

Exhibit F

(12) **United States Patent**
Boomgaarden et al.

(10) **Patent No.:** **US 8,967,844 B2**
 (45) **Date of Patent:** ***Mar. 3, 2015**

(54) **LOW PROFILE LIGHT AND ACCESSORY KIT FOR THE SAME**

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(73) Assignee: **Lightning Science Group Corporation**, Satellite Beach, FL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/134,884**

(22) Filed: **Dec. 19, 2013**

(65) **Prior Publication Data**

US 2014/0104847 A1 Apr. 17, 2014

Related U.S. Application Data

(63) Continuation of application No. 13/476,388, filed on May 21, 2012, now Pat. No. 8,672,518, which is a continuation-in-part of application No. 12/775,310, filed on May 6, 2010, now Pat. No. 8,672,518.

(60) Provisional application No. 61/248,665, filed on Oct. 5, 2009.

(51) **Int. Cl.**

F21V 29/00 (2006.01)

F21V 23/00 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC . **F21K 9/10** (2013.01); **F21V 21/04** (2013.01); **F21V 29/004** (2013.01); **F21V 23/00** (2013.01);

(Continued)

(58) **Field of Classification Search**

USPC 362/362, 364, 365, 368, 373, 294, 362/249.01, 249.02

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,168,299 B1 1/2001 Yan
 6,431,728 B1 8/2002 Fredericks et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP 1950491 A1 7/2008
 WO 2008137732 A1 11/2008

OTHER PUBLICATIONS

EP International Search Report for Application No. 10174449.8; Dated Dec. 14, 2010.

(Continued)

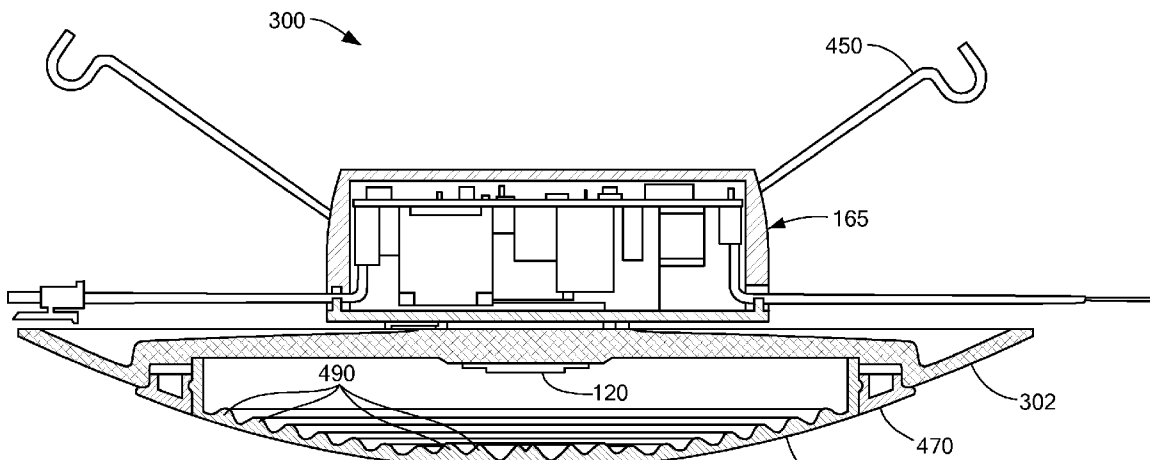
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(57) **ABSTRACT**

A luminaire includes a heat spreader, a heat sink, a light source and an outer optic. The heat sink is substantially ring-shaped and is disposed around and in thermal communication with an outer periphery of the heat spreader. The light source is disposed in thermal communication with the heat spreader, the light source having a plurality of light emitting diodes (LEDs) that are disposed in thermal communication with the heat spreader. The outer optic is disposed in optical communication with the plurality of LEDs. The heat spreader, the heat sink and the outer optic, in combination, have an overall height H and an overall outside dimension D such that the ratio of H/D is so dimensioned as to: cover an opening defined by a nominally sized four-inch can light fixture; and, cover an opening defined by a nominally sized four-inch electrical junction box.

24 Claims, 17 Drawing Sheets



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|------|--------------------|-----------|--|-----------------|----------------------|
| (51) | Int. Cl. | | | | |
| | F21K 99/00 | (2010.01) | | 2009/0086504 A1 | 4/2009 Kim |
| | F21S 8/02 | (2006.01) | | 2009/0129086 A1 | 5/2009 Thompson, III |
| | F21S 8/04 | (2006.01) | | 2009/0141506 A1 | 6/2009 Lan et al. |
| | F21V 21/04 | (2006.01) | | | |
| | F21Y 101/02 | (2006.01) | | | |
| | F21V 21/02 | (2006.01) | | | |

OTHER PUBLICATIONS

European Office Action for Application No. 10 174 449.8. Mailed on Apr. 8, 2013. 4 pages.

