

AO 120 (Rev. 08/10)

TO: <b>Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> P.O. Box 1450 Alexandria, VA 22313-1450	<b>REPORT ON THE                  FILING OR DETERMINATION OF AN                  ACTION REGARDING A PATENT OR                  TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas on the following  
 Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:14-cv-00202	DATE FILED 3/10/2014	U.S. DISTRICT COURT for the Eastern District of Texas
PLAINTIFF Innovative Display Technologies LLC		DEFENDANT Nissan Motor Co., Ltd. and Nissan North America, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 6,755,547	6/29/2004	Innovative Display Technologies LLC
2 7,300,194	11/27/2007	Innovative Display Technologies LLC
3 7,384,177	6/10/2008	Innovative Display Technologies LLC
4 7,404,660	7/29/2008	Innovative Display Technologies LLC
5 7,434,974	10/14/2008	Innovative Display Technologies LLC (see continuation attached)

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director    Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director    Copy 4—Case file copy

**Sony Corp. Exhibit 1002**

AO 120 CONTINUATION

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
6 7,537,370	5/26/2009	Innovative Display Technologies LLC
7 8,215,816	7/10/2012	Innovative Display Technologies LLC

AO 120 (Rev. 08/10)

<p><b>TO:</b></p> <p style="text-align: center;"><b>Mail Stop 8</b>  <b>Director of the U.S. Patent and Trademark Office</b>  <b>P.O. Box 1450</b>  <b>Alexandria, VA 22313-1450</b></p>	<p><b>REPORT ON THE</b>  <b>FILING OR DETERMINATION OF AN</b>  <b>ACTION REGARDING A PATENT OR</b>  <b>TRADEMARK</b></p>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court District of Delaware on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED 12/31/2013	U.S. DISTRICT COURT District of Delaware
PLAINTIFF Delaware Display Group LLC and Innovative Display Technologies LLC		DEFENDANT Amazon.com, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 See Attached		
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

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4	US 7,404,660 B2	7/29/2008	Innovative Display Technologies LLC
5	US 7,434,974 B2	10/14/2008	Innovative Display Technologies LLC
6	US 7,537,370 B2	5/26/2009	Innovative Display Technologies LLC
7	US 7,914,196 B2	3/29/2011	Delaware Display Group LLC
8	US 8,215,816 B2	7/10/2012	Innovative Display Technologies LLC

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 filed in the U.S. District Court District of Delaware on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO.	DATE FILED 12/31/2013	U.S. DISTRICT COURT District of Delaware
PLAINTIFF Delaware Display Group LLC and Innovative Display Technologies LLC		DEFENDANT HTC Corporation and HTC America, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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4	US 7,404,660 B2	7/29/2008	Innovative Display Technologies LLC
5	US 7,434,974 B2	10/14/2008	Innovative Display Technologies LLC
6	US 7,537,370 B2	5/26/2009	Innovative Display Technologies LLC
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8	US 8,215,816 B2	7/10/2012	Innovative Display Technologies LLC

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 Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED 12/31/2013	U.S. DISTRICT COURT District of Delaware
PLAINTIFF Delaware Display Group LLC and Innovative Display Technologies LLC		DEFENDANT LG Electronics, Inc., LG Electronics U.S.A., Inc., LG Display Co., Ltd., and LG Display America, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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5	US 7,434,974 B2	10/14/2008	Innovative Display Technologies LLC
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DOCKET NO.	DATE FILED 12/31/2013	U.S. DISTRICT COURT District of Delaware
PLAINTIFF Delaware Display Group LLC and Innovative Display Technologies LLC		DEFENDANT Pantech Corp. Ltd, and Pantech Wireless, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DOCKET NO.	DATE FILED 12/31/2013	U.S. DISTRICT COURT District of Delaware
PLAINTIFF Delaware Display Group LLC and Innovative Display Technologies LLC		DEFENDANT Sony Corporation, Sony Corporation of America, Sony Electronics Inc., and Sony Mobile Communications (USA) Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DOCKET NO.	DATE FILED 12/31/2013	U.S. DISTRICT COURT District of Delaware
PLAINTIFF Delaware Display Group LLC and Innovative Display Technologies LLC		DEFENDANT Vizio, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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3	US 7,384,177 B2	6/10/2008	Innovative Display Technologies LLC
4	US 7,404,660 B2	7/29/2008	Innovative Display Technologies LLC
5	US 7,434,974 B2	10/14/2008	Innovative Display Technologies LLC
6	US 7,537,370 B2	5/26/2009	Innovative Display Technologies LLC
7	US 7,914,196 B2	3/29/2011	Delaware Display Group LLC
8	US 8,215,816 B2	7/10/2012	Innovative Display Technologies LLC

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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Marshall Division on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:13-cv-00522	DATE FILED 6/28/2013	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF INNOVATIVE DISPLAY TECHNOLOGIES LLC		DEFENDANT ACER INC., and ACER AMERICA CORPORATION
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 U.S. No. 7,537,370	5/26/2009	Innovative Display Technologies LLC
2 U.S. No. 8,215,816	7/10/2012	Innovative Display Technologies LLC
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 Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:13-cv-00523	DATE FILED 6/28/2013	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF INNOVATIVE DISPLAY TECHNOLOGIES LLC		DEFENDANT DELL, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 U.S. No. 7,537,370	5/26/2009	Innovative Display Technologies LLC
2 U.S. No. 8,215,816	7/10/2012	Innovative Display Technologies LLC
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 Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.);

DOCKET NO. 2:13-cv-00524	DATE FILED 6/28/2013	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF INNOVATIVE DISPLAY TECHNOLOGIES LLC		DEFENDANT HEWLETT-PACKARD COMPANY
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 U.S. No. 7,537,370	5/26/2009	Innovative Display Technologies LLC
2 U.S. No. 8,215,816	7/10/2012	Innovative Display Technologies LLC
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Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:13-cv-00525	DATE FILED 6/28/2013	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF INNOVATIVE DISPLAY TECHNOLOGIES LLC		DEFENDANT HUAWEI INVESTMENT AND HOLDING CO., LTD., HUAWEI TECHNOLOGIES CO., LTD., and HUAWEI DEVICE USA INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 U.S. No. 7,537,370	5/26/2009	Innovative Display Technologies LLC
2 U.S. No. 8,215,816	7/10/2012	Innovative Display Technologies LLC
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DOCKET NO. 2:13-cv-00526	DATE FILED 6/28/2013	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF INNOVATIVE DISPLAY TECHNOLOGIES LLC		DEFENDANT RESEARCH IN MOTION LIMITED, and RESEARCH IN MOTION CORPORATION
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 U.S. No. 7,537,370	5/26/2009	Innovative Display Technologies LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK HOLDER OF PATENT OR TRADEMARK
1	
2	
3	
4	
5	

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
--------------------

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1—Upon initiation of action, mail this copy to Director    Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director    Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO: <b>Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Marshall Division on the following  
 Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:13-cv-00527	DATE FILED 6/28/2013	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF INNOVATIVE DISPLAY TECHNOLOGIES LLC		DEFENDANT ZTE CORPORATION, and ZTE (USA) INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 U.S. No. 7,537,370	5/26/2009	Innovative Display Technologies LLC
2 U.S. No. 8,215,816	7/10/2012	Innovative Display Technologies LLC
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
--------------------

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1—Upon initiation of action, mail this copy to Director    Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director    Copy 4—Case file copy



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/548,330	7537370	2885	9200



CC00000040779038

**Correspondence Address/Fee Address Change**

The following fields have been set to Customer Number 93969 on 03/23/2010

- Correspondence Address
- Power of Attorney Address

The address of record for Customer Number 93969 is:

93969  
Donald L. Otto (Rambus)  
Renner, Otto, Boisselle & Sklar, LLP  
1621 Euclid Avenue  
19th Floor  
Cleveland, OH 44115



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office  
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P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/548,330	7537370	2885	9200



CC00000040519120

**Correspondence Address/Fee Address Change**

The following fields have been set to Customer Number 93969 on 03/09/2010

- Correspondence Address
- Power of Attorney Address

The address of record for Customer Number 93969 is:

