



- (51) International Patent Classification:
F21V 29/00 (2006.01) F21V 17/00 (2006.01)
- (21) International Application Number:
PCT/US2012/027305
- (22) International Filing Date:
1 March 2012 (01.03.2012)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/448,655 2 March 2011 (02.03.2011) US
- (71) Applicant (for all designated States except US): **SANDIA CORPORATION** [US/US]; 1515 Eubank Boulevard SE, Albuquerque, NM 87123 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **KOPLow, Jeffrey, P.** [US/US]; 2512 Soren Way, San Ramon, CA 94582 (US).
- (74) Agents: **ENG, Kimton, N.** et al.; **DORSEY & WHITNEY LLP**, Columbia Center, 701 Fifth Ave, Suite 6100, Seattle, WA 98104-7043 (US).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, 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).

Published:
— with international search report (Art. 21(3))

[Continued on next page]

(54) Title: SOLID STATE LIGHTING DEVICES AND METHODS WITH ROTARY COOLING STRUCTURES

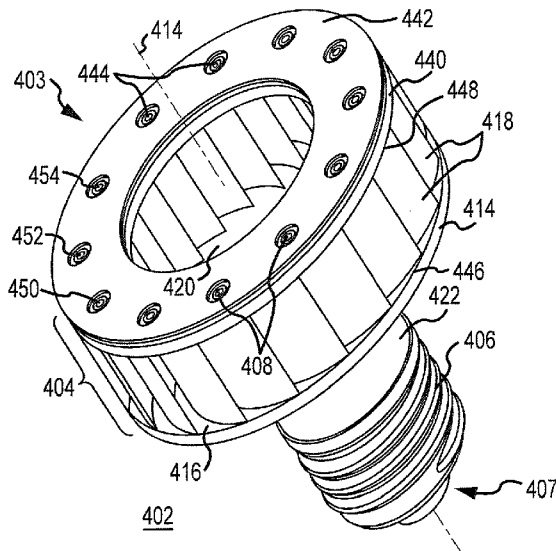


FIGURE 4

(57) Abstract: Solid state lighting devices and methods for heat dissipation with rotary cooling structures are described. An example solid state lighting device includes a solid state light source, a rotating heat transfer structure in thermal contact with the solid state light source, and a mounting assembly having a stationary portion. The mounting assembly may be rotatably coupled to the heat transfer structure such that at least a portion of the mounting assembly remains stationary while the heat transfer structure is rotating. Examples of methods for dissipating heat from electrical devices, such as solid state lighting sources are also described. Heat dissipation methods may include providing electrical power to a solid state light source mounted to and in thermal contact with a heat transfer structure, and rotating the heat transfer structure through a surrounding medium.



(88) Date of publication of the international search report:
7 February 2013

A. CLASSIFICATION OF SUBJECT MATTER*F21V 29/00(2006.01)i, F21V 17/00(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 29/00; F04B 17/00; H05K 7/20; F04B 35/04; F28F 5/00; F04B 17/03

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, light, heat, rotate, and impeller

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010-0177480 A1 (KOPLOW JEFFREY P.) 15 July 2010 See the abstract; paragraphs [0058] - [0059]; claims 1, 31; and figure 7-8	1-25
A	US 2009-0168351 A1 (CHEN CHIN-MING et al.) 02 July 2009 See the abstract; paragraphs [0025] - [0031]; claims 1, 16; and figure 2A-2C	1-25
A	US 2008-0175730 A1 (WYSK HANS-JOACHIM et al.) 24 July 2008 See the abstract; paragraphs [0021] - [0028]; claim 1; and figure 1	1-25
A	US 2002-0090307 A1 (JUI-HUNG CHENG) 11 July 2002 See the abstract; paragraphs [0019] - [0027]; claims 1, 6; and figure 7	1-25

 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

26 SEPTEMBER 2012 (26.09.2012)

Date of mailing of the international search report

27 SEPTEMBER 2012 (27.09.2012)

Name and mailing address of the ISA/KR

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

Facsimile No. 82-42-472-7140

Authorized officer

KIM, KAPBYUNG

Telephone No. 82-42-481-5998



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/027305

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0177480 A1	15.07.2010	CN 102112939 A	29.06.2011
		EP 2329337 A1	08.06.2011
		JP 2011-530191 A	15.12.2011
		US 2009-0199997 A1	13.08.2009
		US 2011-0103011 A1	05.05.2011
		US 8228675 B2	24.07.2012
		WO 2010-016963 A1	11.02.2010
US 2009-0168351 A1	02.07.2009	TW 200928113 A	01.07.2009
		US 8040674 B2	18.10.2011
US 2008-0175730 A1	24.07.2008	DE 102007003568 A1	07.08.2008
		DE 102007003568 A8	12.03.2009
		US 8087905 B2	03.01.2012
US 2002-0090307 A1	11.07.2002	US 6457955 B1	01.10.2002