

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
20 October 2011 (20.10.2011)

(10) International Publication Number  
**WO 2011/130715 A3**

(51) International Patent Classification:  
F21V 7/04 (2006.01)

(21) International Application Number:  
PCT/US2011/032792

(22) International Filing Date:  
15 April 2011 (15.04.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

61/325,265	16 April 2010 (16.04.2010)	US
61/325,270	16 April 2010 (16.04.2010)	US
61/325,262	16 April 2010 (16.04.2010)	US
61/325,282	16 April 2010 (16.04.2010)	US
61/325,280	16 April 2010 (16.04.2010)	US
61/325,277	16 April 2010 (16.04.2010)	US
61/325,275	16 April 2010 (16.04.2010)	US
61/325,272	16 April 2010 (16.04.2010)	US
61/325,271	16 April 2010 (16.04.2010)	US
61/325,269	16 April 2010 (16.04.2010)	US
61/325,252	16 April 2010 (16.04.2010)	US
61/325,266	16 April 2010 (16.04.2010)	US
61/347,567	24 May 2010 (24.05.2010)	US
61/363,342	12 July 2010 (12.07.2010)	US
61/368,560	28 July 2010 (28.07.2010)	US
61/377,888	27 August 2010 (27.08.2010)	US
61/381,077	9 September 2010 (09.09.2010)	US
61/415,250	18 November 2010 (18.11.2010)	US
61/425,328	21 December 2010 (21.12.2010)	US
61/441,871	11 February 2011 (11.02.2011)	US
61/450,711	9 March 2011 (09.03.2011)	US

(71) Applicant (for all designated States except US): **FLEX LIGHTING II, LLC** [US/US]; 208 South Jefferson Street, Suite 202, Chicago, IL 60661 (US).

(72) Inventors; and  
(75) Inventors/Applicants (for US only): **NICHOL, Anthony J.** [US/US]; 208 South Jefferson Street, Suite 202, Chicago, IL 60661 (US). **COLEMAN, Zane** [US/US]; 1342 W. School St., Unit 3, Chicago, IL 60657 (US).

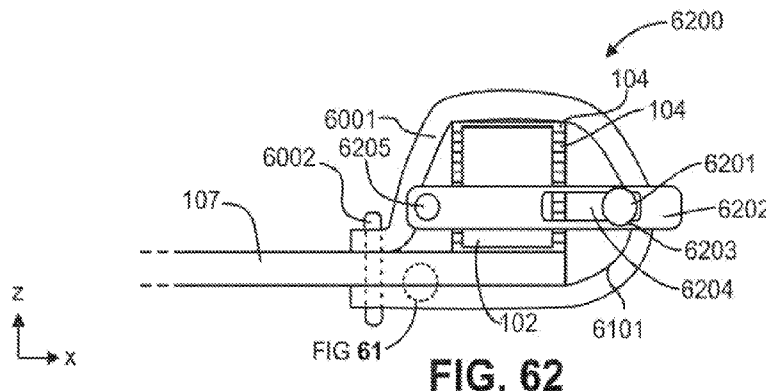
(74) Agent: **KRISCHKE, Eric, T.**; Schiff Hardin LLP, 233 S. Wacker Dr., Suite 6600, Chicago, IL 60606 (US).

(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, RO, RS, RU, 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.

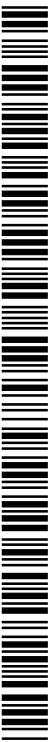
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, 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).

[Continued on next page]

(54) Title: ILLUMINATION DEVICE COMPRISING A FILM-BASED LIGHTGUIDE



(57) Abstract: A light emitting device includes a film lightguide. The lightguide includes a lightguide region and an array of coupling lightguides continuous with the lightguide region, each terminating in a bounding edge and folded such that the bounding edges define a light input surface. A light source emits light into the light input surface. Light propagates within each coupling lightguide to the lightguide region, with light from each coupling lightguide combining with light from one or more other coupling lightguides and totally internally reflecting within the lightguide region. One or more light extraction features frustrate the totally internally reflected light such that light exits the lightguide in a light emitting region. Surface relief features on a surface of a low contact area cover are adjacent to a region of the lightguide with one or more of the surface relief features contacting the lightguide. A method of producing a device is disclosed.



WO 2011/130715 A3



**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))*
- *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:**  
12 January 2012

**Published:**

- *with international search report (Art. 21(3))*

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2011/032792

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - F21V 7/04 (2011.01)

USPC - 362/606

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)

IPC(8) - F21V 5/02, F21V 7/04, and G09F 13/04 (2011.01)

USPC - 362/606, 362/625, 362/634

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)

MicroPatent, Google Patents, and ACM

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2007/0031097 A1 (HEIKENFELD et al) 08 February 2007 (08.02.2007) entire document	1-22
Y	WO 2009/048863 A1 (NICHOL) 16 April 2009 (16.04.2009) entire document	1-22
Y	US 2004/0228104 A1 (BIRMAN) 18 November 2004 (18.11.2004) entire document	2-4, and 20-22
Y	US 7,452,120 B2 (LEE et al) 18 November 2008 (18.11.2008) entire document	3 and 17-20
Y	US 2006/0061008 A1 (KARNER et al) 23 March 2006 (23.03.2006) entire document	6 and 15
Y	US 6,641,880 B1 (DEYAK et al) 04 November 2003 (04.11.2003) entire document	13
Y	US 6,964,226 B2 (WEISS et al) 15 November 2005 (15.11.2005) entire document	18-19

 Further documents are listed in the continuation of Box C.

\* 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 another 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

25 October 2011

Date of mailing of the international search report

17 NOV 2011

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:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300  
PCT OSP: 571-272-7774