93969  
Rambus International Ltd  
c/o Rambus Inc.  
4440 El Camino Real  
Los Altos, CA 94022



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www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/548,330	05/26/2009	7537370	GLOLP0108USAL	5221

23908 7590 05/06/2009  
RENNER OTTO BOISSELLE & SKLAR, LLP  
1621 EUCLID AVENUE  
NINETEENTH FLOOR  
CLEVELAND, OH 44115

**ISSUE NOTIFICATION**

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**  
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Jeffery R. Parker, Richfield, OH;

**PART B - FEE(S) TRANSMITTAL**

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450**  
or **Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23908 7590 03/23/2009

**RENNER OTTO BOISSELLE & SKLAR, LLP**  
1621 EUCLID AVENUE  
NINETEENTH FLOOR  
CLEVELAND, OH 44115

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.  
**transmitted via EFS WEB**

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Jeanne Murphy	(Depositor's name)
	(Signature)
April 14, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/548,330	10/11/2006	Jeffery R. Parker	GL0LP0108USAL	5221

TITLE OF INVENTION: LIGHT EMITTING PANEL ASSEMBLIES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	06/23/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
SEMBER, THOMAS M	2885	362-600000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).  
 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list  
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,  
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

RENNER, OTTO, BOISSELLE & SKLAR, LLP

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)  
 PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: **Solid State Opto Limited**  
 (B) RESIDENCE: (CITY and STATE OR COUNTRY) **British Virgin Islands**

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:  
 Issue Fee  
 Publication Fee (No small entity discount permitted)  
 Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)  
 A check is enclosed.  
 Payment by credit card. ~~Form PTO-2038 is attached.~~ via EFS Web  
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number **18-0988** (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)  
 a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature  Date 4/14/09  
 Typed or printed name Donald L. Otto Registration No. 22,125

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	11548330
<b>Filing Date:</b>	11-Oct-2006
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Attorney Docket Number:</b>	GLOLP0108USAL

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1810</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	5147322
<b>Application Number:</b>	11548330
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	14-APR-2009
<b>Filing Date:</b>	11-OCT-2006
<b>Time Stamp:</b>	08:34:35
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1810
RAM confirmation Number	6070
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Issue Fee Payment (PTO-85B)	GLOLP0108USALissuefee.pdf	94808 50525f66b930796e086cf94d7e4e62345b6 23504	no	1
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (PTO-06)	fee-info.pdf	31903 4c366253472d627f14e6758e9e8159a3482 03d51	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			126711		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p>					



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NOTICE OF ALLOWANCE AND FEE(S) DUE

23908 7590 03/23/2009

RENNER OTTO BOISSELLE & SKLAR, LLP
1621 EUCLID AVENUE
NINETEENTH FLOOR
CLEVELAND, OH 44115

EXAMINER
SEMBER, THOMAS M
ART UNIT PAPER NUMBER
2885
DATE MAILED: 03/23/2009

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

11/548,330 10/11/2006 Jeffery R. Parker GLOLP0108USAL 5221
TITLE OF INVENTION: LIGHT EMITTING PANEL ASSEMBLIES

Table with 7 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23908 7590 03/23/2009

RENNER OTTO BOISSELLE & SKLAR, LLP  
 1621 EUCLID AVENUE  
 NINETEENTH FLOOR  
 CLEVELAND, OH 44115

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

11/548,330      10/11/2006      Jeffery R. Parker      GLOLP0108USAL      5221

TITLE OF INVENTION: LIGHT EMITTING PANEL ASSEMBLIES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional      NO      \$1510      \$300      \$0      \$1810      06/23/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
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SEMBER, THOMAS M      2885      362-600000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____</p> <p>(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____</p> <p>3 _____</p>
---	---

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY and STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (<b>Please first reapply any previously paid issue fee shown above</b>)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
---	---

5. **Change in Entity Status** (from status indicated above)

a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.       b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



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Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for Jeffery R. Parker and examiner information for Thomas M. Sember.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	11/548,330	PARKER, JEFFERY R.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Thomas M. Sember	2885	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to the amendment filed on 01/15/09.
2.  The allowed claim(s) is/are 1-11, 13, 15-27, 29, 31-49, 51 and 53-54.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some\*    c)  None    of the:
    1.  Certified copies of the priority documents have been received.
    2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_ .
    3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
    - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.


**Attachment(s)**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)</li> <li>3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date <u>01/15/09 and 02/02/07</u></li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____ .</li> <li>7. <input type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____.</li> </ol> |
|--|--|

/Thomas M Sember/  
Primary Examiner, Art Unit 2885






<b>Issue Classification</b>  	<b>Application/Control No.</b> 11548330	<b>Applicant(s)/Patent Under Reexamination</b> PARKER, JEFFERY R.
	<b>Examiner</b> Thomas M Sember	<b>Art Unit</b> 2885

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS			SUBCLASS			CLAIMED					NON-CLAIMED							
362			607			F	2	1	V	8 / 00 (2006.01.01)								
<b>CROSS REFERENCE(S)</b>																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
362	618	619	620															

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	15	17	29	33	45	49								
2	2	16	18	30	34		50								
3	3	17	19	31	35	46	51								
4	4	18	20	32	36		52								
5	5	19	21	33	37	47	53								
6	6	20	22	34	38	48	54								
7	7	21	23	35	39										
8	8	22	24	36	40										
9	9	23	25	37	41										
10	10	24	26	38	42										
11	11	25	27	39	43										
	12		28	40	44										
12	13	26	29	41	45										
	14		30	42	46										
13	15	27	31	43	47										
14	16	28	32	44	48										

NONE			<b>Total Claims Allowed:</b>	
			48	
(Assistant Examiner)	(Date)			
/Thomas M Sember/ Primary Examiner. Art Unit 2885	03/06/0	O.G. Print Claim(s)	O.G. Print Figure	
(Primary Examiner)	(Date)	1	3, 5	

<b>Search Notes</b>  	<b>Application/Control No.</b> 11548330	<b>Applicant(s)/Patent Under Reexamination</b> PARKER, JEFFERY R.
	<b>Examiner</b> Thomas M Sember	<b>Art Unit</b> 2885

<b>SEARCHED</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>

<b>SEARCH NOTES</b>			
<b>Search Notes</b>	<b>Date</b>	<b>Examiner</b>	
Updated search	10/01/08	/TS/	
	03/05/09	/TS/	

<b>INTERFERENCE SEARCH</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>
362	as previousaly searched	03/05/09	/TS/
	Did broadest claim search in PGPUB	"	"

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Receipt date: 01/15/2009

11548330 - Serial 2885

Form PTO-1449 (Modified)  <b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)	Atty Docket No.	Serial No.
	GLOLP0108USAL	11/548,330
	Applicant: Jeffery R. Parker	
	Filing Date	Group
	October 11, 2006	2885

U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	5,775,791 (corresponds to JP 6-25802)	07/1998	Yoshikawa et al			

FOREIGN PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Country	Class	Sub-class	Translation	
						Yes	No
	6-25802 (enclosed)	04/1998	JP				X
	06-003526 (enclosed)	01/1994	JP			X	
	61-240506 (enclosed)	10/1986	JP				X
	07-159607 (enclosed)	06/1995	JP			X	
	07-120605 (enclosed)	05/1995	JP			X	

OTHER ART

Examiner Initial	Author, Title, Date, Pertinent Pages, etc.

EXAMINER	/Thomas Sember/	DATE CONSIDERED	03/06/2009
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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Information Disclosure Statement PTO-1449 (Modified)

The identification of any reference is not intended to be, and should not be understood as being, an admission that such publication, in fact, constitutes "prior art" within the meaning of applicable law since, for example, a given reference may have a later effective date than first seems apparent or the reference may have an effective date which can be antedated. The "prior art" status of any reference is a matter to be resolved during prosecution.

