



- (51) **International Patent Classification:**
F21V 5/00 (2006.01) *F21V 29/00* (2006.01)
- (21) **International Application Number:** PCT/US2012/022151
- (22) **International Filing Date:** 23 January 2012 (23.01.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:** 13/019,498 2 February 2011 (02.02.2011) US
- (71) **Applicant (for all designated States except US):** 3M INNOVATIVE PROPERTIES COMPANY [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).
- (72) **Inventors:** JOHNSTON, Raymond P.; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). KRISTOFFERSEN, Martin; Liljev. 3B, N-3929 Porsgrunn (NO). MEIS, Michael A.; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). BROTT, Robert L.; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).
- (74) **Agents:** VIETZKE, Lance L., et al.; 3M Center Office of Intellectual Property Counsel Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

[Continued on next page]

(54) **Title:** SOLID STATE LIGHT WITH OPTICAL DIFFUSER AND INTEGRATED THERMAL GUIDE

(57) **Abstract:** A solid state light having a solid state light source such as LEDs, an optical diffuser, and a thermal guide. The diffuser receives and distributes light from the light source, and the thermal guide is integrated with the optical diffuser for providing thermal conduction from the solid state light source and dissipating heat through convection and radiation for cooling the light. The interior surface of the optical diffuser can have extraction features for providing uniform distribution of light.

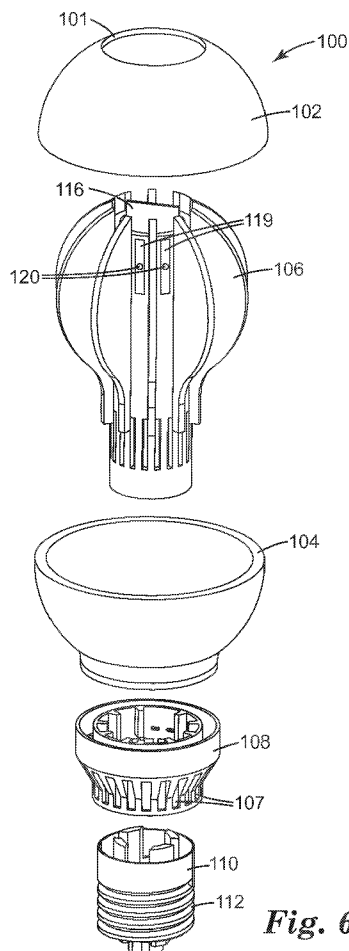


Fig. 6





AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS,

SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

8 November 2012

A. CLASSIFICATION OF SUBJECT MATTER***F21V 5/00(2006.01)i, F21V 29/00(2006.01)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)

F21V 5/00; F21S 2/00; F21V 29/00; F21V 17/00; F21Y 101/02

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: LED, diffuser, thermal guide, optical guide

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7160012 B2 (HILSCHER, ACHIM et al.) 09 January 2007 See abstract, claims 1-20, figures 1-4.	1-17
A	KR 10-0991670 B1 (TM TECH CO., LTD.) 04 November 2010 See abstract, claims 1-2, figures 1-5.	1-17
A	KR 20-0440554 Y1 (KWANGSUNG ELECTRIC INDUSTRY CO., LTD.) 17 June 2008 See abstract, claims 3-6, figures 1-4.	1-17
A	US 2008-0253125 A1 (KANG, SHUNG-WEN et al.) 16 October 2008 See abstract, claims 1-7, figures 1-12.	1-17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 AUGUST 2012 (29.08.2012)

Date of mailing of the international search report

29 AUGUST 2012 (29.08.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

LEE, Seung Joo

Telephone No. 82-42-481-8186



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/022151

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7160012 B2	09.01.2007	AU 2003-205508 A1 CN 1640199 A CN 1640199 B DE 50310999 D1 EP 1461979 A1 EP 1461979 B1 JP 04-154334 B2 JP 2005-514752 A US 2005-0105302 A1 WO 03-059012 A1	24.07.2003 13.07.2005 08.09.2010 12.02.2009 29.09.2004 31.12.2008 24.09.2008 19.05.2005 19.05.2005 17.07.2003
KR 10-0991670 B1	04.11.2010	KR 10-1055774 B1	11.08.2011
KR 20-0440554 Y1	17.06.2008	EP 2223009 A2 JP 2011-505054 A US 2011-0037386 A1 WO 2009-069894 A2 WO 2009-069894 A3	01.09.2010 17.02.2011 17.02.2011 04.06.2009 04.06.2009
US 2008-0253125 A1	16.10.2008	US 2009-0043525 A1 US 7581856 B2	12.02.2009 01.09.2009