Flush lighting apparatus for false ceilings

A flush lighting apparatus for false ceilings is described comprising a single block cylindrical diffuser (1) including lens (2), which is snapingly supported by an intermediate body (3) in which there is accommodated a LED-holder circuit board (8) locked in working position by a overhanging dissipator (9) also snapingly mounted onto the intermediate body (3).
Description

[0001] The present invention relates to a flush lighting apparatus for false ceilings.

[0002] There are known flush lighting apparatuses consisting of a main cylindrical diffuser body which supports a separate transparent lens and a LED-holder circuit board with power wiring and possible heat dissipator.

[0003] Said main body comprises fastening means for connecting the lighting apparatus to the false ceiling.

[0004] The various components mentioned above (diffuser, lens, circuit board and wiring) must be assembled by using screw/nut screw connections, bolts, or the like, which means that threaded or non-threaded holes must be made in components which are often made of not easily workable material.

[0005] Furthermore, the installer must use appropriate tools to proceed with assembly, operating on screws, nuts or other which must be attached to the aforesaid components.

[0006] The manufacturer of this type of light apparatuses must therefore envisage for each apparatus a series of connection elements (screws, nuts and the like) for fastening the components.

[0007] The assembly of the lens in the diffuser is a particularly critical moment given the importance of the lens in ensuring quality of the projected light. Incorrect positioning may cause dazzling of the user underneath the apparatus.

[0008] Furthermore, the lens may accidentally fall, causing considerable monetary damage. The lens is often the most costly component of a lighting apparatus.

[0009] The assembler must therefore pay the utmost attention and this causes a considerably waste of time.

[0010] It is the object of the present invention to make a flush lighting apparatus for false ceilings consisting of components which are easy and fast to assemble without the use of supplementary fastening elements.

[0011] In accordance with the invention, such object is reached by a flush lighting apparatus for false ceilings characterised in that it comprises a lens including single block cylindrical diffuser 1 comprising a transparent polycarbonate lens 2 supported by an intermediate hollow cylindrical body 3 by means of lateral protrusions 4 which engage side slots 5 of the diffuser 1.

[0012] Furthermore, the lens being within the diffuser, the lens is certainly protected from accidental shocks during the step of assembly of the apparatus and/or fastening to the false ceiling.

[0013] These and other features of the present invention will be further explained in the following detailed description of an embodiment example shown by way of non-limitative example in the attached drawings, in which:

[0014] A lighting apparatus comprises a single block cylindrical diffuser 1 comprising a transparent polycarbonate lens 2 supported by an intermediate hollow cylindrical body 3 by means of lateral protrusions 4 which engage side slots 5 of the diffuser 1.

[0015] Said lens 2 is obtained by integral moulding with the diffuser 1 shaped to also have an edge 20 on its lower surface abutting against the complementary upper surface of the dissipator 9.

[0016] The intermediate body 3 comprises lateral arms 6 for fastening to the false ceiling and internal protrusions 7 on which a LED-holder circuit board 8 is rested on the internal protrusions 7 and locked in said position by a dissipator 9 locked by appropriately shaped folded upper ends 10 of upper arms 11 of the intermediate body 3.

[0017] Said folded ends 10 are "beak"-shaped with a lower surface abutting against the complementary upper surface of the dissipator 9.

[0018] Said dissipator 9 comprises cavities 12 within which electrical material (not shown) connected to the circuit board 8 via vertical channels 13 is accommodated.

[0019] The assembly of the device is very simple being based solely on snappingly mounted systems.

[0020] Considering the disassembled device shown in figures 8 and 9, the diffuser 1 is coupled with the intermediate body 3 engaging the side protrusions 4 (slightly flexible) of the latter in the slots of the diffuser 1, then the circuit board 8 is rested on the internal protrusions 7 and locked in said position by placing the dissipator 9 over said board 8.

[0021] Upper arms 11 are used to fasten the dissipator 9 (and therefore the board 8), whose "beak"-shaped folded ends 10 touch the top of the dissipator 9. In order to secure the block, said arms 11 must be slightly flexible, therefore allowing to fit the dissipator 9 into the upper part of the intermediate body 3.

