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(54) LIGHT FIXTURE

(57) The present invention relates to a light fixture comprising a casing (2) defining a surrounding wall (21), a light source (3) formed by one or more light emitters that give off heat (Q) in the direction opposite the direction of light emission, an electric circuit (4) configured for supplying power to the light source (3), and a heat sink (5) arranged for dissipating the heat (Q) produced by the light source (3). The electric circuit (4) of said light fixture (1) is arranged on a plane (P) different from the plane of the heat sink (5) and located in the direction of the path (R) of the light emitted by the light source (3).

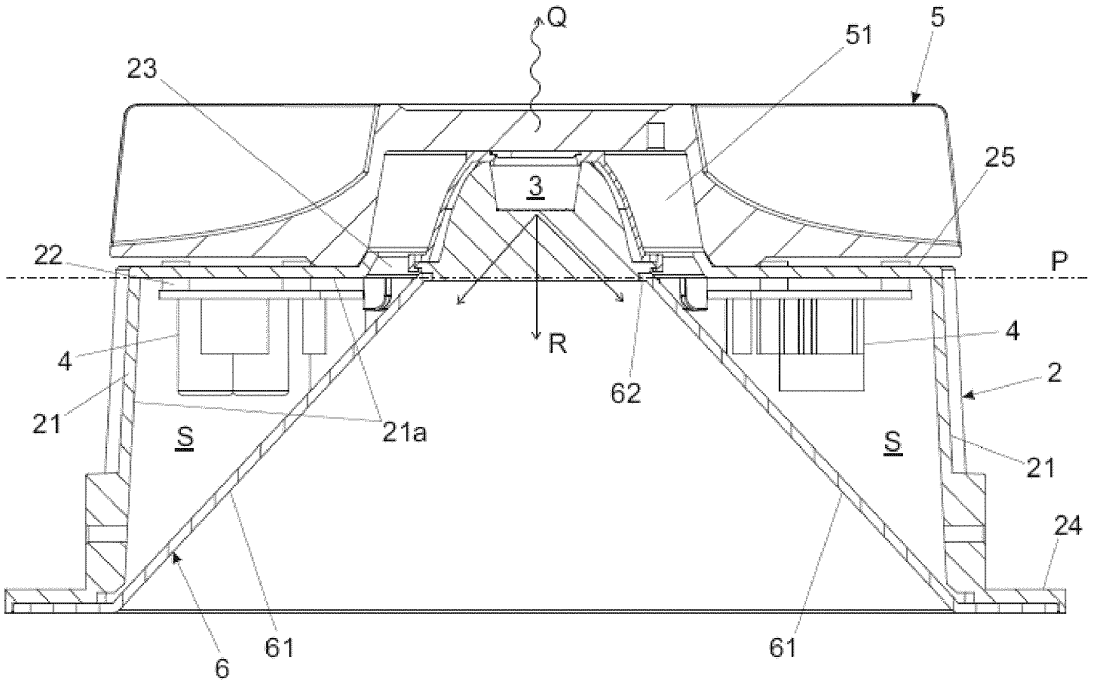

Fig. 2

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Description

Field of the Invention

[0001] The present invention relates to a light fixture comprising a light source formed by one or more light emitters that give off heat in the direction opposite the direction of light emission, such as light emitting diodes, for example, of the type of light fixtures which require an electric power supply and/or control circuit, as well as a heat sink arranged for dissipating the heat produced by said light source.

Background of the Invention

[0002] The suitable operation of light fixtures of the type described above requires the light sources to work at an optimum temperature, preventing excessive heating of the electrical part of said light fixtures which lead to rapid wear, breakdown and/or malfunction.

[0003] To maintain the ideal working temperature, heat sinks provided with fins that are manufactured with materials having a high thermal conductivity, such as aluminum or copper, are often used. Said sinks allow absorbing the heat generated by light emitters to subsequently dissipate it into the air by means of heat exchange.

