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(54) Title: LED LIGHTING LAMP

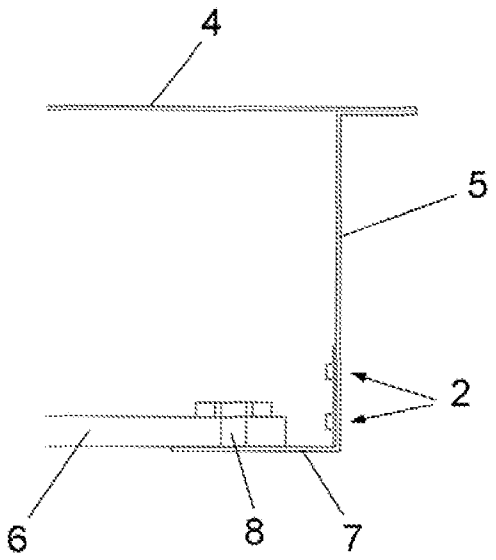

FIG. 4

(57) Abstract: A LED lighting lamp (1) comprising a plurality of LEDs (2) arranged inside of a housing (3) provided with a rear wall (4) intended to be mounted on a surface such as a ceiling, lateral walls (5), and a frontal plate (6) capable to leave the light to pass outwards. It is characterised in that the LEDs (2) are distributed over the inside perimeter of the lateral walls (5) in a zone close to said frontal plate (6), said LEDs (2) remaining positioned at incidence in a direction substantially parallel to said rear wall (4). The glare is avoided and a reduction of the power consumption, an increasing of the illumination capacity of the lamp, and an improvement of the aesthetic effect are achieved.

WO 2013/008059 A1

LED LIGHTING LAMP

The present invention relates to a LED lighting lamp.

BACKGROUND OF THE INVENTION

In the technical field of lighting, there is a large market of manufacturers and specific illumination products that cover, basically, the need of ceiling lights based on the standard ceiling lamps with adaptable operation up to the false ceiling, metal guides and plaster tiles systems which are used currently in the majority of the buildings and spaces.

In this range of products, there are ceiling lamps whose incidence of light is very focal, and also distorted, and with a relatively limited affected area which requires the installation of a great number of lamps in order to guarantee the correct illumination of a given space.

Generally, to illuminate hospitals, buildings, offices, etc., it is necessary to install fluorescent ceiling lamps, although currently this type of lighting is oriented towards low-consumption bulbs which offer the same luminous capacity but with a reduced consumption; however, they contain mercury among their components which is harmful and very controversial with respect to their recycling.

There are also LED ceiling lamps which have superior illumination capacity, although their consumption is soaring due to the great number of installed luminaries that are necessary. For example, ceiling lamps with a consumption of 74 W, which use LEDs of 1 W, are known. Also a large amount of heat is generated, and this requires the use of a heat sink mounted on the back side which makes the product more expensive and difficult for installation.

The majority of these ceiling lamps have LEDs that are pointing directly downwards, i.e. in perpendicular to the ceiling which is very aggressive for the retina when the user looks directly to the ceiling lamps and can cause severe glares.

To soften this effect of glare, the said lights include a translucent opal plate, generally made of plastic, which prevents the visual contact between the focus of the LED and the user by permitting the light to pass through. However, this translucent plate absorbs a large portion of the generated light and distorts it slightly which leads to a 30-35% reduction of the light.

Another inconvenience of this type of ceiling lamps is that when one or several LEDs get merged, the points without illumination become noticeable in the set

of the lamp which produces anti-aesthetic effect.

DESCRIPTION OF THE INVENTION

The objective of the LED lighting lamp according to the present invention is to solve the drawbacks of the known LED lighting lamps of the state of the art by avoiding the glare and achieving a reduction of the consumption, increasing the lighting performance of the lamp and improving the aesthetical effect.

The LED lighting lamp, according to the present invention, is of a type that comprises a plurality of LEDs arranged inside of a housing provided with a rear wall intended to be mounted on a surface such as a ceiling, lateral walls, and a frontal plate capable to leave the light to pass outwards, and characterised in that the LEDs are distributed over the inside perimeter of the lateral walls in a zone close to said frontal plate, said LEDs remaining positioned at incidence in a direction substantially parallel to said rear wall.

Thanks to this layout of the LEDs, when the lamp is mounted on a ceiling there is no more direct impact of the light downwards as happens with the ceiling lamps known from the state of the art and, as a result, the visual fatigue and the problems related to the ocular tiredness of the user are avoided. Moreover, it is not necessary to mount a translucent plate and thus the light generated by the LEDs is neither reduced nor distorted.

