



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.06.2009 Bulletin 2009/26

(51) Int Cl.:
F21V 5/04 ^(2006.01) **F21K 7/00** ^(2006.01)
F21V 17/12 ^(2006.01) **F21Y 101/02** ^(2006.01)

(21) Application number: **08171853.8**

(22) Date of filing: **16.12.2008**

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

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(30) Priority: **21.12.2007 IT PD20070426**

(54) **Lighting body with lens**

(57) Lighting body, provided with support (S), for housing two or more LEDs (L), comprising at least one lens or a transparent element (A), positioned above said

support (S), provided with diffusing partly opacified lower surface (A2), so that the light emitted by each LED (L) crosses wholly or partly the diffusing opacified surface (A2) of said lens or transparent element (A).

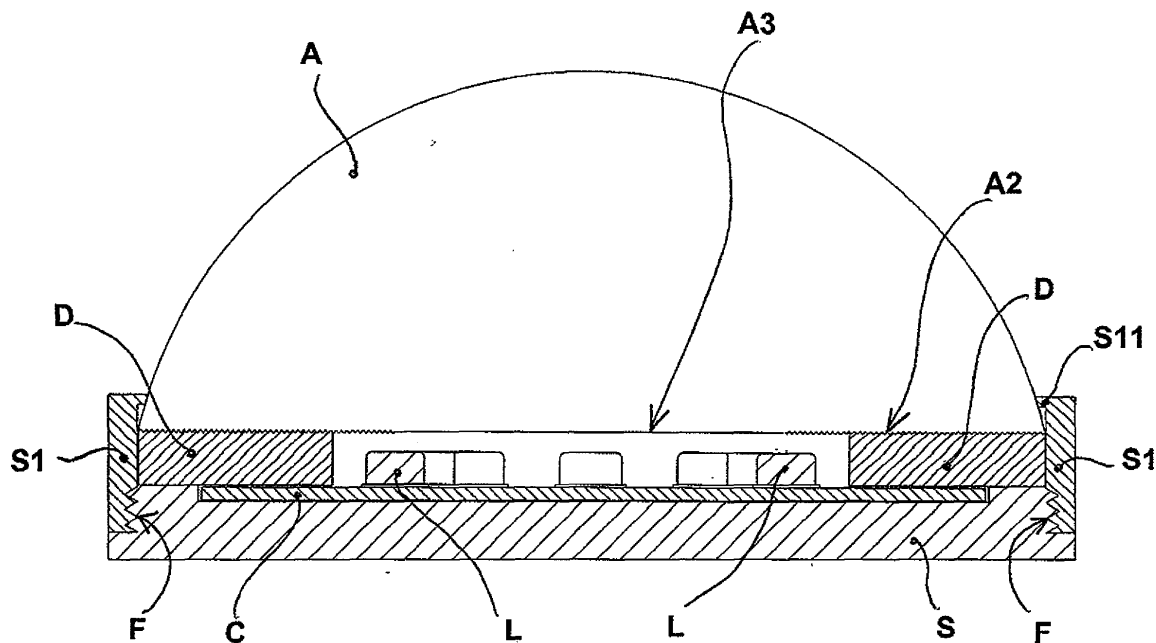


Fig.2

Description

[0001] The present patent relates to the sector of lighting equipment, both outdoor and indoor, and in particular concerns a new lighting body with lens for light-emitting diodes.

[0002] Currently in the field of domestic and other lighting, LEDs (Light Emitting Diodes) are increasingly used with respect to the traditional incandescent bulbs.

[0003] In fact LEDs provide a high luminosity at a low cost in terms of both consumption and production, maintaining a high level of efficiency and dependability.

[0004] These LEDs consist substantially of diodes which, if polarised directly, emit visible light.

[0005] LEDs are used widely for signalling on control panels and as pilot lights, or as transmitters for remote controls and optical fibres.

[0006] High luminosity models suitable for the technical lighting sector have been recently developed, and today the market already offers a wide range of lighting equipment which uses a LED unit as the light source, providing an alternative to the traditional incandescent bulbs and fluorescent bulbs, with great advantages in terms of energy saving and duration.

[0007] Their direct polarisation voltage varies according to the wavelength of the light they emit, and the more electric current crosses them, the more light they emit; generally a minimum current is required for them to emit light in a perceptible quantity. The current varies according to the type of LED diode used. The commonest LED diodes require, on average, low amperages to emit a good luminosity. In recent years high luminosity LEDs have also been developed, with almost double amperage values.