[0004] Today, electric circuits forming the power and/or control electronics of these light fixtures are usually located outside the casing of the light fixture. In most cases, a greater heat concentration must take place in the same sink or in the direction of heat dissipation. This is particularly significant when there are light sources formed by light emitters that give off heat in the direction opposite the direction of light emission. This aspect is a major problem, since the electric circuits are located in areas having thermal conditions that are more unfavorable for their correct operation.

[0005] In contrast, on certain occasions, the light sources themselves, particularly light sources having a higher sensitivity such as LED-type light sources, suffer from the heat generated by the electric circuits, causing them to lose efficiency and to have a reduced service life when working in environments with a temperature higher than their optimum working temperature.

[0006] According to a first objective, the present invention relates to a light fixture the configuration of which allows separating the electric circuit from areas where more heat is generated, and at the same time having better protection against the heat generated by the light source and by the electric circuit itself. According to a second objective, the present invention relates to a light fixture the configuration of which allows reducing its height, and thereby also reducing the minimum height for the assembly thereof, with the respective material savings and the possibility of placing it in places with a more limited headroom.

Description of the Invention

[0007] The light fixture of the present invention is of the type comprising:

- a casing defining a surrounding wall;
- a light source formed by one or more light emitters that give off heat in the direction opposite the direction of light emission, such as light emitting diodes (LED), for example;
- an electric circuit configured for supplying power to and/or controlling the light source; and
- a heat sink arranged for dissipating the heat produced by the light source, usually located on the casing.

[0008] The light fixture of the present invention is characterized in that the electric circuit is arranged on a plane different from the plane of the heat sink, in the direction of the path of the light emitted by the light source, i.e., on a plane located on the side opposite the side to which the flow of heat emitted by the heat sink itself is directed, a better thermal protection of the electric circuit thus being obtained.

[0009] The electric circuit is preferably housed within the casing, separated from the heat sink. The electric circuit can thus be separated from the heat sink and the space of the light fixture is optimized to enable housing said electric circuit within the casing. The resulting light fixture is more compact, being able to be installed in places with more limited space.

[0010] To further favor the compact design of the light fixture of the present invention, the light source is preferably housed within the heat sink in a housing provided therein.

[0011] The surrounding wall is preferably provided in the inner part thereof with one or more fixing elements configured for fixing the electric circuit to said surrounding wall. Such fixing elements can consist of threaded holes for the passage of screws, attachment clips, staplers, supports, etc.

[0012] The surrounding wall preferably comprises a central opening which is arranged facing the light source and configured for enabling the passage of the light emitted by said light source. Said central opening in turn faces the housing of the heat sink.

[0013] The surrounding wall preferably comprises a support base on which the heat sink is externally fixed.

[0014] The light fixture of the present invention preferably also comprises a protective element housed inside the casing, defining an outer wall, a space being established between the surrounding wall and the outer wall, and the electric circuit being arranged in said space. This protective element further favors the thermal insulation of the electric circuit, preventing the actual heat produced by the circuit from being able to negatively affect the light source.

[0015] The protective element can act only as a phys-

ical barrier against the passage of heat, but it can also be manufactured with heat-insulating materials that further favor said thermal insulation. According to a preferred embodiment, the light reflector of the light fixture is used as protective element.

Brief Description of the Drawings

[0016] A set of drawings that help to better understand the invention and are expressly related to an embodiment of said invention presented as a non-limiting example thereof will be very briefly described below.

Figure 1 depicts an exploded perspective view of the light fixture of the present invention.

Figure 2 depicts a sectioned elevational view of the light fixture of the present invention.

Figure 3 depicts a partially sectioned front view of the light fixture of the present invention.

Detailed Description of the Invention

[0017] Figure 1 shows an exploded perspective view of the light fixture of the present invention. In this case, a downlight-type light fixture for flush-mounted installation is used as an example. As can be seen, the light fixture (1) comprises:

- a casing (2) defining a surrounding wall (21);
- a light source (3) formed by one or more light emitters that give off heat (Q) in the direction opposite the direction of light emission, in this case, light emitting diodes;
- an electric circuit (4) configured for supplying power to and/or controlling the light source (3); and
- a heat sink (5) arranged on the casing (2) for dissipating the heat (Q) produced by the light source (3).