Advantageously, the frontal plate is surrounded by a peripheral profile whose width is capable to cover at least partially the body of the LEDs.

The mounted profile hides the LEDs in order to prevent them from being seen by the user. The invisible configuration of the LEDs makes easier their maintenance and replacement since, if one of the LEDs fails, no black spot will be visible and the illuminating capacity of the lamp will not be affected.

Preferably, the lamp includes LEDs of 0.08 W. Consequently, the consumption of each LED is very low.

Advantageously, the lamp includes at least one row of LEDs.

Preferably, the rear wall and the lateral walls of the housing are made of metal sheet.

Preferably, the metal sheet has approximately 0.8 mm of thickness.

Advantageously, the metal sheet is lacquered in white.

Also advantageously, the inside surface of the metal sheet, intended to

reflect the light, is matt in order to guarantee the maximum diffusion of the light.

According to an embodiment of the present invention, the frontal plate capable to leave the light to pass outwards, is mostly transparent with opal graphics provided to boost the illumination capacity of the lamp.

In addition, there are various models of finishing of said graphics which provide a nice finish of the lamp from an aesthetic point of view.

Preferably, the frontal plate is made of methacrylate.

Preferably, the frontal plate has a thickness of between 4 and 6 mm.

Advantageously, the lamp is completely adapted to its suspension on a bearing metal structure of a conventional false ceiling.

BRIEF DESCRIPTION OF THE DRAWINGS

To facilitate the description of what has been described previously some drawings are attached, in which, diagrammatically and only as a non-limitative example, one practical case of embodiment of the LED lighting lamp according to the invention is shown, in which:

Figure 1 is a plan view of the LED lighting lamp according to the invention;

Figure 2 is a magnified detail of one corner of the lamp in Figure 1, showing the position of the LEDs emerging from the lateral walls;

Figure 3 is a cross section of the lamp in Figure 1; and

Figure 4 is a magnified detail of the lamp in Figure 3, showing the distribution of the LEDs in two rows.

DESCRIPTION OF A PREFERRED EMBODIMENT

As can be seen in figures 1 and 3, the LED lighting lamp 1 comprises a plurality of LEDs 2 arranged inside of a housing 3 provided with a rear wall 4 intended to be mounted on a ceiling, lateral walls 5 and a frontal plate 6 capable to leave the light to pass outwards.

The lighting lamp 1 comprises standardised dimensions, in this example in the form of a square with dimensions of 60x60 cm, and can be adapted to any conventional false ceiling.

The rear wall 4 and the lateral walls 5 of the housing 3 are made of metal

sheet with a thickness of 0.8 mm, lacquered in white, and with a matted inside reflecting part in order to ensure the maximum diffusion of the light.

As can be seen in figures 2 and 4, the LEDs 2 are distributed over the inside perimeter of the lateral walls 5 in a zone close to the said frontal plate 6, the LEDs 2 remaining positioned in a direction substantially parallel to said rear wall and the ceiling. In this example, the LEDs 2 are arranged in two rows (see Figure 4).

Thanks to this layout of the LEDs with incidence parallel to the ceiling, there is no direct impact of the light downwards as happens with the ceiling lamps known from the state of the art and, as a result, the visual fatigue and the problems related to the ocular tiredness of the user are avoided. Moreover, it is not necessary to mount a translucent plate and thus the light generated by the LEDs is neither reduced nor distorted.

The frontal plate 6 is surrounded by a peripheral profile 7 integral with the lateral walls 5 whose width can cover the body of the LEDs 2. The position of the profile 7 hides the LEDs 2 in order to prevent them from being seen by the user. The invisible configuration of the LEDs 2 makes easier their maintenance and replacement since, if one of the LEDs 2 fails, no black spot will be visible and the illuminating capacity of the lamp 1 will not be affected.

In this example, the frontal plate 6 is joined to the peripheral profile 7 by means of simple screws 8.

The frontal plate 6 is mostly transparent with opal graphics (not shown) whose purpose is to boost the illumination capacity of the lamp. The frontal plate 6 is made of methacrylate of 4 to 6 mm of thickness and has various models of finishing, which provide a nice finish of the set lamp 1 from an aesthetic point of view.

The technical characteristics of the lighting lamp 1 described in this embodiment are:

- Consumption: 50 W.
- Lifespan: 50000 hours.
- Power supply: 220 V and 12 V.
- Lighting capacity: 2200 lumens.
- The type of the light is white.

