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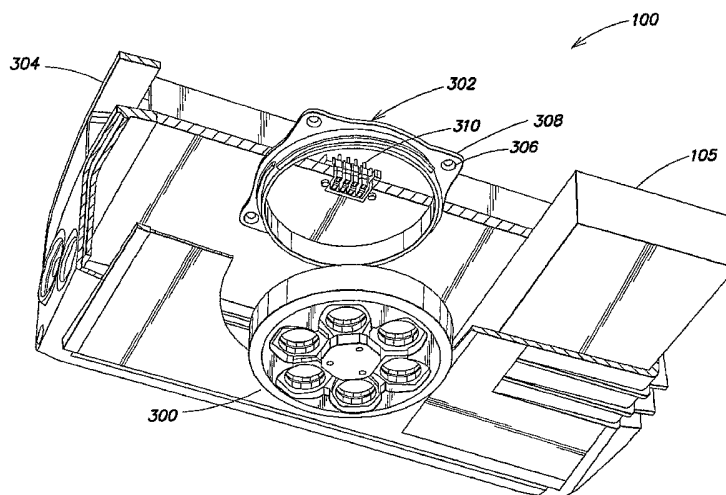
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(54) Title: MODULAR LED LIGHTING APPARATUS FOR SOCKET ENGAGEMENT



(57) Abstract: Modular lighting fixtures that allow convenient installation and removal of LED-based light-generating modules and controller modules. In one example, a modular lighting fixture includes a housing configured to be recessed into or disposed behind an architectural surface such as ceiling, wall, or soffit, in new or existing construction scenarios. The fixture housing includes a socket configured to facilitate one or more of a mechanical, electrical and thermal coupling of the light-generating module to the fixture housing. The ability to easily engage and disengage the LED-based light-generating module with the socket, without removing the fixture housing itself, allows for straightforward replacement of the light-generating module upon failure, or exchange with another module having different light-generating characteristics. Modular lighting controllers for such fixtures also may be easily installed in or removed from the fixture housing via the same access route by which the light-generating module is installed and removed.



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A. CLASSIFICATION OF SUBJECT MATTER IPC: F21V 29/00(2006.01);F21S 8/00(2006.01);F21V 11/00(2006.01); F21S 8/06(2006.01);F21V 17/06(2006.01) USPC: 362/294,146,147,148,351,353,373,404,437 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) U.S. : 362/294,146,147,148,351,353,373,404,437 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 practicable, search terms used) Please See Continuation Sheet																													
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 5,690,424 (Warshauer et al) 25 November 1997 (25.11.1997), whole document.</td> <td>1-6</td> </tr> <tr> <td>---</td> <td></td> <td>-----</td> </tr> <tr> <td>Y</td> <td></td> <td>7-63, 66-69</td> </tr> <tr> <td>Y</td> <td>US 5,738,436 (Cummings et al.) 14 April 1998 (14.04.1997), whole document.</td> <td>7-29,35-51,52-63,87-89</td> </tr> <tr> <td>Y</td> <td>US 6,974,233 (Aubrey) 13 December 2005 (13.12.2005), whole document.</td> <td>10,14-34,42,67,95-97,111,118,119</td> </tr> <tr> <td>Y</td> <td>US 2005/0237746 (Yiu) 27 October 2005 (27.10.2005), paragraph 0021.</td> <td>12, 13</td> </tr> <tr> <td>Y</td> <td>US 6,211,626 (Lys et al.) 3 April 2001 (3.04.2001) column 19, lines 51-55.</td> <td>40,44-49,51,72,79-82,102</td> </tr> <tr> <td>Y</td> <td>US 2005/0111231 (Crodian et al.) 26 May 2005 (26.05.2005), paragraph 0068.</td> <td>53-57,82,99-107,133-142</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 5,690,424 (Warshauer et al) 25 November 1997 (25.11.1997), whole document.	1-6	---		-----	Y		7-63, 66-69	Y	US 5,738,436 (Cummings et al.) 14 April 1998 (14.04.1997), whole document.	7-29,35-51,52-63,87-89	Y	US 6,974,233 (Aubrey) 13 December 2005 (13.12.2005), whole document.	10,14-34,42,67,95-97,111,118,119	Y	US 2005/0237746 (Yiu) 27 October 2005 (27.10.2005), paragraph 0021.	12, 13	Y	US 6,211,626 (Lys et al.) 3 April 2001 (3.04.2001) column 19, lines 51-55.	40,44-49,51,72,79-82,102	Y	US 2005/0111231 (Crodian et al.) 26 May 2005 (26.05.2005), paragraph 0068.	53-57,82,99-107,133-142
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Date of the actual completion of the international search 28 August 2006 (28.08.2006)		Date of mailing of the international search report 23 OCT 2006																											
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer Renee Luebke <i>Lyle Dene For</i> Telephone No. (571)-272-1550																											

INTERNATIONAL SEARCH REPORT

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PCT/US06/20042

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/0105264 (Spero) 3 June 2004 (03.06.2004), abstract, paragraph 0064.	58,59,60,104,105,106,139
Y	US 2005/0225976 (Zampini et al.) 13 October 2005 (13.10.2005), paragraph 0010.	61-63,107,140-142
X	US 6,009,650 (Lamparter) 4 January 2000 (4.01.2000), column 4, line 63, Figure 3.	64
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Y		65-107,108-119,116-119,122,123,126,127
Y	US 5,842,775 (Roorda et al.) 1 December 1998 (1.12.1998), column 5, lines 1-15.	34,43,65,109
Y	US 5,785,418 (Hochstein) 28 July 1998 (28.07.1998), column 9, lines 6-18.	68,69,112
Y	US 2006/0098438 (Ouderkirk et al.) 11 May 2006 (11.05.2006), paragraph 0022.	49-51,74-76,83,94,114,115,117-119,120-142
Y	US 6,851,831 (Karlicek, Jr.) 8 February 2005 (8.02.2005), column 2, lines 45-55.	77,78
Y	US 2005/0169002 (Steen et al.) 4 August 2005 (4.08.2005), paragraphs 0007, 0027.	88,89
Y	US 6,561,689 (Kidd et al.) 13 May 2003 (13.05.2003), column 4, lines 45-50.	90
Y	US 2004/0228124 (Reiff et al.) 18 November 2004 (18.11.2004), paragraph 0081.	91-98,108-119
Y	US 2003/0053310 (Sommers) 20 March 2003 (20.03.2003), paragraph 0034.	97
Y	US 6,059,421 (White et al.) 9 May 2000 (9.05.2000), whole document.	119, 120-142
Y	US 2005/0195602 (Pan) 8 September 2005 (8.09.2005), Figure 2A.	128-130

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/20042

Continuation of B. FIELDS SEARCHED Item 3:

EAST word search terms: LED, light emitting diode, chip, hexagon, honeycomb, color, memory, ceiling, socket, control, circuit, information, data, heatsink, thermal, heat, serial number, calibration, power requirement, operation temperature, power, history, subassembly, electrical, thermal, contact, chamber, optic, lens, FR-4, flexible, PCB, through hole, aperture, hole, cutout, perimiter, base plate, round, circular,