[0018] Figure 2 shows a sectioned elevational view of the light fixture (1) of the present invention. As can be seen, the electric circuit (4) is arranged on a plane (P) different from the plane of the heat sink (5), in the direction of the path (R) of the light emitted by the light source (3), in other words, opposite the flow of heat (Q) emitted by said light source (3). It can therefore be stated that the electric circuit (4) is arranged on a plane (P) located below the heat sink (5), and according to this example, also below the light source (3).

[0019] According to the present example, the electric circuit (4) is housed within the casing (2), separated from the heat sink (5). The light source (3) is in turn housed within the heat sink (5) in a housing (51) provide therein.

[0020] The surrounding wall (21) is provided in the inner part (21a) thereof with fixing elements (22) configured for fixing the electric circuit (4) to said surrounding wall (21).

[0021] The surrounding wall (21) comprises a central opening (23) which is arranged facing the light source (3) and configured for enabling the passage of the light emitted by said light source (3). Said central opening (23) in turn faces the housing (51) of the heat sink (5).

[0022] The surrounding wall (21) comprises an outer frame (24) for being adapted to the mounting surface (false ceiling, gypsum-cardboard or wood enclosures, furniture, etc.) once the light fixture (1) has been mounted.

[0023] The surrounding wall (21) comprises a support base (25) on which the heat sink (5) is externally fixed.

[0024] The light fixture (1) comprises a protective element (6) housed inside the casing (2), defining an outer wall (61), a space (S) being established between the inner part (21 a) of the surrounding wall (21) and the outer wall (61) of the protective element (6). The electric circuit (4) is arranged in said space (S). The outer wall (61) has a frustoconical shape establishing a space (S) having a triangular cross section with the surrounding wall (21).

[0025] The protective element (6) is prolonged from an inner end (62) of the outer wall (61), and is configured for housing the light source (3).

[0026] Figure 3 shows a partially sectioned bottom view of the light fixture (1) of the present invention. Said figure clearly shows the arrangement of the electric circuit (4) within the casing (2) and how it is attached to said casing by means of the fixing elements (22).

Claims

1. A light fixture, comprising:

- a casing (2) defining a surrounding wall (21);
- a light source (3) formed by one or more light emitters that give off heat (Q) in the direction opposite the direction of light emission;
- an electric circuit (4) configured for supplying power to and/or controlling the light source (3); and
- a heat sink (5) arranged for dissipating the heat (Q) produced by the light source (3), **characterized in that** the electric circuit (4) is arranged on a plane (P) different from the plane of the heat sink (5), in the direction of the path (R) of the light emitted by the light source (3).

2. The light fixture according to claim 1, **characterized in that** the electric circuit (4) is housed within the casing (2), separated from the heat sink (5).

3. The light fixture according to any of claims 1 to 2, **characterized in that** the light source (3) is housed in a housing (51) arranged within the heat sink (5).

4. The light fixture according to any of claims 1 to 3, **characterized in that** the surrounding wall (21) is

provided in the inner part (21 a) thereof with one or more fixing elements (22) configured for fixing the electric circuit (4) to said surrounding wall (21).

5. The light fixture according to any of claims 1 to 4, **characterized in that** the surrounding wall (21) comprises a central opening (23) which is arranged facing the light source (3) and configured for enabling the passage of the light emitted by said light source (3).

6. The light fixture according to claim 5, **characterized in that** the central opening (23) of the surrounding wall (21) faces the housing (51) of the heat sink (5).

7. The light fixture according to any of claims 1 to 6, **characterized in that** the surrounding wall (21) comprises a support base (25) on which the heat sink (5) is fixed.