Z:\SEC177\GLOLP108USAL\SUPPLEMENTAL IDS.wpd (IDS1449.FRM) (2/97)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.S./

SONY\_000048



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
 United States Patent and Trademark Office  
 Address: COMMISSIONER FOR PATENTS  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 5221

<b>SERIAL NUMBER</b> 11/548,330	<b>FILING or 371(c) DATE</b> 10/11/2006 <b>RULE</b>	<b>CLASS</b> 362	<b>GROUP ART UNIT</b> 2885	<b>ATTORNEY DOCKET NO.</b> GLOLP0108USAL		
<b>APPLICANTS</b> Jeffery R. Parker, Richfield, OH; <b>** CONTINUING DATA *****</b> This application is a DIV of 10/784,527 02/23/2004 PAT 7,160,015 which is a DIV of 09/256,275 02/23/1999 PAT 6,712,481 which is a CIP of 08/778,089 01/02/1997 PAT 6,079,838 which is a DIV of 08/495,176 06/27/1995 PAT 5,613,751 <b>** FOREIGN APPLICATIONS *****</b> <b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 03/08/2007						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and /THOMAS M SEMBER/ Acknowledged Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> OH	<b>SHEETS DRAWINGS</b> 4	<b>TOTAL CLAIMS</b> 54	<b>INDEPENDENT CLAIMS</b> 3
<b>ADDRESS</b> RENNER OTTO BOISSELLE & SKLAR, LLP 1621 EUCLID AVENUE NINETEENTH FLOOR CLEVELAND, OH 44115 UNITED STATES						
<b>TITLE</b> LIGHT EMITTING PANEL ASSEMBLIES						
<b>FILING FEE RECEIVED</b> 3360	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

**EAST Search History**

<b>Ref #</b>	<b>Hits</b>	<b>Search Query</b>	<b>DBs</b>	<b>Default Operator</b>	<b>Plurals</b>	<b>Time Stamp</b>
L3	3683	(depression and deformit\$3 or protrus\$4 or prism\$3 or v \$shaped) near5 (panel or display or guide)and (edge or input) near4 (panel or display or guide)	US-PGPUB	OR	ON	2009/03/05 22:44

**3/ 5/ 2009 11:11:23 PM**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of

Applicant: Jeffery R. Parker  
Serial No.: 11/548,330  
Filed: October 11, 2006  
For: LIGHT EMITTING PANEL ASSEMBLIES  
Art Unit:  
Examiner:

**INFORMATION DISCLOSURE STATEMENT**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

1. Pursuant to 37 C.F.R. 1.97 and 1.98, and in compliance with 37 C.F.R. 1.56, the Office's attention is directed to the patents, pending applications, publications and other information listed on the attached PTO-1449. A copy of each listed document is enclosed, except for (a) those previously cited or submitted to the Office in the following application(s) upon which this application relies for an earlier filing date under 35 U.S.C. 120, and (b) any U.S. patent or U.S. patent application publication if the present application was filed after June 30, 2003 or entered the national stage under 35 USC § 371 after June 30, 2003:

Serial No.:	<u>10,784,527</u>	<u>09/256,275</u>	<u>08/778,089</u>	<u>08/495,176</u>
Filing Date:	<u>2/23/04</u>	<u>2/23/99</u>	<u>1/2/97</u>	<u>6/27/95</u>
Patent No.:		<u>6,712,481</u>	<u>6,079,838</u>	<u>5,613,751</u>

Regarding any document, publication or other information for which a date is not given on the attached PTO-1449, Applicant(s) believe(s) the same may qualify as "prior" art to this application and should be treated accordingly, although Applicant(s) reserve(s) the right to contest the prior art status of any document, publication or information, should issue arise.

2. Regarding each listed document that is not in the English language, an English-language translation accompanies this Statement as indicated on the attached PTO-1449 or a concise explanation of the relevance of the document is set forth in the following document(s):

- (a) \_\_\_ A copy of each English language version of a search report (or EPO Search Report) indicating the degree of relevance found by the foreign office of each document being submitted from the search report, is being submitted herewith or has previously been submitted.
- (b) \_\_\_ Attached is a "Concise Explanation of Relevance of Non-English Language Documents".

3. Pursuant to 37 C.F.R. 1.97(b) this Statement is being filed (one must be checked):

- (a) \_\_\_ Within 3 months of the filing date or date of entry into the National Stage.
- (b) X Before the mailing date of a first Office Action on the merits. If this Statement is not filed before the mailing date of a first Office Action on the merits, the required certification is given below or, in the absence thereof, the Office is authorized to charge the required fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988 for consideration of this Statement.
- (c) \_\_\_ Before the mailing date of a first Office Action on the merits after a first or second submission after final rejection under 37 C.F.R. 1.129(a).

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.S./

Receipt date: 02/02/2007

11548330 - GAU: 2885

(d) \_\_\_ After the period set forth in 37 C.F.R. 1.97(b) but before the mailing date of either a final action or a notice of allowance.

(1) \_\_\_ The required certification is given below, or

(2) \_\_\_ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p) for consideration of this Statement, or

(3) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988

(e) \_\_\_ After the mailing date of either a final action or a notice of allowance, but before payment of the issue fee. Petition hereby is made for consideration of this Statement and the required certification is indicated below.

(1) \_\_\_ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p), or

(2) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988.

4. Certification (if applicable)

(a) \_\_\_ The undersigned hereby certifies that each item of information contained in this Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than 3 months prior to the filing of this Statement.

(b) \_\_\_ The undersigned hereby certifies that no item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the undersigned's knowledge after making reasonable inquiry, no item of information contained in this statement was known to any individual designated in 37 C.F.R. 1.56(c) more than 3 months prior to the filing of this Statement.

5. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By  \_\_\_\_\_  
Donald L. Otto, Reg. No. 22,125

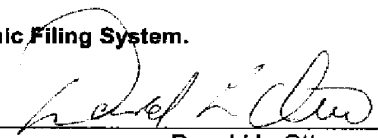
1621 Euclid Avenue, 19th Floor  
Cleveland, Ohio 44115  
(216) 621-1113

CERTIFICATE OF MAILING OR ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is \_\_\_ being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop \_\_, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

X  being transmitted via the USPTO Electronic Filing System.

Date: February 2, 2007

 \_\_\_\_\_  
Donald L. Otto

Z:\SEC177\GLOLIP108USALUIDS-1449.wpd

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.S./

SONY\_000052



Form PTO-1449 (Modified)  <b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)	Atty Docket No. <b>GLOLP0108USAL</b>	Serial No. <b>11/548,330</b>
	Applicant: <b>Jeffery R. Parker</b>	
	Filing Date <b>October 11, 2006</b>	Group

U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	2,480,178	8/1949	Zinberg			
	3,043,947	7/1962	Albinger, Jr.			
	3,328,570	6/1967	Balchunas			
	3,241,256	3/1966	Viret et al			
	3,721,815	3/1973	Wall			
	3,752,974	8/1973	Baker et al			
	3,760,179	9/1973	Addington, Jr.			
	3,781,537	12/1973	Ramsey			
	3,892,959	7/1975	Pulles			
	3,958,113	5/1976	Termohlen			
	4,043,636	8/1977	Eberhardt et al			
	4,128,332	12/1978	Rowe			
	4,257,084	3/1981	Reynolds			
	4,277,817	7/1981	Hehr			
	4,323,951	4/1982	Pasco			
	4,373,282	2/1983	Wragg			
	4,446,508	5/1984	Kinzie			
	4,519,017	5/1985	Daniel			
	4,573,766	3/1986	Bournay, Jr. et al			
	4,630,895	12/1986	Abdala, Jr., et al			
	4,648,690	3/1987	Ohe			
	4,673,254	6/1987	Kato et al			
	4,677,531	6/1987	Szeles			
	4,714,983	12/1987	Lang			
	4,729,067	3/1988	Ohe			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.S./