Cree, Inc., LR6 Six-Inch LED Downlight product literature, Rev. Dec. 19, 2012, 4 pages.

EP International Search Report for Application No. 10174449.8 dated Dec. 14, 2010.

EP Office Action for Application No. 10 174 449.8 mailed on Apr. 8, 2013, 4 pages.

Matsushita Electric Works, Ltd., MFORCE High-Output, High-Color Rendering LED Unit for Lighting product literature, Annual Report 2007, 2 pages.

Lighting Research Center, Lighting Research Program Project 2.3 Low-Profile LED Luminaries, PIER Final Project Report, prepared for the California Energy Commission, Apr. 2007, CEC-500-2005-141-A4, pp. 1-66.

Inteltech Corporation, Silescent 100i LV Light literature, Rev. May 2008, 4 pages.

Cree, Inc., Defendant, "Preliminary Invalidation Contentions", filed in the United States District Court for the Middle District of Florida Orlando Division, Case No. 6:13-cv-00587-RBD-GJK, on Dec. 20, 2013; 122 pages.

European Office Action for Application No. 10174449.8; Dated Sep. 12, 2014.

Exhibit 44—Lighting Research Center, Lighting Research Program Project 2.3 Low-Profile LED Luminaries, PIER Final Project Report, prepared for the California Energy Commission, Apr. 2007, pp. 1-66, CEC-500-2005-141-A4.

Exhibit 46—Inteltech Corporation, Silescent 100i LV Light literature, Rev. May 2008, 4 pages.

Exhibit 48—Cree, Inc., LR6 Six-Inch LED Downlight product literature, Rev. Dec. 19, 2012, 4 pages.

Exhibit 51—Matsushita Electric Works, Ltd., MFORCE High-Output, High-Color Rendering LED Unit for Lighting product literature, Annual Report 2007, 2 pages.

Exhibit D—Cree, Inc., Defendant, "Preliminary Invalidation Contentions", filed in the United States District Court for the Middle District of Florida Orlando Division, Case No. 6:13-cv-00587-RBD-GJK, on Dec. 20, 2013; 500 pages.

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|------|-----------------|---|
| (52) | U.S. Cl. | |
| | CPC | F21Y 2101/02 (2013.01); F21V 29/2212 (2013.01); F21V 29/22 (2013.01); F21S 8/026 (2013.01); F21V 21/02 (2013.01); F21S 8/04 (2013.01) |
| | USPC | 362/547; 362/294; 362/235; 362/147; 362/148 |

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,719,446 B2	4/2004	Cao	
7,125,146 B2*	10/2006	Willis et al.	362/267
7,413,321 B2	8/2008	Kim	
7,547,112 B2	6/2009	Kim	
7,607,812 B2	10/2009	Kim	
7,670,021 B2*	3/2010	Chou	362/148
7,722,220 B2	5/2010	Van De Ven	
7,722,227 B2*	5/2010	Zhang et al.	362/364
7,810,960 B1*	10/2010	Soderman et al.	362/294
7,828,465 B2*	11/2010	Roberge et al.	362/294
7,950,832 B2	5/2011	Tanaka et al.	
7,959,332 B2	6/2011	Tickner et al.	
7,980,736 B2	7/2011	Soderman et al.	
7,993,034 B2	8/2011	Wegner	
8,201,968 B2*	6/2012	Maxik et al.	362/235
8,348,477 B2	1/2013	Tickner et al.	
8,672,518 B2*	3/2014	Boomgaarden et al.	362/294
2008/0037255 A1	2/2008	Wang	
2008/0165535 A1	7/2008	Mazzochette	
2008/0170398 A1	7/2008	Kim	
2008/0232093 A1	9/2008	Kim	
2008/0232116 A1	9/2008	Kim	
2008/0285271 A1	11/2008	Roberge et al.	
2009/0086474 A1*	4/2009	Chou	362/230