[0008] The first LEDs produced were available only in the colour red. Subsequently LEDs were developed that emitted both yellow and green light. With the production of LEDs with blue light, it was possible to produce devices which, incorporating at least three LEDs, one red, one green and one blue, could generate any colour.

[0009] Individually said LEDs do not emit large quantities of light, hence they are usually coupled with other LEDs so as to form a lighting body with greater overall luminosity.

[0010] A big drawback of the above-mentioned lighting bodies is due to the fact that each LED projects a cone of light independent of the others which, when they overlap each other, cause an anomaly known as parasitic light, manifested by the creation of a series of less luminous lines along the edge of the light projected onto a wall.

[0011] The effect of the parasitic light is furthermore aggravated when LEDs are used which emit light of different colours like white, green, red or yellow, or white only; the lens separates the luminous spectrum, creating the rainbow effect on the edges.

[0012] To eliminate the effect of the parasitic light, diaphragms are used; however, the latter considerably re-

duce the overall luminosity of the lighting body.

[0013] To remedy all the above-mentioned drawbacks, a new type of lighting body has been developed and produced with lens for light-emitting diodes.

[0014] The object of the new lighting body with lens for light-emitting diodes is to eliminate the effect of the parasitic light, maintaining almost unchanged the overall light emitted by the new lighting body.

[0015] The new lighting body, in its main parts, comprises a support for housing two or more LEDs and at least one lens, suitable for favouring uniform diffusion of the light emitted by said LEDs and conveying it into a narrower field 50° - 120° with respect to the light emitted by the LED which covers a field of 180°.

[0016] Said support comprises at least one electronic circuit, connecting said LEDs to one another and to the electrical supply, and one or more hooks, integral with said support, suitable for hooking and retaining said lens.

[0017] Said lens, positioned above said support, comprises at least one central convex body, made of transparent material, for example plastic or glass, provided with a substantially convex or flat lower surface and a convex upper surface.

[0018] Said lower surface, in the preferred flat solution, comprises at least one diffusing opacified portion obtained, for example, by sandblasting or photoengraving, so as to leave the central part of said lower surface transparent and non-treated.

[0019] Furthermore said LEDs are housed on said support, so that they are located in the portion of said diffusing opacified lower surface. In the solution illustrated, said LEDs are geometrically arranged on a circumference, where the circumference of the inner edge of said crown passes over and through the median points of said LEDs.

[0020] These and other objects, direct and complementary, are achieved by the new lighting body with lens for light-emitting diodes.

[0021] Lighting body, provided with support, for housing two or more LEDs, comprising at least one lens positioned above said support, provided with substantially flat lower surface, and where part of said lower surface is diffusing and opacified right to the centre of the LED so that part of the light emitted by each LED crosses the diffusing opacified part of said lower surface.

[0022] The characteristics of the new lighting body with lens for light-emitting diodes will be better clarified by the following description with reference to the drawings attached by way of non-limiting example.

[0023] Figure 1 shows an overhead view of the new lighting body, while figure 2 shows the lateral view of the new lighting body.

[0024] Figure 3 shows a detail of the lens of the new lighting body.

[0025] The new lighting body, in its main parts, comprises a support (S) for housing at least eight LEDs (L) and at least one lens (A) suitable for favouring uniform diffusion of the light emitted by said LEDs (L).

[0026] Said support (S), substantially cylindrical in

shape, comprises at least one seat, located on the upper surface of said support (S), for housing at least one electronic circuit (C), at least one thread (F) on the lateral surface of said support (S), at least one spacer (D), substantially annular, suitable for supporting said lens (L), and at least one ring nut (S1) provided with at least four hooks (S11), integral with said ring nut (S1), suitable for hooking and retaining said lens (A).

[0027] With reference to figure 1, the dimensions of the inner edge (D1) of said spacer (D) are such that it does not overlap said LEDs.

[0028] Said ring nut (S1) can be screw-tightened to said thread (F) of said support (S) in order to lock said lens (A).

[0029] Said electronic circuit (C), on which said LEDs (L) are positioned in a radial arrangement, connects said LEDs (L) to one another and to the electrical power supply.

[0030] Said lens (A), positioned above said spacer (D), comprises at least one semi-spherical central body (A1) made of transparent material, for example plastic or glass, provided with substantially flat lower surface and semi-spherical upper surface (A4). Said flat lower surface comprises an outer diffusing crown (A2) opacified by means of sandblasting or photoengraving for plastic, for example, and a transparent non-treated central disc (A3).

[0031] The dimensions of the inner edge (A21) of said outer crown (A2) are such that it overlaps said LEDs at least partly.