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	4,729,068	3/1988	Ohe			
	4,729,185	3/1988	Baba			
	4,751,615	6/1988	Abrams			
	4,761,047	8/1988	Mori			
	4,763,984	8/1988	Awai et al			
	4,765,701	8/1988	Cheslak			
	4,791,540	12/1988	Dreyer, Jr. et al			
	4,802,066	1/1989	Mori			
	4,811,507	3/1989	Blanchet			
	4,825,341	4/1989	Awai			
	4,890,201	12/1989	Joft			
	4,909,604	3/1990	Kobayashi et al			
	4,914,553	4/1990	Hamada et al			
	4,929,062	5/1990	Guzik et al			
	4,974,122	11/1990	Shaw			
	4,975,808	12/1990	Bond et al			
	4,978,952	12/1990	Irwin			
	4,985,809	1/1991	Matsui et al			
	5,005,108	4/1991	Pristash et al			
	5,027,258	6/1991	Schoniger et al			
	5,055,978	10/1991	Rogoff			
	5,070,431	12/1991	Kitazawa et al			
	5,093,765	3/1992	Kashima et al			
	5,134,549	7/1992	Yokoyama			
	5,136,483	8/1992	Schoniger et al			
	5,136,480	8/1992	Pristash et al			
	5,190,370	3/1993	Miller et al			
	5,207,493	5/1993	Murase et al			
	5,243,506	9/1993	Whitehead			
	5,262,928	11/1993	Kashima et al			
	5,283,673	2/1994	Murase et al			
	5,339,179	8/1994	Rudisill et al			
	5,349,503	9/1994	Blonder et al			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.S./

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	5,375,043	12/1994	Tokunaga			
	5,377,084	12/1994	Kojima et al			
	5,390,085	2/1995	Mari-Roca et al			
	5,390,436	2/1995	Ashall			
	5,394,308	2/1995	Watanabe et al			
	5,467,208	11/1995	Kokawa et al			
	5,467,417	11/1995	Nakamura et al			
	5,477,423	12/1995	Fredriksz et al			
	5,479,275	12/1995	Abileah			
	5,485,291	1/1996	Qiao et al			
	5,600,455	2/1997	Ishikawa et al			
	5,613,751	3/1997	Parker et al			
	5,719,649	2/1998	Shono et al			
	5,947,578	9/1999	Ayres			
	5,999,685	12/1999	Goto et al			
	6,827,456	12/2004	Parker et al			

FOREIGN PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Country	Class	Sub-class	Translation	
						Yes	No

OTHER ART

Examiner Initial	Author, Title, Date, Pertinent Pages, etc.

EXAMINER /Thomas Sember/	DATE CONSIDERED 03/06/2009
--------------------------	----------------------------

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

**Information Disclosure Statement PTO-1449 (Modified)**

The identification of any reference is not intended to be, and should not be understood as being, an admission that such publication, in fact, constitutes "prior art" within the meaning of applicable law since, for example, a given reference may have a later effective date than first seems apparent or the reference may have an effective date which can be antedated. The "prior art" status of any reference is a matter to be resolved during prosecution.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.S./

11548330

**ABSTRACT**

Light emitting panel assemblies include an optical panel member having a pattern of light extracting deformities on or in one or both sides to cause light to be emitted in a predetermined output distribution. The pattern of light extracting deformities on or in one side may have two or more different types or shapes of deformities and at least one of the types or shapes may vary along the length or width of the panel member. Where the light extracting deformities are on or in both sides, at least some of the deformities on or in one side may be of a different type or shape or vary in a different way or manner than the deformities on or in the other side.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Applicant: Jeffery R. Parker  
Serial No.: 11/548,330  
Filed: October 11, 2006  
For: LIGHT EMITTING PANEL ASSEMBLIES

Art Unit: 2885  
Examiner: Thomas M. Sember

Docket No. GLOLP0108USAL

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

1. Pursuant to 37 C.F.R. 1.97 and 1.98, and in compliance with 37 C.F.R. 1.56, the Office's attention is directed to the patents, pending applications, publications and other information listed on the attached PTO-1449. A copy of each listed document is enclosed, except for (a) those previously cited or submitted to the Office in the following application(s) upon which this application relies for an earlier filing date under 35 U.S.C. 120, and (b) any U.S. patent or U.S. patent application publication if the present application was filed after June 30, 2003 or entered the national stage under 35 USC § 371 after June 30, 2003:

Serial No.:	<u>10/784,527</u>	<u>09/256,275</u>	<u>08/778,089</u>	<u>08/495,176</u>
Filing Date:	<u>02/23/04</u>	<u>02/23/99</u>	<u>01/02/97</u>	<u>06/27/95</u>
Patent No.:	<u>7,160,015</u>	<u>6,712,481</u>	<u>6,079,838</u>	<u>5,613,751</u>

Regarding any document, publication or other information for which a date is not given on the attached PTO-1449, Applicant(s) believe(s) the same may qualify as "prior" art to this application and should be treated accordingly, although Applicant(s) reserve(s) the right to contest the prior art status of any document, publication or information, should issue arise.

2. Regarding each listed document that is not in the English language, an English-language translation accompanies this Statement as indicated on the attached PTO-1449 or a concise explanation of the relevance of the document is set forth in the following document(s):
- (a) \_\_\_ A copy of each English language version of a search report (or EPO Search Report) indicating the degree of relevance found by the foreign office of each document being submitted from the search report, is being submitted herewith or has previously been submitted.
- (b) \_\_\_ Attached is a "Concise Explanation of Relevance of Non-English Language Documents".
3. Pursuant to 37 C.F.R. 1.97(b) this Statement is being filed (one must be checked):
- (a) \_\_\_ Within 3 months of the filing date or date of entry into the National Stage, or the filing date of a Request for Continued Examination (RCE).
- (b) \_\_\_ Before the mailing date of a first Office Action on the merits. If this Statement is not filed before the mailing date of a first Office Action on the merits, the required certification is given below or, in the absence thereof, the Office is authorized to charge the required fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988 for consideration of this Statement.
- (c) \_\_\_ Before the mailing date of a first Office Action on the merits after a first or second submission after final rejection under 37 C.F.R. 1.129(a).

(d)  After the period set forth in 37 C.F.R. 1.97(b) but before the mailing date of either a final action or a notice of allowance.

(1) \_\_\_ The required certification is given below, or

(2)  Enclosed via EFS Web is a credit card payment covering the fee set forth in 37 C.F.R. 1.17(p) for consideration of this Statement, or

(3) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988

(e) \_\_\_ After the mailing date of either a final action or a notice of allowance, but before payment of the issue fee. Petition hereby is made for consideration of this Statement and the required certification is indicated below.

(1) \_\_\_ Enclosed via EFS Web is a credit card payment covering the fee set forth in 37 C.F.R. 1.17(p), or

(2) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988.

4. Certification (if applicable)

(a) \_\_\_ The undersigned hereby certifies that each item of information contained in this Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than 3 months prior to the filing of this Statement.

(b) \_\_\_ The undersigned hereby certifies that no item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the undersigned's knowledge after making reasonable inquiry, no item of information contained in this statement was known to any individual designated in 37 C.F.R. 1.56(c) more than 3 months prior to the filing of this Statement.

5. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By 

Donald L. Otto, Reg. No. 22,125

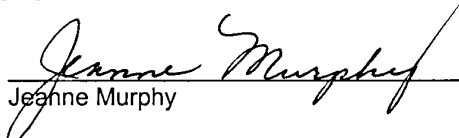
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Form PTO-1449 (Modified)  <b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)	Atty Docket No.	Serial No.
	GLOLP0108USAL	11/548,330
	Applicant: Jeffery R. Parker	
Filing Date	Group	
October 11, 2006	2885	

**U.S. PATENT DOCUMENTS**

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	5,775,791 (corresponds to JP 6-25802)	07/1998	Yoshikawa et al			

**FOREIGN PATENT DOCUMENTS**

Examiner Initial	Document Number	Date (MM/YYYY)	Country	Class	Sub-class	Translation	
						Yes	No
	6-25802 (enclosed)	04/1998	JP				X
	06-003526 (enclosed)	01/1994	JP			X	
	61-240506 (enclosed)	10/1986	JP				X
	07-159607 (enclosed)	06/1995	JP			X	
	07-120605 (enclosed)	05/1995	JP			X	

**OTHER ART**

Examiner Initial	Author, Title, Date, Pertinent Pages, etc.