* cited by examiner

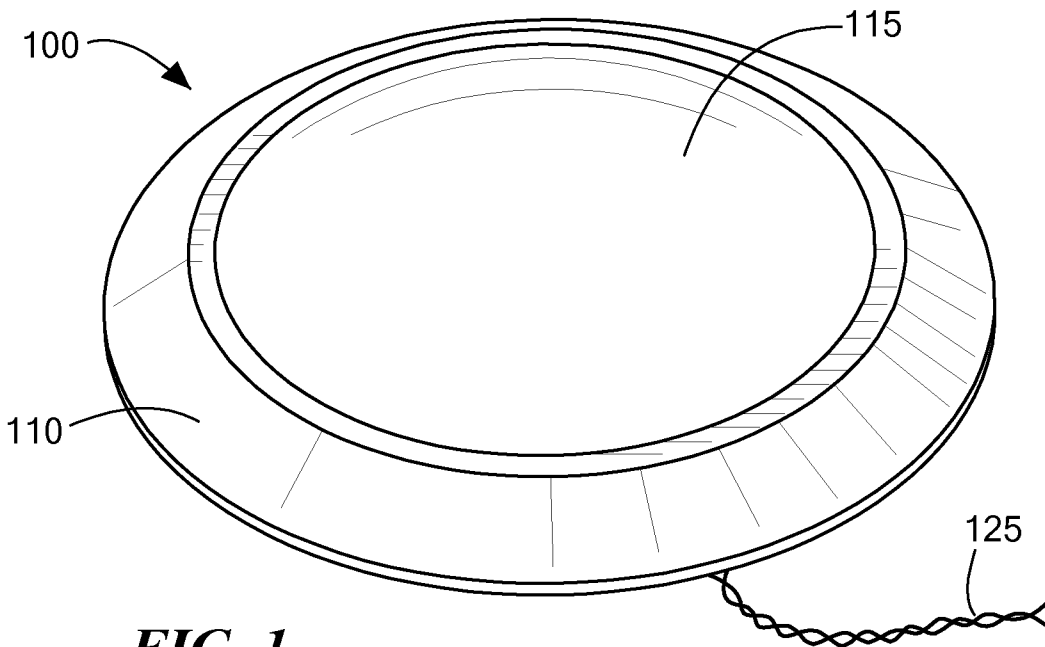


FIG. 1

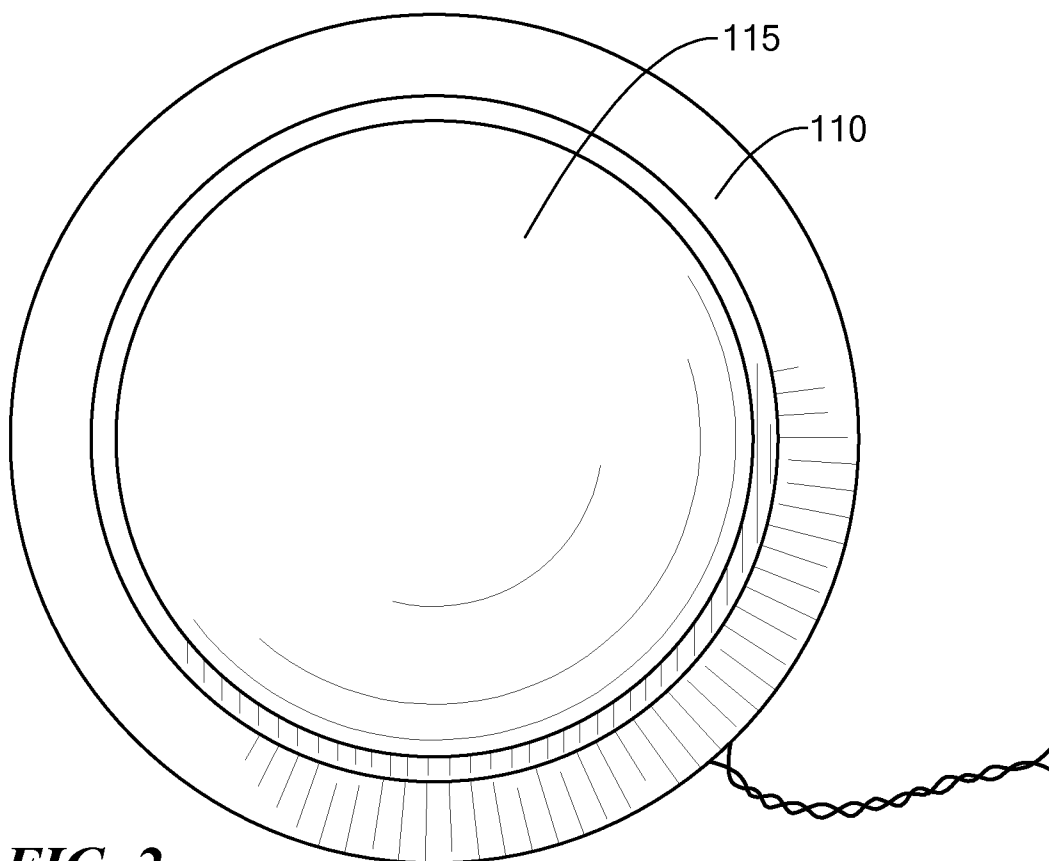


FIG. 2