8. The light fixture according to any of claims 1 to 7, **characterized in that** it comprises a protective element (6) housed inside the casing (2), defining an outer wall (61), a space (S) being established between the inner part (21a) of the surrounding wall (21) and the outer wall (61) of the protective element (6); and **in that** the electric circuit (4) is arranged in said space (S).

9. The light fixture according to claim 8, **characterized in that** the protective element (6) consists of a light reflector.

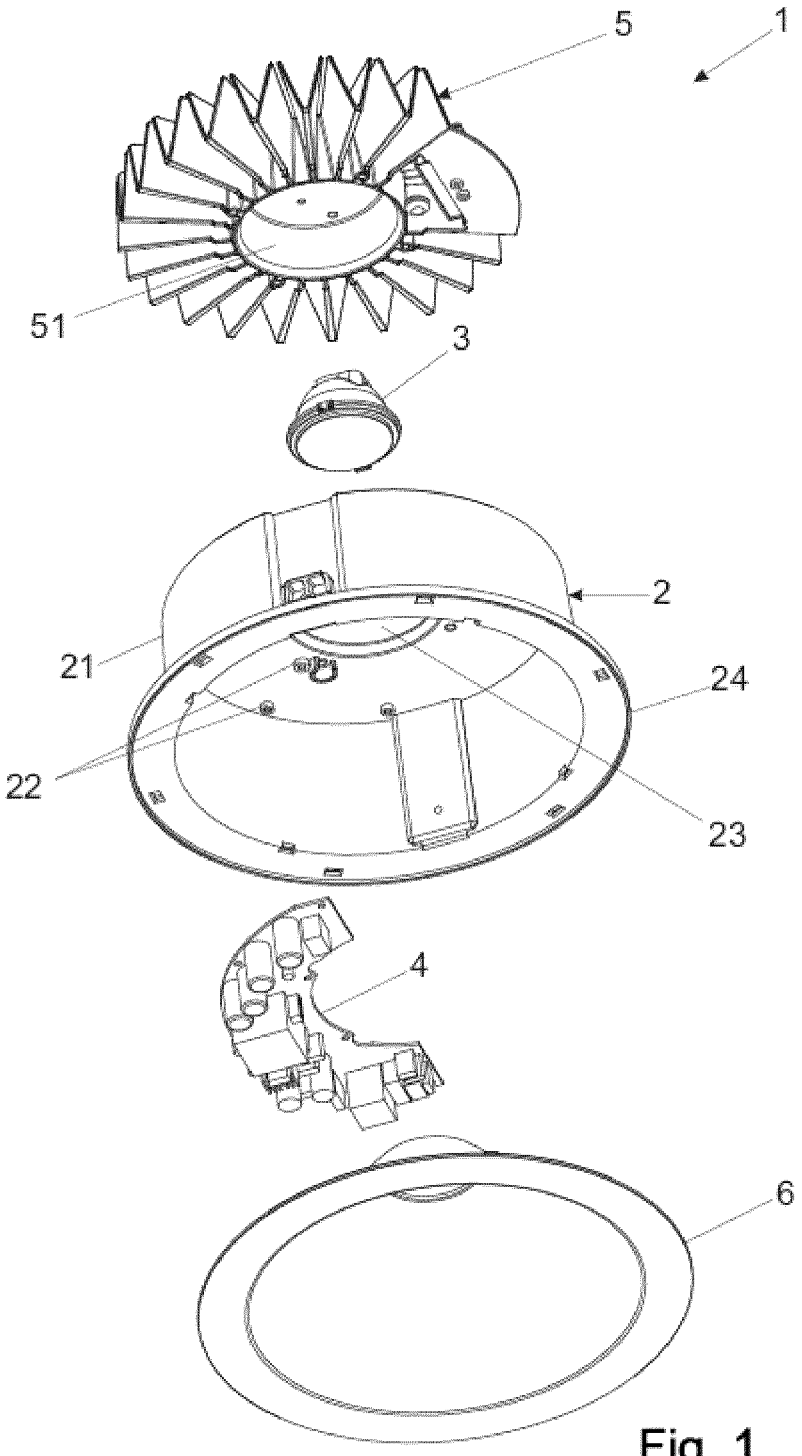

Fig. 1

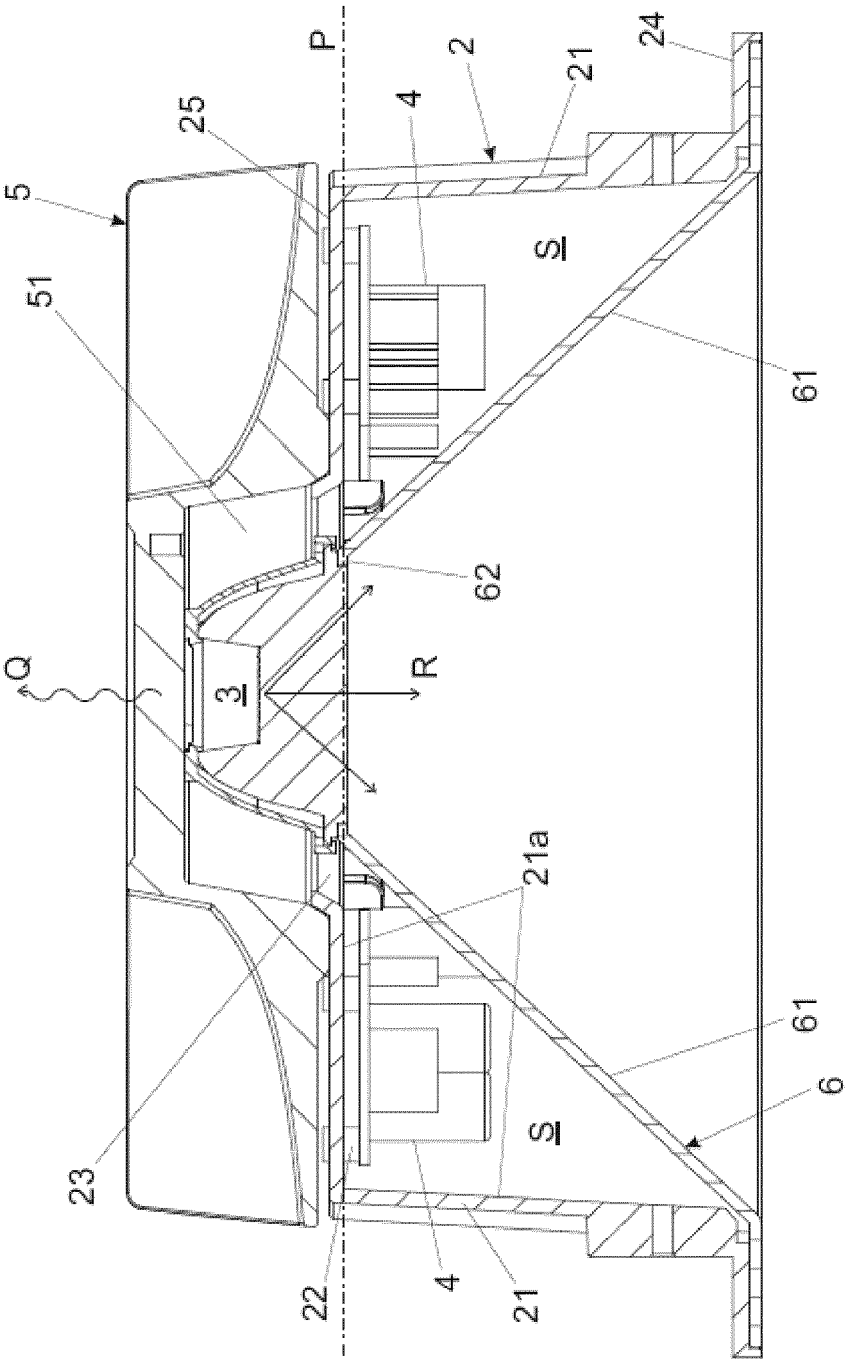

Fig. 2

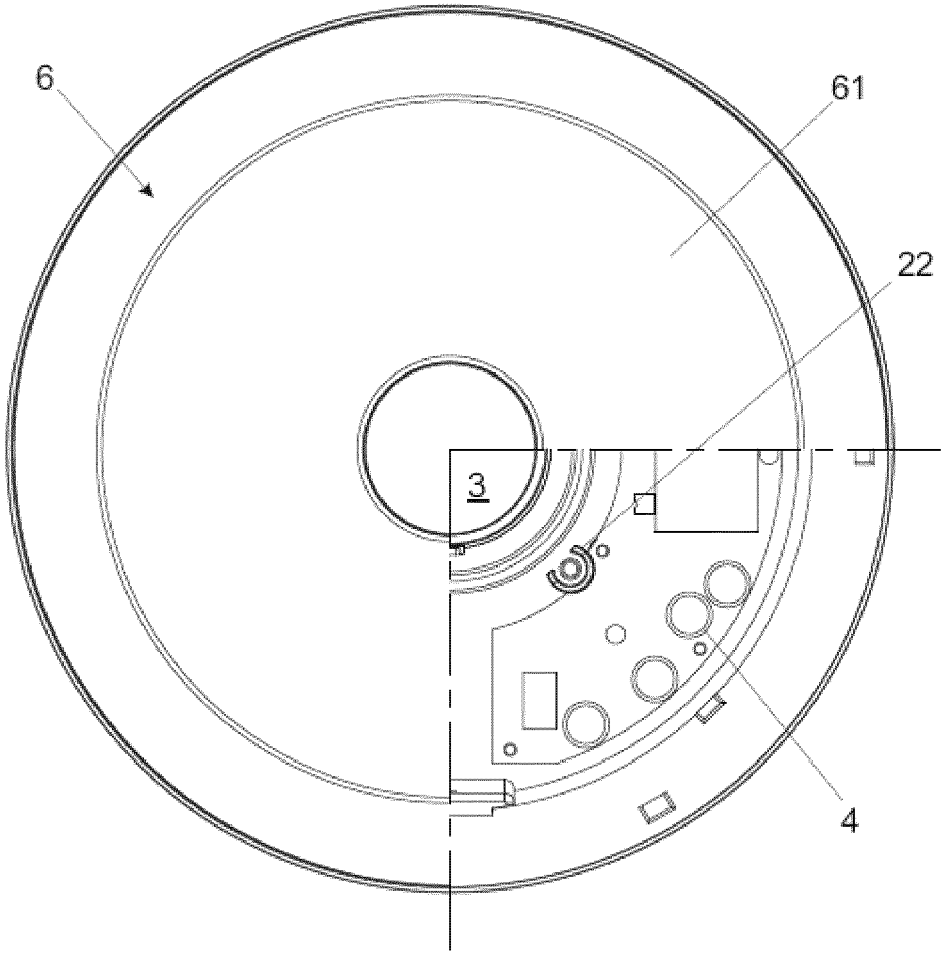

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 16 18 9190

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	EP 2 481 973 A2 (TOSHIBA LIGHTING & TECHNOLOGY [JP]) 1 August 2012 (2012-08-01) * paragraph [0008] - paragraph [0132] * * figure 1 *	1-9	INV. F21S8/02 F21V23/00 F21V29/15 F21V29/77
X	CN 104 565 930 A (CHAO W) 29 April 2015 (2015-04-29) * paragraph [0001] - paragraph [0031] * * figure 5 *	1-7	
X	EP 2 574 838 A1 (TOSHIBA LIGHTING & TECHNOLOGY [JP]) 3 April 2013 (2013-04-03) * paragraph [0004] - paragraph [0048] * * figure 3 *	1,2,5-9	
			TECHNICAL FIELDS SEARCHED (IPC) F21S F21V F21Y

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 November 2016	Blokland, Russell

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 18 9190

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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