[0032] In the solution illustrated, said LEDs (L) are geometrically arranged on a circumference and the circumference of the inner edge (A21) of said crown (A2) passes over and through the median points of said LEDs (L).

[0033] Said LEDs (L) are arranged radially on said support (S) so that their light crosses said lens (A) in the outer crown (A2).

[0034] Therefore with reference to the preceding description and the accompanying drawings the following claims are made.

Claims

1. Lighting body, provided with support (S), for housing two or more LEDs (L), **characterised in that** it comprises at least one lens or a transparent element (A), positioned above said support (S), provided with partly opacified diffusing lower surface (A2) so that the light emitted by each LED (L) crosses wholly or partly the diffusing opacified surface (A2) of said lens or transparent element (A).
2. Lighting body, according to claim 1, **characterised in that** said lower surface of said lens (A) is substantially flat.
3. Lighting body, according to claims 1, 2, **characterised in that** said lower surface of said lens (A) com-

prises an outer diffusing opacified crown area (A2) and an inner non-treated disc (A3).

4. Lighting body, according to claim 3, **characterised in that** said LEDs (L) are geometrically arranged on a circumference, in which the circumference of the inner edge (A21) of said crown (A2) passes over and through the median points of said LEDs (L).
5. Lighting body, according to claims 1, 2, 3, **characterised in that** said LEDs (L) are arranged radially on said support (S) and in which the diffusing opacified part (A2) of said lens (A) is in the form of a crown with non-treated central part positioned at least partly above said LEDs (L).
6. Lighting body, according to claims 1, 2, 3, 4, **characterised in that** said lens (A) comprises a convex upper surface (A4).
7. Lighting body, according to claims 1, 2, 3, 4, 5, **characterised in that** said support (S) comprises one or more hooks (S11) for fixing said lens (A).
8. Lighting body, according to claims 1, 2, 3, 4, 5, 6, **characterised in that** said LEDs (L) are integral with an electronic circuit (C) and in which said electronic circuit (C) is retained by at least one annular spacer (D).

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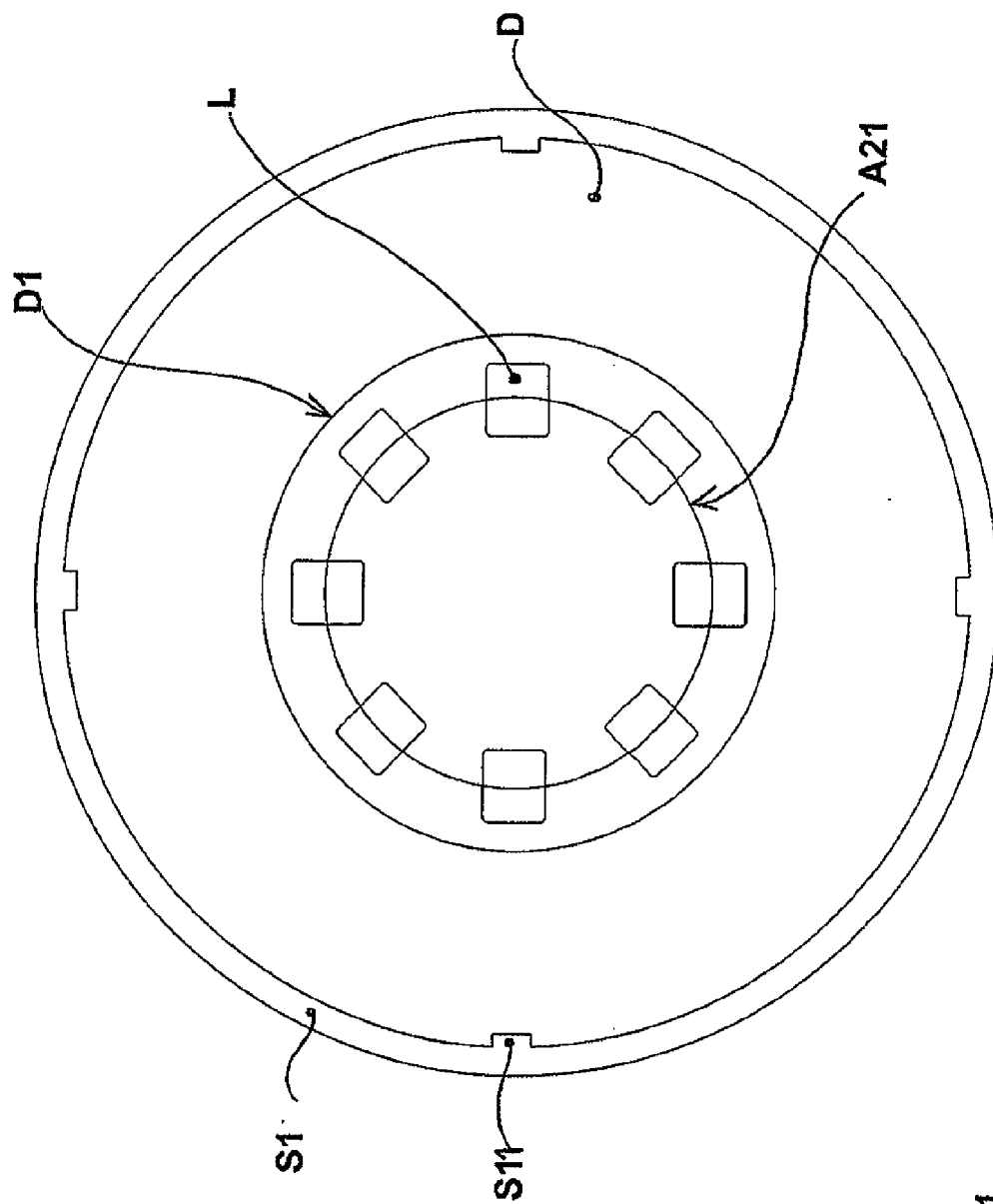


