(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 390 715 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
19.12.2012 Bulletin 2012/51

(43) Date of publication A2:
30.11.2011 Bulletin 2011/48

(21) Application number: **11175104.6**

(22) Date of filing: **25.06.2008**

(51) Int Cl.:
G02F 1/13357 *(2006.01)* ***G02B 6/00*** *(2006.01)*
F21V 8/00 *(2006.01)*

(84) Designated Contracting States:
DE

(30) Priority: **29.07.2007 US 829912**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
08159050.7 / 2 023 193

(71) Applicant: **Cree, Inc.**
Durham, NC 27703 (US)

(72) Inventors:
- **Medendorp, Nicholas W. Jr.**
Raleigh
NC 27614 (US)
- **Hiller, Norbert**
Chapel Hill
NC 27514 (US)
- **Villard, Russell G.**
Apex
NC 27502 (US)

(74) Representative: **Wraige, David Leslie Charles**
Elkington and Fife LLP
Prospect House
8 Pembroke Road
Sevenoaks, Kent TN13 1XR (GB)

(54) Led backlight system for lcd displays

(57) A liquid crystal display (LCD) system is disclosed. The system comprises:
a) a LCD panel;
b) at least one waveguide element comprising a plurality of light entry regions;
c) a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the at least one waveguide element at a first light entry region of the plurality of light entry regions;
d) a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the at least one waveguide element at a second light entry region of the plurality of light entry regions; and
e) a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.

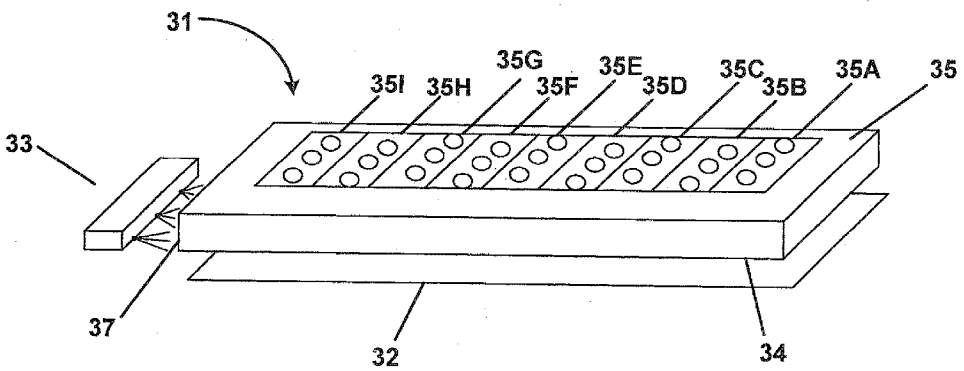

FIG. 4

EP 2 390 715 A3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 17 5104

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/022935 A1 (SAKAI SEIJI [JP] ET AL) 2 February 2006 (2006-02-02) * the whole document *	1-14	INV. G02F1/13357 G02B6/00 F21V8/00
X	EP 1 775 623 A1 (OLYMPUS CORP [JP]) 18 April 2007 (2007-04-18) * paragraphs [0059], [0061] - [0065]; figure 18 *	1-3,5,6, 10-12,14	
X	US 2005/259939 A1 (RINKO KARI [FI]) 24 November 2005 (2005-11-24) * paragraphs [0064], [0078] - [0079]; figures 4b,5a *	1-3,5-7, 10,12,14	
X	US 2007/063943 A1 (TANAKA SHINYA [JP] ET AL) 22 March 2007 (2007-03-22) * paragraphs [0060] - [0065]; figures 14-15 *	1-3,5,6, 10,12,14	
X	US 2006/002146 A1 (BABA MASATAKE [JP]) 5 January 2006 (2006-01-05) * paragraphs [0054] - [0055]; figures 7-8 *	1-6,8-14	TECHNICAL FIELDS SEARCHED (IPC) G02F G02B H05B F21V
X	WO 01/84046 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; LUMILEDS LIGHTING THE NETHERLA [N) 8 November 2001 (2001-11-08) * page 7 - page 10; figures 1-2,4 * * page 12 - page 13 *	1-3,5,6, 10-12,14	
X	US 2006/083019 A1 (HAHM HUN J [KR] ET AL HAHM HUN JOO [KR] ET AL) 20 April 2006 (2006-04-20) * the whole document * * paragraphs [0035] - [0049] * * figure 5 *	1-3,5,6, 9,10, 12-15	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 November 2012	Riblet, Philippe

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 17 5104

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/169012 A1 (TAKEUCHI NORIHITO [JP]) 4 August 2005 (2005-08-04) * the whole document * -----	1-3,5,6, 9,10, 12-15	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 November 2012	Riblet, Philippe