[0022] The electrical material is arranged in cavities 12 and appropriately connected to board 8 by means of channels 13.
The dissipator 9, in addition to locking the board 8, is used to dissipate the heat produced during use of the lighting apparatus. For this purpose, the cavities 12, in addition to accommodating the wiring, allow to dissipate the heat better (by increasing the heat exchange surface).

The lighting device is ready to be fastened to the false ceiling by means of the side arms 6, also slightly flexible, and the edge 20.

It can be observed that no screws or nuts are required. No components need to be drilled.

The assembler does not need to use tools.

In particular, the lens 2, being integral with the diffuser 1, does not need to be handled by the assembler; furthermore, being inside the diffuser 1, it is protected by the latter in the event of accidental shocks.

Claims

1. A flush lighting apparatus for false ceilings characterised in that it comprises a single block cylindrical diffuser (1) including lens (2), which is snappingly supported by an intermediate body (3) in which there is accommodated a LED-holder circuit board (8) locked in working position by a overhanging dissipator (9) also snappingly mounted onto the intermediate body (3).

2. An apparatus according to claim 1, characterised in that said intermediate body (3) comprises lateral protrusions (4) engageable in side slots (5) of the diffuser (9), side arms (6) for fastening the apparatus to the false ceiling and upper fastening means (11) for fastening the dissipator (9).

3. An apparatus according to claim 2, characterised in that said fastening means consist in upper arms (11) with ends (10) shaped so as to engage with said dissipator (9) and lock it.

4. An apparatus according to claim 2, characterised in that said intermediate body (3) comprises at least one internal protrusion (7) on which the LED-holder circuit board (8) rests.

5. An apparatus according to claim 1, characterised in that said dissipator (9) comprises cavities (12) adapted to accommodate electrical material connectable to the circuit board (8) through channels (13) of said dissipator (9).

6. An apparatus according to claim 1, characterised in that said lens (2) is made of transparent polycarbonate.
## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>CLASSIFICATION OF THE APPLICATION (IPC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>WO 03/036159 A (TIR SYSTEMS LTD; JACOB, STEPHANE, FREDERICK; YORK, ALLAN, BRENT) 1 May 2003 (2003-05-01) * page 1, line 5 - line 31 * * page 3, line 2 - line 3 * * page 4, line 21 - page 5, line 31 * * page 6, line 1 - line 7 * * page 9, line 14 - line 27 * * page 10, line 11 - line 23 * * figures 6, 9 * -----</td>
<td>1,5,6</td>
<td>INV. F21S8/02</td>
</tr>
<tr>
<td>A</td>
<td>BE 1 013 875 A3 (LED DESIGN INNOVATION IN AFKORTING L.D.I., NAAMLOZE VENROOTSCHAP) 5 November 2002 (2002-11-05) * page 4, line 4 - line 8 * * page 4, line 25 - line 29 * * figure 2 * -----</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>EP 1 006 311 A (ERCO LEUCHTEN GMBH) 7 June 2000 (2000-06-07) * paragraph [0035] - paragraph [0036] * * figures 1-3 * -----</td>
<td>1</td>
<td>F21V F21S</td>
</tr>
<tr>
<td>A</td>
<td>DE 101 03 781 A1 (RUDOLF ZIMMERMANN GMBH + CO. KG) 22 August 2002 (2002-08-22) * paragraph [0016] - paragraph [0017] * * paragraph [0021] * * paragraph [0030] - paragraph [0032] * * paragraph [0039] * * figure 2 * -----</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

The present search report has been drawn up for all claims.

**Place of search**

Munich

**Date of completion of the search**

11 July 2006

**Examiner**

Arsac England, S
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 EPO file on.
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-07-2006

<table>
<thead>
<tr>
<th>Patent document</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DE 10297364 T5</td>
<td>28-10-2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GB 2398116 A</td>
<td>11-08-2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2005506672 T</td>
<td>03-03-2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2003081419 A1</td>
<td>01-05-2003</td>
</tr>
<tr>
<td>BE 1013875 A3</td>
<td>05-11-2002</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 29921156 U1</td>
<td>20-04-2000</td>
</tr>
<tr>
<td>DE 10103781 A1</td>
<td>22-08-2002</td>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>

For more details about this annex: see Official Journal of the European Patent Office, No. 12/82