EXAMINER	DATE CONSIDERED
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EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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(19)日本国特許庁(J P)

(12) 公開実用新案公報(U)

(11)実用新案出願公開番号

実開平6-25802

(43)公開日 平成6年(1994)4月8日

(51)Int.Cl. <sup>4</sup>	識別記号	庁内整理番号	F I	技術表示箇所
G 0 2 B 6/00	3 3 1	6920-2K		
G 0 2 F 1/1335	5 3 0	7408-2K		

審査請求 未請求 請求項の数3(全 3 頁)

(21)出願番号 実願平4-61246

(22)出願日 平成4年(1992)8月31日

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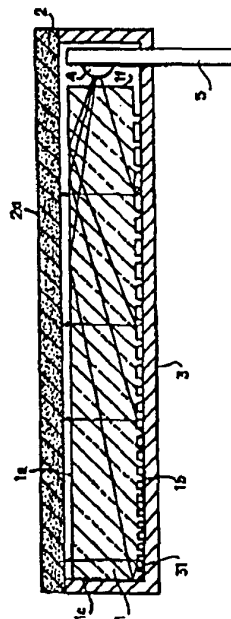
(74)代理人 弁理士 大塚 康徳 (外1名)

(54)【考案の名称】 面発光装置

(57)【要約】

【目的】 発光面が均一な明るさの面発光装置を提供する。

【構成】 L E D 4 から発した光は導光板 1 に入射される。導光板 1 内に入射された光は上面 1 a や底面 1 b で全反射され、あるいは反射棒 3 で反射されて凸部 3 1 に当たる。凸部 3 1 は底面と共に成型されており、漏斗形状をしている。凸部 3 1 に当たった光は反射されて上面 1 a から出射し、拡散板 2 で拡散されて対象物を照らします。





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【実用新案登録請求の範囲】

【請求項1】 発光面の側方に配置された光源からの光を前記発光面から出射する面発光装置であって、発光面と対向する底面部に、微小な凸部で形成した反射形状部を、その密度が前記光源からの距離に応じて漸増するように配設した透明な導光板を備え、前記光源から入射された光を前記反射形状部により反射して前記発光面から出射することを特徴とする面発光装置。

【請求項2】 前記反射形状部は、前記光源から遠ざかる向きについて千鳥格子状に配設することを特徴とする請求項1項記載の面発光装置。

【請求項3】 前記反射形状部はその頂から底面部に連なる接続部を曲面で形成した微小な凸部であることを特\*

\* 徴とする請求項1項記載の面発光装置。

【図面の簡単な説明】

【図1】 本考案の実施例である面発光装置の断面図である。

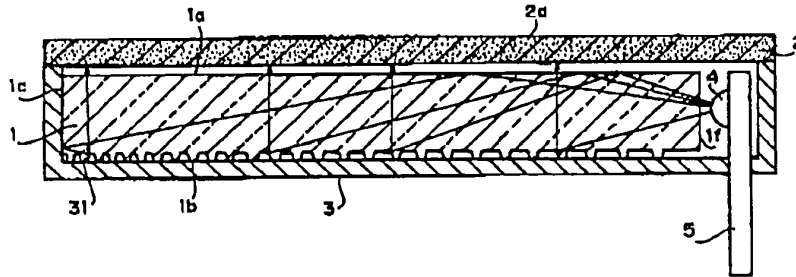
【図2】 面発光装置の上面図である。

【図3】 導光板の底面の拡大図である。

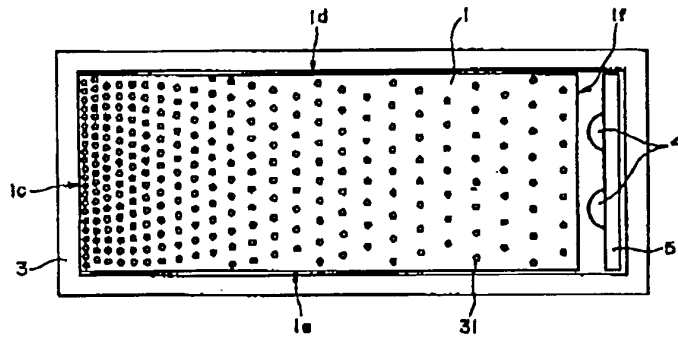
【符号の説明】

- 1 導光板、
- 2 拡散板、
- 3 反射枠、
- 4 光源、
- 31 凸部である。

【図1】



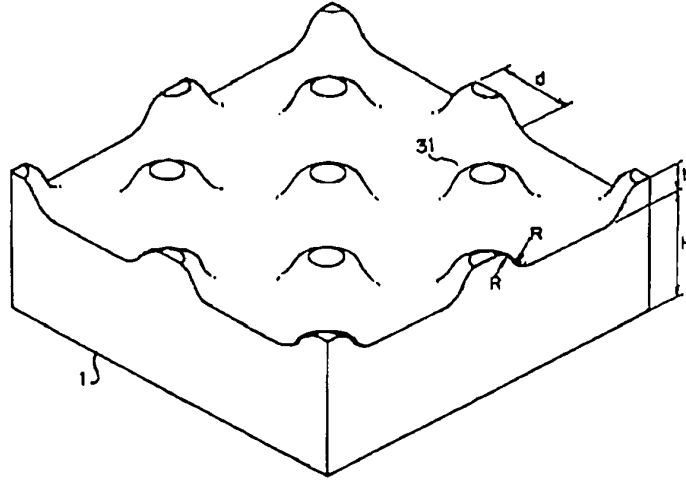
【図2】



(3)

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【図3】



**【考案の詳細な説明】****【0001】****【産業上の利用分野】**

本考案は、被照明体である例えば液晶表示パネル等を背部から照明するために用いられる面発光装置に関する。

**【0002】****【従来の技術】**

従来、面発光装置にあっては、光源から発した光を発光面に導くために、光源の光を導光板に入射したのち発光面へ向けて出射していた。この導光板として、発光面に対向する面をヘアライン加工してその面に当たる光を乱反射させ、光源の光りを効率的に発光面に導くものとして、例えば特公昭58-17957号公報等の技術が知られている。

**【0003】****【考案が解決しようとする課題】**

しかしながら、近年、液晶表示パネル等は大型化しており、そのバックライトとなる面発光装置も大型化している。このように面発光装置が大型化すると、前記従来の導光板を用いた面発光装置では、光源に近い部分は明るく、遠い部分は暗いというように発光面の明るさにむらができてしまい、全体を均一な明るさで発光させることが難しかった。

**【0004】**

本考案は上記従来例に鑑みて成されたもので、光源の光を発光面全体に均一に出射してムラなく発光させることができる面発光装置を提供することを目的とする。

**【0005】****【課題を解決するための手段】**

上記目的を達成するために、本考案の面発光装置は次のような構成からなる。発光面の側方に配置された光源からの光を前記発光面から出射する面発光装置であって、発光面と対向する底面部に、微小な凸部で形成した反射形状部を、その密度が前記光源からの距離に応じて漸増するように配設した透明な導光板を備

え、前記光源から入射された光を前記反射形状部により反射して前記発光面から出射することを特徴とする。

【0006】

【作用】

上記構成により、光源から発した光は導光板に入射し、反射形状部で反射されて発光面より出射される。

【0007】

【実施例】

以下、添付図面を参照して本考案の好適な実施例を詳細に説明する。

<構造>

図1は本考案の実施例である面発光装置の断面図である。図において、光源4は基板5に取り付けられており、光源5に近接して、端面1fから光源の光が入射するようアクリル等の透明部材からなる導光板1が配置されている。導光板1はその発光面側の上面1a以外の面を反射枠3に覆われており、上面1aの反対側の底面1bを除いて、平滑面仕上げされている。また、導光板1の底面1bには、底面に平行な断面形状が円形であるような微小な凸部31が導光板1と一体に形成されており、その頂面は平坦に仕上げられている。この凸部31は図3に示す様にその頂から底面部に連なる立ち上がり部及び立ち下がり部の形状が径Rの曲面となっており、図2に示すように配置される。

【0008】

導光板1の上面1a上部には拡散板2が取り付けられている。拡散板2は磨りガラス等からなるもので、導光板1の上面1aから出射する光りを拡散し、発光面2aにより不図示の被照明体を照らし出す。