In this example, 0.08 W LEDs are used with a consumption of 50 W, while a ceiling light, according of the state of the art with LEDs facing downwards, i.e. perpendicular to the ceiling, and with diffuser plates of the same dimensions and illumination capacity as the lamp of the invention, has a consumption of 74 W by

using LEDs of 1 W, and in addition it needs a heat sink in the rear part. Therefore, the lamp 1 of the invention achieves a significant reduction of the power consumption which is important in installations in large spaces.

CLAIMS

1. A LED lighting lamp (1) comprising a plurality of LEDs (2) arranged inside of a housing (3) provided with a rear wall (4) intended to be mounted on a surface such as a ceiling, lateral walls (5), and a frontal plate (6) capable to leave the light to pass outwards, characterised in that the LEDs (2) are distributed over the inside perimeter of the lateral walls (5) in a zone close to said frontal plate (6), said LEDs (2) remaining positioned at incidence in a direction substantially parallel to said rear wall (4).

2. A lamp (1), according to claim 1, in which the frontal plate (6) is surrounded by a peripheral profile (7) whose width is capable to cover at least partially the body of the LEDs (2).

3. A lamp (1), according to claim 1, which includes LEDs (2) of 0.08 W.

4. A lamp (1), according to claim 1, which includes at least one row of LEDs (2).

5. A lamp (1), according to claim 1, in which the rear wall (4) and the lateral walls (5) of the housing (3) are made of metal sheet.

6. A lamp (1), according to claim 5, in which the metal sheet has approximately 0.8 mm of thickness.

7. A lamp (1), according to claims 5 or 6, in which the metal sheet is lacquered in white.

8. A lamp (1), according to claim 7, in which the inside surface of the metal sheet, intended to reflect the light, is matt in order to guarantee the maximum diffusion of the light.

9. A lamp (1), according to claim 1, in which the frontal plate (6), capable to leave the light to pass outwards, is mostly transparent with opal graphics provided to boost the illumination capacity of the lamp.

10. A lamp (1), according to claim 9, in which the frontal plate (6) is made of methacrylate.

11. A lamp (1), according to claims 9 or 10, in which the frontal plate (6) has a thickness of between 4 and 6 mm.

12. A lamp (1), according to claim 1, which is completely adapted to its suspension on a bearing metal structure of a conventional false ceiling.