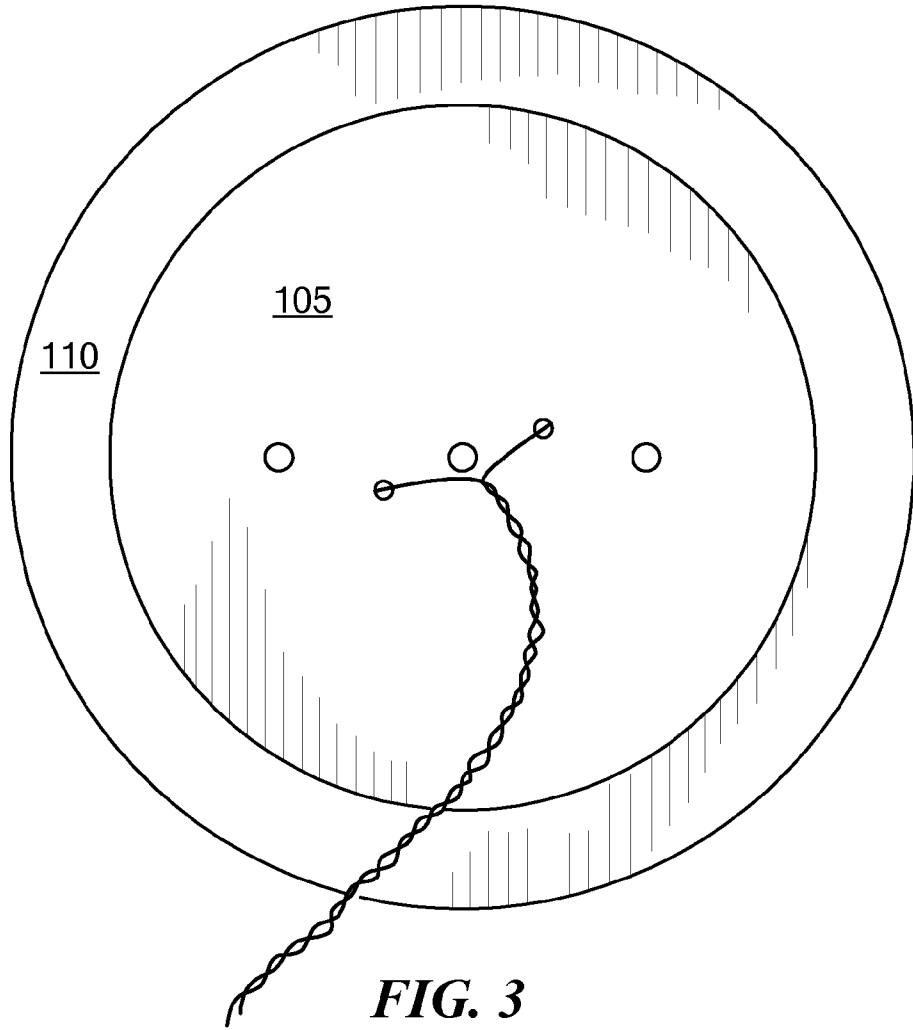


FIG. 3

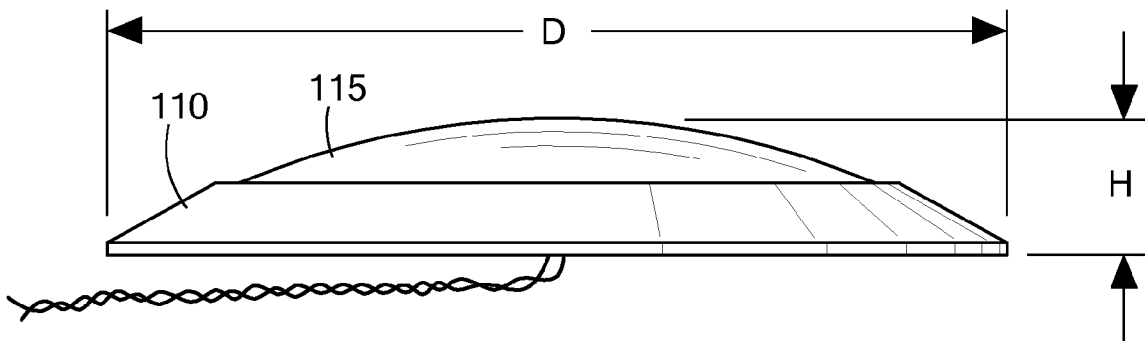


FIG. 4

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