more preferably associated with an integral heat sink (5) for the plurality of LED modules (2). 10

14. Luminaire (1) according to any one of the preceding claims, wherein the LED module(s) (2) or the heat sink (5) is provided in and/or attached to an opening (35) of the housing (3), preferably on the second light emitting area (32) side, wherein the opening (35) is preferably formed as a longitudinal slit in the housing (3) having a longitudinal extension. 15 20

15. Luminaire (1) according to any one of the preceding claims, wherein the reflection area (30) substantially has a V-shape in a cross sectional view having its tapered end (300) projecting towards the LED module (2), and wherein the reflection area (30) preferably is provided by a reflective coating or a separate reflector. 25

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Fig. 1

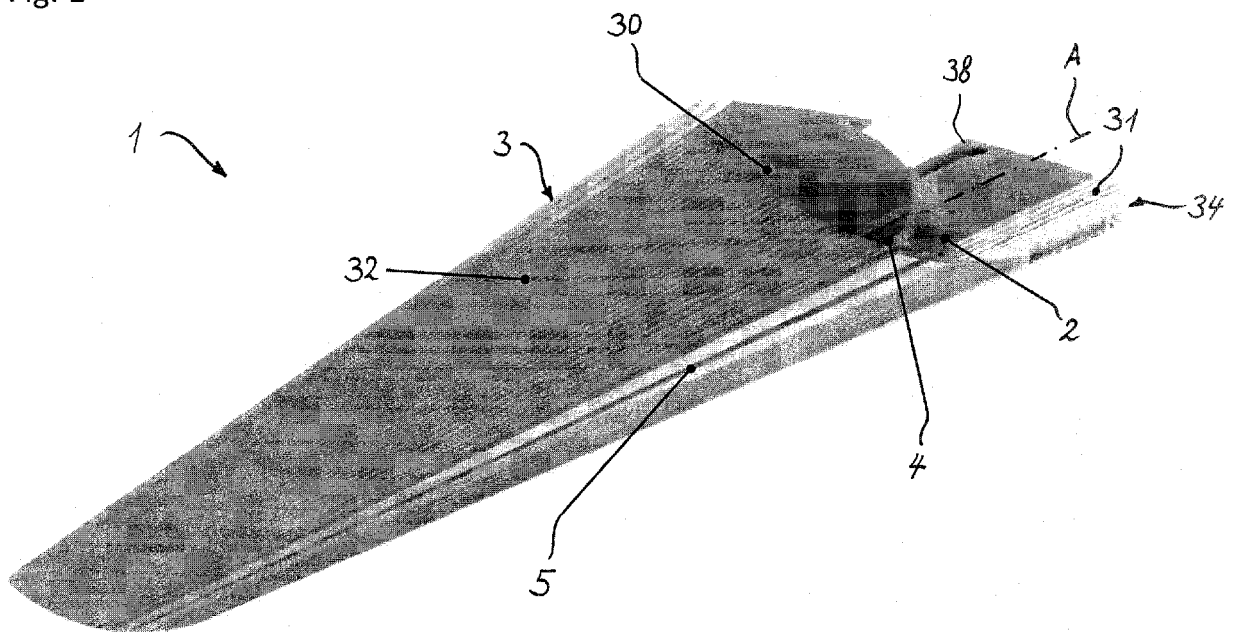
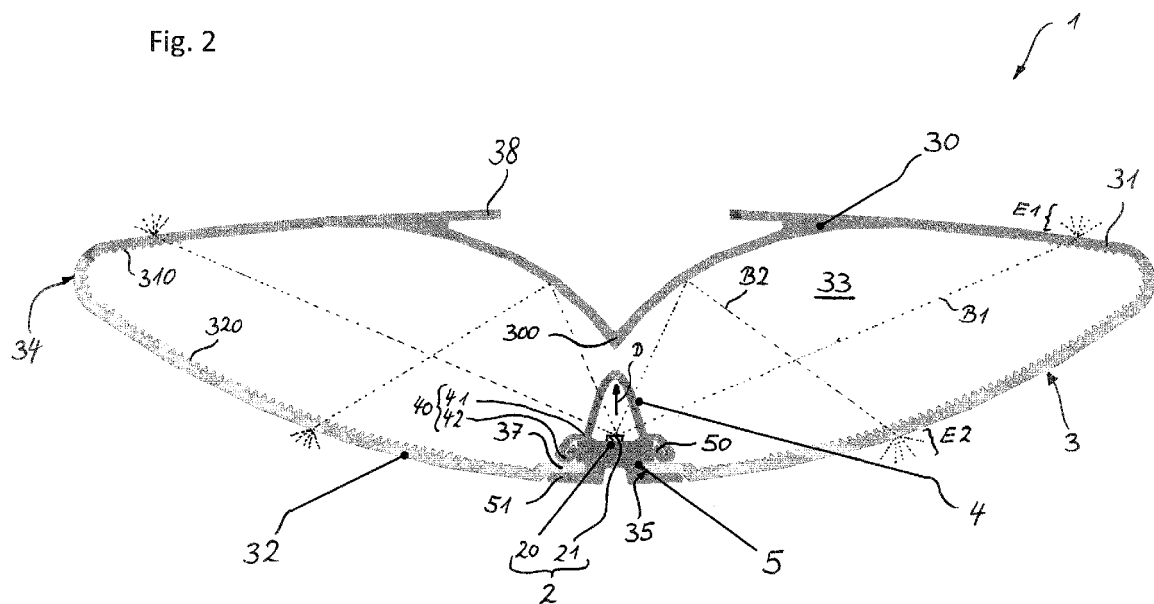


Fig. 2





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