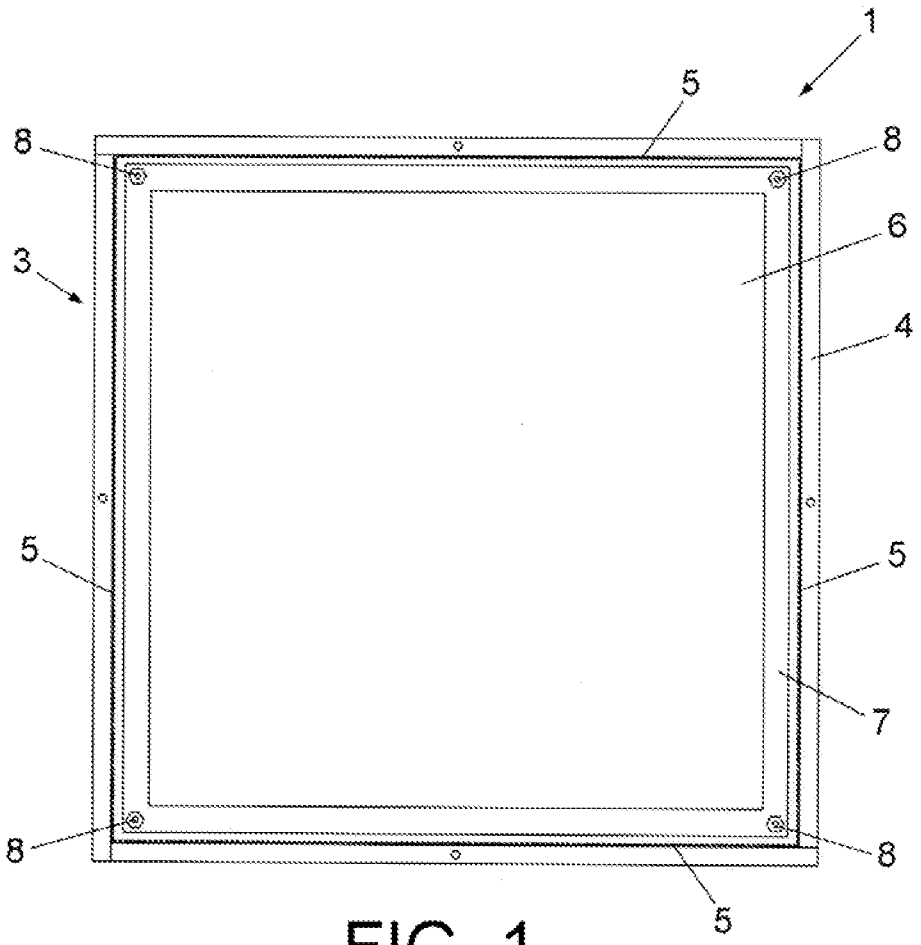

FIG. 1

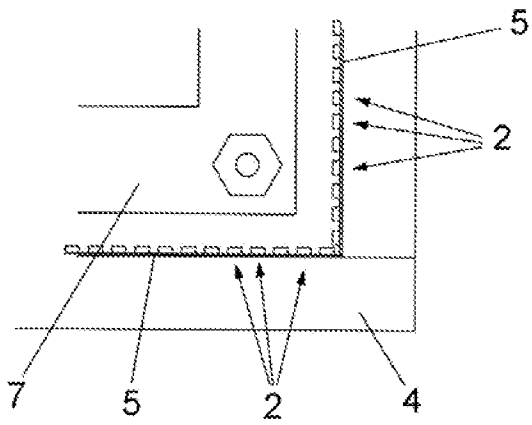

FIG. 2

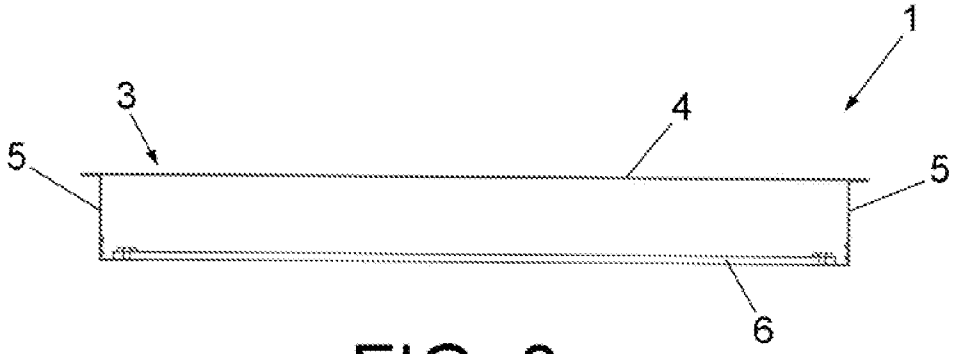

FIG. 3

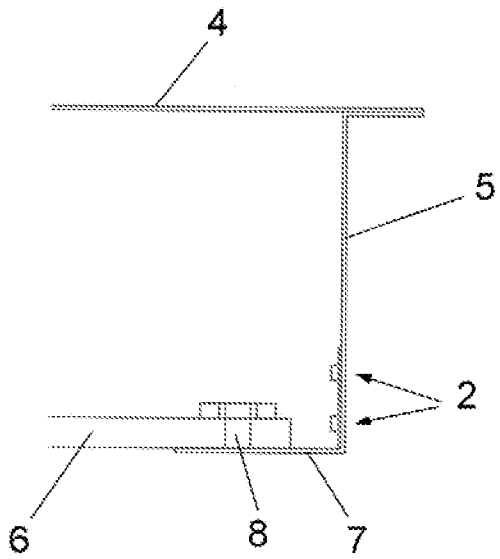

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2011/053076

A. CLASSIFICATION OF SUBJECT MATTER
INV. F21S8/04
ADD. F21Y101/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F21S F21K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 092 919 A2 (KRONENBERG GMBH H & J [DE]) 18 April 2001 (2001-04-18) paragraph [0032] - paragraph [0041] figures 1-3	1,3-12
X	US 2010/182782 A1 (LADEWIG CHRISTOPHER [US]) 22 July 2010 (2010-07-22) paragraph [0015] - paragraph [0032] figures 1-4	1-12
X	DE 20 2008 013198 U1 (INSTA ELEKTRO GMBH [DE]) 11 December 2008 (2008-12-11) paragraph [0012] - paragraph [0017] figures 1-5	1-3,5,6, 9-12
X	DE 203 13 899 U1 (LIGHTING PARTNER B V [NL]) 4 December 2003 (2003-12-04) paragraph [0009] - paragraph [0012] figure 1	1-7,9-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
20 March 2012	02/04/2012

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2011/053076

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