【0009】

図3は導光板1の底面1bを拡大して一部を切り出した斜視図である。各微小な凸部31は光源からの光を反射する反射形状部であり、その横断面は円形であって、導光板1に対する接続部の外周は半径Rの曲面を持つ漏斗状に形成されている（以下、このアールの部分を縁部と呼ぶ）。凸部31の大きさは、導光板1の厚さHが1mm程度であるのに対し、各凸部の高さhは0.03ないし0.0

(6)

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7mm程度であり、その径 $d$ は0.05ないし0.2mm程度であって、すべて同一の形状である。

**【0010】**

図2は本実施例の面発光装置を上面から見た図であり、拡散板2を取り除いた状態である。図における小円は一つ一つが微小な凸部31であり、光源4から遠ざかる方向にむけて千鳥格子状に配列されている。また、凸部31が導光板1に形成される密度も、光源から遠ざかるにつれて徐々に密になっている。

**<発光の過程>**

光源4から発した光は、光源4の端面1fから導光板1に入射する。導光板がアクリルである場合、アクリルの屈折率は $n=1.49$ であり、入射した光が導光板界面で全反射する臨界角は42度10分である。端面1fから入射・屈折した光は、導光板1の表面1a、側面1d、1e及び底面1bの平坦な部分に当たった場合には全反射され、外部に漏れることはない。また、端面1cに当たった場合には反射枠3により反射される。

**【0011】**

こうして、導光板1に入射した光は直接あるいは上述のような全反射を繰り返して底面1bの凸部31の縁部に当たる。前述のように縁部は曲面で形成されており、そこに当たった光は反射されて上面1aから出射され、拡散板2によって拡散されて発光面2aより発される。

**【0012】**

以上のように、導光板1から出射する光は凸部31の縁部による反射を経るため、凸部31の密度が高ければその付近における上面1aからの出光量も増えることになる。したがって、光源4付近から遠ざかるにつれて減少する光量を補正するように、光源4から遠ざかるにつれて凸部31の密度を徐々に上げれば、入射光量の多い光源付近では出射する光量が減り、入射光量の少ない部分ではその逆となって、導光板1の上面1aから出射する光量は均一化される。

**【0013】**

このように導光板1底面に、光源から遠ざかるにつれてその密度が減少するように、立ち上がり部及び立ち下がり部が曲面を成す漏斗形状の微小な凸部を配置

することにより、次のような効果が得られる。

① 円形の凸部を配置することにより、光がどの方向から当たっても同じ反射率で反射させることができ、凸部の形状による方向性を持たず、光の均一性が得られる。

② 凸部を同形状にすることにより、その密度で反射率をコントロールすることができ、面光源の光量を均一化することができる。

③ 凸部を千鳥格子状に配置することにより、光源から出た光が多く凸部に直接入射し易くなり、特定の部分が明るくなることなく、光の均一性が得られる。

④ このような導光板は、加工の際にも凸部を一体成型することでヘアライン加工のような後工程を必要とせず、安価に製造することができる。

#### 【0014】

##### 【他の実施例】

前の実施例においては、光源4は導光板1の一方の端面に向けて光を入射する様に配置されていたが、大型の導光板を用いる際には、その両端に光源を配置することもできる。その場合、導光板1底面の凸部31は、2つの光源からもっとも遠い中央付近を高密度になるよう配置し、光源付近では低い密度になる様に密度の傾斜を設けて配置する。このようにしても均一に発光する面発光装置を実現できる。

#### 【0015】

##### 【考案の効果】

以上説明した様に、本考案にかかる面発光装置は、光源の光を発光面全体に均一に出射してムラなく発光させることができるという効果がある。

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-003526

(43)Date of publication of application : 14.01.1994

(51)Int.Cl. G02B 6/00  
G02B 6/00  
F21S 1/00  
G02B 5/00  
G02F 1/1335  
// F21V 8/00

(21)Application number : 04-159403

(71)Applicant : FUJITSU LTD

(22)Date of filing : 18.06.1992

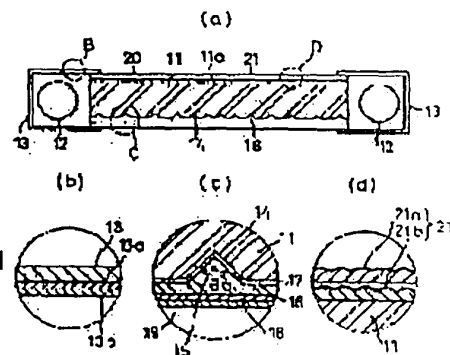
(72)Inventor : NAGATANI SHINPEI  
YAMADA FUMIAKI  
MIYAHARA DAIKI  
ITO TAKAHIDE

## (54) ILLUMINATING DEVICE

### (57)Abstract:

**PURPOSE:** To realize a surface illuminating device whose brightness is high and which is excellent in productivity.

**CONSTITUTION:** This is the illuminating device constituted by providing at least a light transmission plate 11 and a light source 12 arranged on the side surface of the plate 11. As for the light transmission plate 11, a light diffusing plate 21 is disposed on its surface from which light is emitted, and an almost triangular recessed part 14 is formed in a linear or dotted state on the other surface, where a transparent layer 16 is formed of a material having larger refractive index than that of the plate 11 so as to bury the recessed part 14, and further a reflector 18 is arranged or integrated on the outer surface of the layer 16.



(18)日本国特許庁(J.P.)

(12) 公開特許公報(A)

(11)特許出願公開番号

特開平6-3526

(43)公開日 平成6年(1994)1月14日

(51)Int.Cl.*	識別記号	庁内整理番号	F I	技術表示箇所
G 0 2 B 6/00	3 0 1	6920-2K		
	3 3 1	6920-2K		
F 2 1 S 1/00		F 7913-3K		
G 0 2 B 5/00		Z 9224-2K		
G 0 2 F 1/1335	5 3 0	7408-2K		

審査請求 未請求 請求項の数5(全 8 頁) 最終頁に続く

(21)出願番号 特願平4-159403

(22)出願日 平成4年(1992)6月18日

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(74)代理人 弁理士 青木 朗 (外3名)

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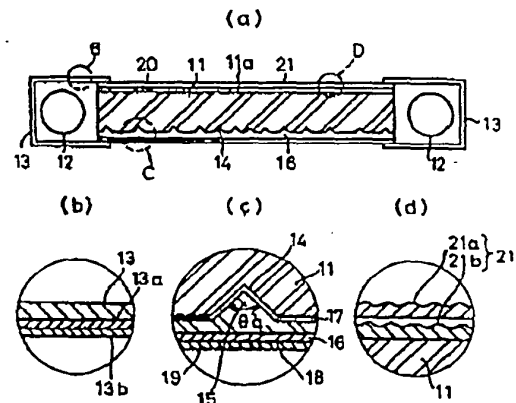
(54)【発明の名称】 照明装置

(57)【要約】

【目的】 本発明は、照明装置に関し、高輝度で、且つ生産性の良い面照明装置を実現することを目的とする。

【構成】 少なくとも導光板11と、その側面に配置された光源12とを具備して成る照明装置において、上記導光板11は、その光を出射する面に光拡散板21が配設され、他方の面には略三角形の凹部14が線状あるいは点状に形成され、さらに該面には該導光板11より屈折率の大きい材料で凹部14を埋めるように透明層16が形成され、さらに該透明層16の外表面には反射板が配置あるいは一体化されて成るように構成する。

本発明の第1の実施例を示す図



- 11…導光板
- 12…光源
- 13…反射カバー
- 13a, 13b…Aa 鋼膜反射層
- 13c, 13d…保護層
- 14…凹部
- 15…凸部
- 16…透明層
- 17…接合剤
- 20…発光部
- 21…光拡散板
- 21a, 21b…ポリカーボネイト樹脂フィルム



1

## 【特許請求の範囲】

【請求項1】 少なくとも導光板(11)と、その側面に配置された光源(12)とを具備して成る照明装置において、

上記導光板(11)は、その光を射出する面に光拡散板(21)が配設され、他方の面には、略三角形の凹部(14)が線状あるいは点状に形成され、さらに、該面には該導光板(11)より屈折率の大きい材料で凹部(14)を埋めるように透明層(16)が形成され、さらに該透明層(16)の外表面には反射板(18)が配