Fig.1

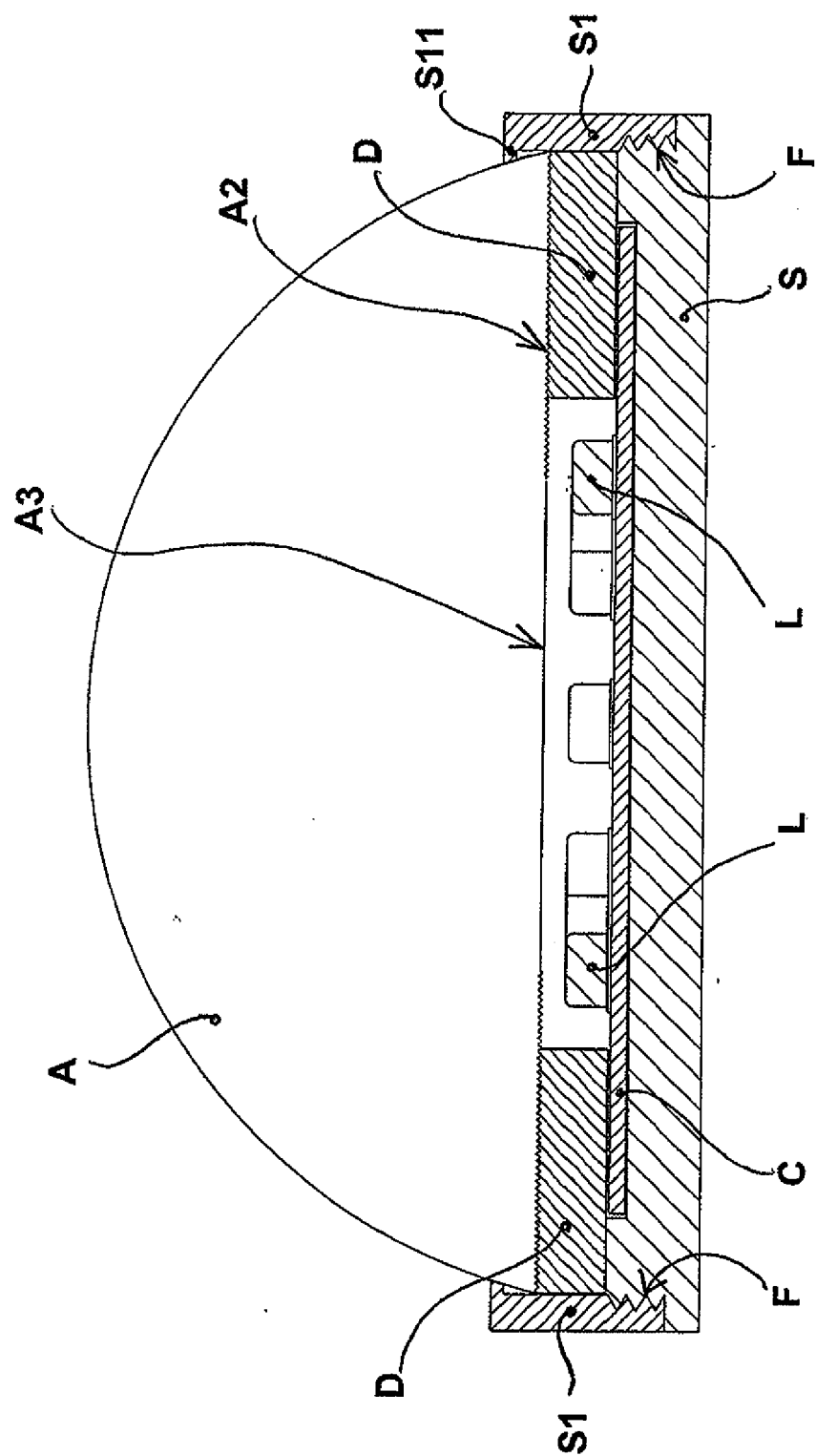


