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(54) Title: LIGHT EMITTING DEVICES AND METHODS

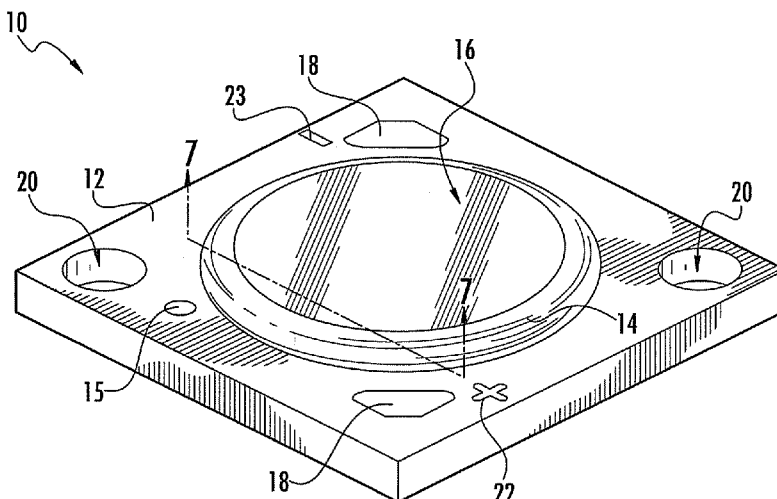


FIG. 1

(57) Abstract: Light emitting devices and methods are disclosed. In one embodiment a light emitting device can include a substrate, one or more light emitting diodes (LEDs) disposed over the substrate, and the LEDs can include electrical connectors for connecting to an electrical element. A light emitting device can further include a retention material disposed over the substrate and the retention material can be disposed over at least a portion of the electrical connectors. In one aspect, a method for making a light emitting device is disclosed. The method can include providing a substrate with one or more LEDs comprising electrical connectors. The method can further include providing a retention material on at least a portion of the substrate wherein the retention material is disposed over at least a portion of the electrical connectors.





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A. CLASSIFICATION OF SUBJECT MATTER**H01L 33/62(2010.01)i**

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)

H01L 33/00-H01L 33/64; H05B 37/02; F21S 8/04; F21Y 101/02; H01L 29/22

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: retention material, curved cross section, fill material, encapsulant

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	JP 2010-009972 A (TOSHIBA LIGHTING & TECHNOLOGY CORP.) 14 January 2010 See abstract; paragraphs [0030],[0032]; claims 1-2; and figures 3-4	30,34-43,45-49 1-25,29,31-33,44 26-28
Y A	US 2007-0029569 A1 (PETER ANDREWS) 08 February 2007 See abstract, paragraphs [0060]-[0065], and figures 3-4	1-25,29,31-33,44 26-28,30,34-43 ,45-49
A	US 2010-0078664 A1 (RENE PETER HELBING) 01 April 2010 See abstract; paragraphs [0026]-[0027],[0031]-[0040]; and figures 1-2	1-49
A	US 6548832 B1 (NORIAKI SAKAMOTO et al.) 15 April 2003 See column 7, line 26 - column 7, line 42 and figure 5	1-49
A	JP 2009-044055 A (TOSHIBA LIGHTING & TECHNOLOGY CORP.) 26 February 2009 See abstract and figures 1-6	1-49

 Further documents are listed in the continuation of Box C. See patent family annex.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2010-009972 A	14.01.2010	None	
US 2007-0029569 A1	08.02.2007	CN 101278410 A0 CN 101278410 B CN 102280567 A DE 112005003652 T5 JP 2009-503888 A JP 2009-503888 T KR 10-2008-0033496 A US 2008-0191237 A1 US 2011-0053297 A1 US 7365371 B2 US 7834375 B2 WO 2007-018560 A1	01.10.2008 14.09.2011 14.12.2011 12.06.2008 29.01.2009 29.01.2009 16.04.2008 14.08.2008 03.03.2011 29.04.2008 16.11.2010 15.02.2007
US 2010-0078664 A1	01.04.2010	CN 102224607 A KR 10-2011-0063793 A WO 2010-039546 A1	19.10.2011 14.06.2011 08.04.2010
US 6548832 B1	15.04.2003	EP 1059667 A2 EP 1059667 A3 EP 1059668 A2 EP 1059668 A3 EP 1059678 A2 JP 2000-353826 A JP 2001-044512 A JP 2001-044579 A JP 2001-044580 A JP 2001-057446 A JP 2001-068742 A JP 2009-260396 A JP 4190095 B2 JP 4342046 B2 JP 4342046 B2 JP 4412787 B2 JP 4412787 B2 KR 10-0418165 B1 KR 10-0419807 B1 KR 10-0419808 B1 KR 10-2001-0014669 A US 6730933 B1	13.12.2000 04.07.2007 13.12.2000 18.07.2007 13.12.2000 19.12.2000 16.02.2001 16.02.2001 16.02.2001 27.02.2001 16.03.2001 05.11.2009 03.12.2008 17.07.2009 14.10.2009 10.02.2010 27.11.2009 11.02.2004 21.02.2004 21.02.2004 26.02.2001 04.05.2004
JP 2009-044055 A	26.02.2009	None	