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 17 5104

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-11-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006022935 A1	02-02-2006	JP 4529573 B2	25-08-2010
		JP 2006040764 A	09-02-2006
		US 2006022935 A1	02-02-2006
EP 1775623 A1	18-04-2007	CN 1973239 A	30-05-2007
		CN 101408673 A	15-04-2009
		CN 101408674 A	15-04-2009
		EP 1775623 A1	18-04-2007
		JP 3908241 B2	25-04-2007
		JP 2006010935 A	12-01-2006
		US 2008285306 A1	20-11-2008
		WO 2006001383 A1	05-01-2006
US 2005259939 A1	24-11-2005	AU 2005239889 A1	17-11-2005
		BR PI0510509 A	30-10-2007
		CA 2579217 A1	17-11-2005
		CN 1997922 A	11-07-2007
		EP 1751593 A2	14-02-2007
		JP 4739327 B2	03-08-2011
		JP 2007535790 A	06-12-2007
		US 2005259939 A1	24-11-2005
		US 2008266863 A1	30-10-2008
		WO 2005107363 A2	17-11-2005
US 2007063943 A1	22-03-2007	NONE	
US 2006002146 A1	05-01-2006	CN 1716042 A	04-01-2006
		JP 4535792 B2	01-09-2010
		JP 2006019141 A	19-01-2006
		KR 20060049253 A	18-05-2006
		US 2006002146 A1	05-01-2006
WO 0184046 A1	08-11-2001	CN 1383480 A	04-12-2002
		EP 1281023 A1	05-02-2003
		JP 2003532273 A	28-10-2003
		MX PA02000166 A	12-08-2004
		TW 514709 B	21-12-2002
		US 2001038532 A1	08-11-2001
		WO 0184046 A1	08-11-2001
US 2006083019 A1	20-04-2006	JP 2006120594 A	11-05-2006
		KR 20060035044 A	26-04-2006
		TW I308649 B	11-04-2009
		US 2006083019 A1	20-04-2006
US 2005169012 A1	04-08-2005	CN 1619382 A	25-05-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 17 5104

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-11-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		EP 1533632 A1	25-05-2005
		JP 2005158370 A	16-06-2005
		KR 20050049412 A	25-05-2005
		US 2005169012 A1	04-08-2005

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	用于液晶显示器的LED背光系统		
公开(公告)号	EP2390715A3	公开(公告)日	2012-12-19
申请号	EP2011175104	申请日	2008-06-25
[标]申请(专利权)人(译)	克里公司		
申请(专利权)人(译)	CREE，INC.		
当前申请(专利权)人(译)	CREE，INC.		
[标]发明人	MEDENDORP NICHOLAS W JR HILLER NORBERT VILLARD RUSSELL G		
发明人	MEDENDORP, NICHOLAS W. JR. HILLER, NORBERT VILLARD, RUSSELL G.		
IPC分类号	G02F1/13357 G02B6/00 F21V8/00 F21Y101/00		
CPC分类号	G02B6/0028 G02B6/0038 G02B6/0068 G02B6/0076 G02F1/133603 G02F1/133524 G02F1/133615		
优先权	11/829912 2007-07-29 US		
其他公开文献	EP2390715A2 EP2390715B1		
外部链接	Espacenet		

摘要(译)

公开了一种液晶显示（LCD）系统。该系统包括：a）LCD面板; b）至少一个波导元件，包括多个光进入区域; c）第一发光源，包括第一多个LED，所述第一多个LED布置在第一条带中并且定位成在所述多个光进入区域的第一光进入区域处将光发射到所述至少一个波导元件中; d）第二发光源，包括第二多个LED，所述第二多个LED布置在第二条带中并且定位成在所述多个光进入区域的第二光进入区域处将光发射到所述至少一个波导元件中; e）与第一多个LED和第二多个LED中的至少一个电连通的公共控制电路。

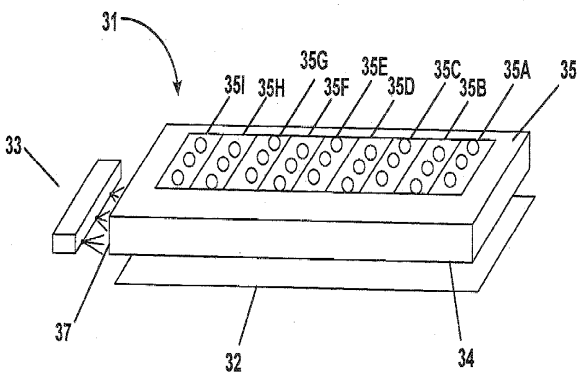

FIG. 4