Fig.2

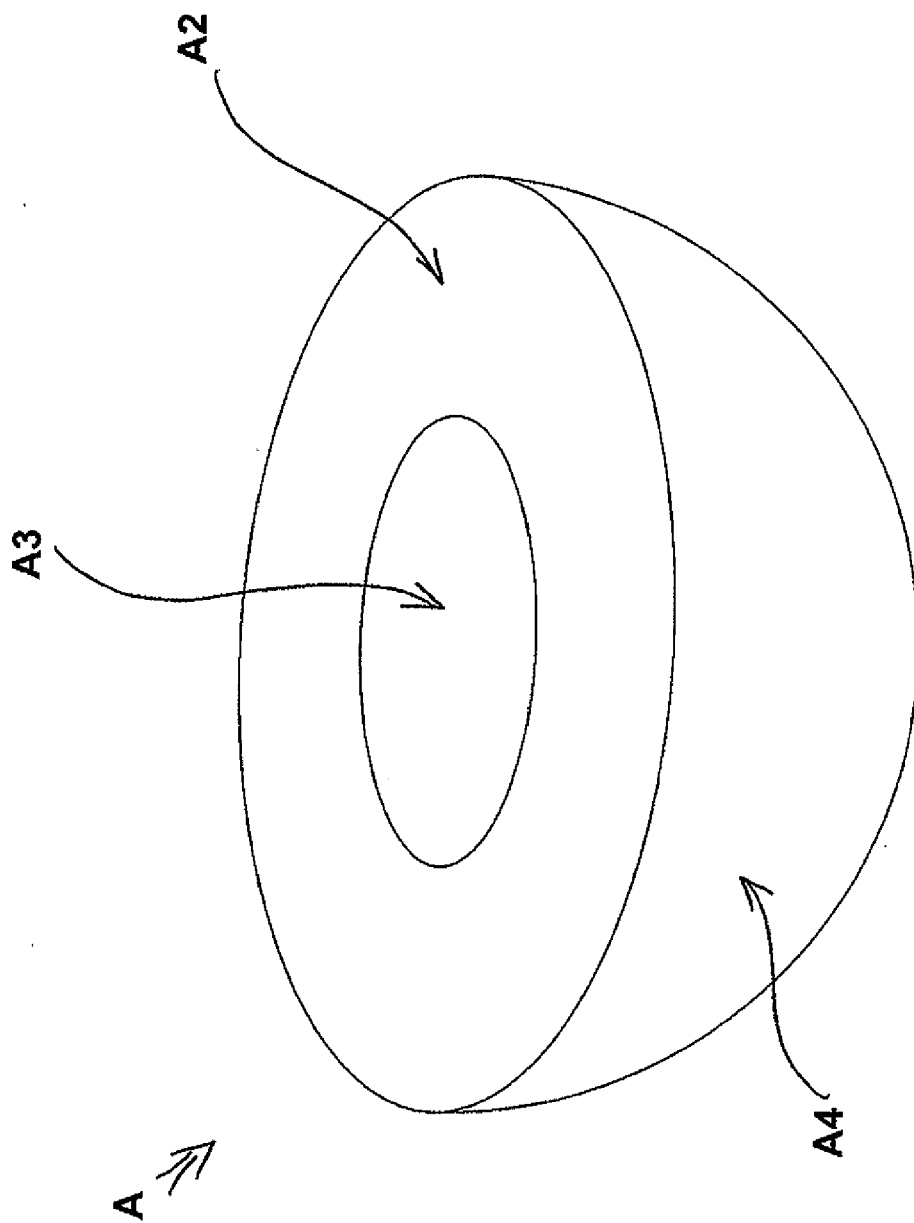


Fig.3