置あるいは一体化されて成ることを特徴とする照明装置。

【請求項2】 少なくとも導光板(11)と、その側面に配置された光源(12)とを具備して成る照明装置において、  
上記導光板(11)は、その光を射出する面に略三角形の凹部(34)が線状あるいは点状に形成され、さらに該面には該導光板(11)より屈折率の大きい材料で凹部(34)を埋めるように透明層(36)が形成され、さらに該透明層(36)の外表面には光拡散板(38)が配設され、他方の面には反射板(32)が設けられて成ることを特徴とする照明装置。

【請求項3】 少なくとも導光板(11)と、その側面に配置された光源(12)とを具備して成る照明装置において、  
上記導光板(11)は、その光を射出する面に略三角形の凹部(34)が線状あるいは点状に形成され、さらに該面には該導光板(11)より屈折率の大きい材料で凹部(34)を埋めるように透明層(36)が形成され、さらに該透明層(36)の外表面には光拡散板(38)が配設され、他方の面には、略三角形の凹部(14)が線状あるいは点状に形成され、さらに該面には該導光板(11)より屈折率の大きい材料で凹部(14)を埋めるように透明層(16)が形成され、さらに該透明層(16)の外表面には反射板(18)が配置あるいは一体化されて成ることを特徴とする照明装置。

【請求項4】 前記導光板(11)の面積が最も大である2面の一方又は両方が傾斜していることを特徴とする請求項1、2または3の照明装置。

【請求項5】 上記請求項1、2、3又は4の照明装置(40)と液晶表示パネル(41)とを組み合わせることを特徴とする液晶表示装置。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は液晶表示装置等の表示の視認性を向上させるために用いる面照明装置に関する。

【0002】 面照明装置には直下型、エッジライト型(導光式)の2方式が一般的とされているが本発明はエッジライト型に関するものである。エッジライト型の面照明装置において使用される導光板には、光を射出する

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ためにその背面に拡散反射層を形成している。この拡散反射層は、面照明装置の発光を面上一様な輝度分布とするため光源からの距離に応じた面積率を持つ点状または、網目状等の拡散反射部分を形成し、その拡散反射部分、非拡散反射部分の比率、つまり光源からの距離に応じた拡散反射量の比率によって発光面上の位置に関係なく一様な輝度分布を実現している。

【0003】 従来、この拡散反射層は白色塗料やガラスビーズ入り塗料を印刷しその光拡散効果によって光を拡散させ、光の全反射条件によって伝搬してきた光を前記条件外とし出射光としていた。しかし、使用者の要求から装置の薄型化が進み導光板が薄くなるに従いその印刷誤差による面積率の狂いによって面照明装置の発光面に生じる輝度ムラが顕著に現れ、特性の良い面照明装置を得るには高精度な印刷技術を必要とし、生産性の向上、低価格化を阻害していた。

【0004】 更に高輝度化を図るためには各部の反射率、透過率等の光学特性を向上する必要があり、上記拡散反射層についても同様に光学特性の向上、即ち、高輝度化の新たな手段が望まれている。

【0005】

【従来の技術】 従来のエッジライト型照明装置の構造を図9に示す。同図において、1は導光板であり、主に透明なアクリル樹脂からなり、その裏面には同図(b)に示すようなスクリーン印刷等の手法によって形成された白色塗料等の光拡散性の塗料からなるドット2aを有する拡散反射層2が形成されている。また同図(a)に示すように拡散反射層2上には反射板3が設けられ、導光板1の反対面には拡散板4が設けられている。

【0006】 5は蛍光管を用いた光源であり、その外周には光源光を効率良く導光板1内に入射させるためアルミ、Ag等の反射カバー6が配置されている。そして光源5から出射した光は反射カバー6によって導光板1の端面部分に集光され導光板1内に入射する。この入射した光は全反射の法則に従い臨界角内において導光板1内を伝搬して行く。この伝搬光は前記全反射の条件が崩されないかぎり外部出射光とはならないため上述した拡散反射層2による拡散反射によって外部出射光となる。

【0007】 この出射された光は拡散板4によって更に拡散され面照明としての輝度均一性を向上する。さらに導光板1裏面側においては反射板3によって拡散板4から、および拡散反射層2からの裏面への漏れ光を発光面1aへ反射し高輝度を図っている。なお前記の拡散反射層2は発光面1a上において光源5に近いほど輝度が高くなる傾向を防ぐため、種々の条件によって決定されたパターンとして形成されていることは周知である。

【0008】

【発明が解決しようとする課題】 上記従来のエッジライト型照明装置において、光源からの光を拡散する拡散反射層2は、印刷手法によって形成されるため、輝度の均

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一性を左右する拡散反射層の面積に誤差が生じ易く生産性(歩留り)の低下を招く要因となっている。また、その塗料による光吸収は導光板内の多重反射によって増大し高輝度化を阻害している。

【0009】更に、光源光は導光板入射後、全て出射光となることが光利用効率の点からも有利であるのに対し、従来の拡散反射層による拡散では反射光の方向を制御できないため導光板内の伝搬光の墨を制御できず光源側へ回帰させるか、あるいは複数の光源を持つものであれば他方の光源側へ光を到達させることになり高輝度化を阻害している。

【0010】本発明は、高輝度で、且つ生産性の良い面照明装置を実現しようとする。

【0011】

【課題を解決するための手段】本発明は照明装置に於いては、少なくとも導光板11と、その側面に配置された光源12とを具備して成る照明装置において、上記導光板11は、その光を出射する面に光拡散板21が配設され、他方の面には略三角形の凹部14が線状あるいは点状に形成され、さらに該面には該導光板11より屈折率の大きい材料で凹部14を埋めるように透明層16が形成され、さらに該透明層16の外表面には反射板18が配置あるいは一体化されて成ることを特徴とする。

【0012】また、本発明の照明装置に於いては、少なくとも導光板11と、その側面に配置された光源12とを具備して成る照明装置において、上記導光板11は、その光を出射する面に略三角形の凹部34が線状あるいは点状に形成され、さらに該面には該導光板11より屈折率の大きい材料で凹部34を埋めるように透明層36が形成され、さらに該透明層36の外表面には光拡散板38が配設され、他方の面には反射板32が設けられて成ることを特徴とする。

【0013】また、本発明の照明装置に於いては、少なくとも導光板11と、その側面に配置された光源12とを具備して成る照明装置において、上記導光板11は、その光を出射する面に略三角形の凹部34が線状あるいは点状に形成され、さらに該面には該導光板11より屈折率の大きい材料で凹部34を埋めるように透明層36が形成され、さらに該透明層36の外表面には光拡散板38が配設され、他方の面には略三角形の凹部14が線状あるいは点状に形成され、さらに該面には該導光板11より屈折率の大きい材料で凹部14を埋めるように透明層16が形成され、さらに該透明層16の外表面には反射板18が配置あるいは一体化されて成ることを特徴とする。またそれに加えて、前記導光板11の面積が最も大である2面の一方又は両方が傾斜していることを特徴とする。

【0014】また、本発明の液晶表面装置に於いては、上記照明装置40と液晶表示パネル41とを組み合わせて成ることを特徴とする。この構成を採ることにより、

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高輝度で、且つ生産性の良い照明装置、及び該照明装置を用いた液晶表示装置が得られる。

【0015】

【作用】本発明では、導光板11の表面に線状又は点状に設けた略三角形の凹部に高屈折率層を形成したことにより、光源12から導光板11内に入射した光は、屈折及び反射を起こし、プリズム効果によって入射角度によらずほぼ一定の角度範囲に出射される。また反射効果は屈折率差による反射および反射板による反射であるため、光吸収を低減でき、従って高輝度化が可能となる。

【0016】

【実施例】図1は本発明の第1の実施例を示す図であり、(a)は断面図、(b)は(a)図のB部拡大図、(c)は(a)図のC部拡大図、(d)は(a)図のD部拡大図である。同図においては、11は導光板、12は該導光板の側面に配置された光源である。該光源12は例えば管径4mmの冷陰極管が用いられ、その周囲には反射カバー13が設けられている。反射カバー13は、厚さ0.5mmのAl板で形成され、その内面には(b)図の如く、厚さ1000ÅのAg薄膜反射層13aを形成し、さらにその上に厚さ100μmのPET樹脂コートを保護層13bとして施し、高反射性と耐久性を持たせ、光源12から出射された光を導光板11の側面に集光し、効率良く導光板内に入射させるようになっている。

【0017】導光板11には厚さ4mmの透明なアクリル樹脂板が用いられ、その一方の面(裏面)に(c)図に示すような頂角θが90°の略三角形の凹部14が光源12の冷陰極管の線状方向と平行に線状(又は点状)に形成されている。そして該凹部14の配置は凹部がある部分と無い部分の面積比率を次式となるようにしている。なお下式は従来用いられている実験式である。  
面積率 =  $(-2.42 \times 10^{-4} \times L^2 + 4.42 \times 10^{-2} \times L + 0.4)^2$

但し、L:光源からの距離

なお、上式は導光板11端部から中央までの範囲に適応させるもので、中央から対称に両端部までの範囲を設定している。

【0018】そして凹部14が形成された面には、その凹部14を雌型とした場合の雄型となる凸部15を一表面に形成したポリカーボネイト樹脂からなる透明板16が導光板11と同等の屈折率を有するアクリレート系透明性の紫外線硬化型接着剤17で一体となるように接着されている。またこの透明板16の外表面には厚さ約1000ÅのAg薄膜反射層18が形成され、さらにその上にPET樹脂で厚さ約100μmの保護層19が形成されている

【0019】さらに導光板11の他方の面(発光面20)には、該面20から裏面に配置された凹部14が視認できないように隠蔽し、且つ輝度の均一性を向上させ

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る目的から厚さ0.25mmで、その表面をシボ加工によって凹凸面としたポリカーボネイト樹脂フィルム（GE社製レキサン8B36）21a、21bを2枚重ねた光拡散板21が配置されている。

【0020】このように構成された本実施例の作用を次に説明する。まず、光源12から出射して導光板11に入射した光は従来と同様に全反射の法則に従い反射を繰り返して導光板11内を伝搬して行く。そしてこの光が凹部14に入射すると、該凹部14が空気中に置いたプリズムと同様の構造となっているため内部にて屈折、反射を起こした後、発光面20に対して垂直な方向から略±45°の範囲内に集光された図2のような特性を持つ出射光となる。この出射光は導光板の表面11aに対しても45°以内となるため、本実施例の全反射条件

$$\phi_c = \sin^{-1} (N_2 / N_1) \approx 42^\circ$$

但し：空気の屈折率 $N_1 = 1$

導光板の屈折率 $N_2 = 1.491$

から前記出射光のほとんどは発光面20への直接出射光となる。

【0021】但し、一部については、臨界角内であるから発光面20への出射光とはならないが伝搬光となり輝度の均一性を向上させる効果を担っている。このようにして得られた発光面20上の出射光は前述した凹部14が面積率によって配置しているため、マクロ的には位置によらずほぼ一定となる。

【0022】以上の本実施例によれば光源12からの光の大部分が凹部14のプリズム効果により発光面20から出射されるため従来に比して輝度は向上する。また導光板の製造は構造上から一般的な樹脂成形技術を主とするため容易となり生産性の向上が可能となる。

【0023】図3は本発明の第2の実施例を示す断面図である。本実施例は基本的には前実施例と同様であり、異なるところは、光源12を1個とし、該導光板の光源の配置されていない方の端面に反射板としてアルミ蒸着テープ22を貼り付け、該反射板による反射光が疑似的に光源と仮定できる構成としたことである。本実施例によれば前実施例と同様な効果が得られる。

【0024】図4は本発明の第3の実施例を示す図で、(a)は断面図、(b)は(a)図のB部拡大図、(c)は(a)図のC部拡大図である。本実施例は指向性の高い照明光が得られる構成であり、基本的構成は第1の実施例における導光板を表裏逆の配置としたものである。即ち導光板11の裏面は平面とし、その上にAg薄膜反射層32を約1000Åの厚さで形成し、更に外表面には厚さ約100μmのPET樹脂を保護層33として形成している。

【0025】導光板11の発光面11aには略三角形状の凹部34を第1の実施例と同様に線状に配置し、該面に該凹部34を雌型とした場合の雄型となる凸部35を一表面に形成したポリカーボネイト樹脂からなる透明板

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36を、導光板11と同等の屈折率を有するアクリレート系透明性の紫外線硬化型接着剤37にて接着一体化している。さらに透明板36の上には、厚さ0.25mmで、その表面をシボ加工によって凹凸面としたポリカーボネイト樹脂フィルム（GE社製レキサン8A13）を光拡散板38として配置し、前記凹部34がなす線状模様を若干隠蔽するとともに輝度の均一化を図っている。なお本実施例では凹部34の形状を(b)図に示すように頂角θbを70°とした略三角形状とした。

【0026】このように構成された本実施例は、第1の実施例と同様にプリズム効果が得られる。さらに本実施例にあっては出射光の大半が発光面11aに対して垂直な方向に対して約±12°の範囲の指向性光が得られる。上記指向性光はレンズ等の光学手法を容易に施すことができ、特に液晶表示装置への適用においては、レンズによる集光を行い表示面上の各ドットにある開口部分へ効率良く入射させることが可能となる。これにより液晶表示装置内の光利用の効率の向上、高輝度化、薄型化、省電力化が図れる。また指向性光を液晶パネルを通過したのちに拡散する手法を用いれば視覚に係わらず良好な表示特性を得ることができる。

【0027】図5は本発明の第4の実施例を示す図であり、(a)は断面図、(b)は(a)図のB部拡大図、(c)は(a)図のC部拡大図である。同図において図1及び図4と同一部分は同一符号を付して示した。本実施例は図1に示す第1の実施例と図4に示す第3の実施例とを組み合わせたものである。即ち、導光板11の裏面は第1の実施例と同様な構成を用い、発光面側は第3の実施例を用いている。従って本実施例の効果は第1、第3の実施例の効果の併せ持っている。

【0028】図6は本発明の第5の実施例を示す断面図である。同図において図1と同一部分は同一符号を付して示した。本実施例は基本的には第1の実施例と同様であり、異なるところは、導光板11の上面を傾斜面として光の利用効率を向上したことである。

【0029】図7は本発明の第6の実施例を示す断面図である。同図において図4と同一部分は同一符号を付して示した。本実施例は基本的には第3の実施例と同様であり、異なるところは、導光板11の下面を傾斜面として光の利用効率を向上したことである。なお本実施例及び前実施例においては凹部の形成されていない面を傾斜面としたが、凹部を有する面を傾斜面としても良く、その場合も導光板の入射端面から対向対面への直接到達光をも有効利用できるものである。

【0030】図8は本発明の照明装置を液晶表示装置の面照明装置に適用した実施例を示す図である。本実施例は本発明の照明装置40を液晶パネル部41と組み合わせて鋼板製の化粧カバー42で一体化したもので、高輝度化、軽量化、薄型化、省電力化を実現したものである。なお、液晶パネル部41を駆動する回路部等は液晶

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パネル部として示し、説明は省略した。また図は照明装置40として第1の実施例を用いているが、他の実施例を用いることができることは勿論である。

【0031】以上の各実施例において、各部の材料を指定したが、これに限定されるものではなく、例えば導光板にポリスチレン、ポリカーボネイト等の透明体を適用する、あるいは反射板として白色塗料やAl、Au、Cr等の金属層を適用しても良い。また、導光板上に形成した略三角形の凹部の形状も所望の特性に応じて設計されるものであるから、種々の角度を設定することができる。つまり、本発明は一般照明、看板用照明等の用途や、使用する光源および装置形状に限定されず、要は光を入射させた透明板の表面に凹部を形成し、該凹部を有する面に該透明板よりも高屈折率な層を設けることによりプリズム効果を得、光を制御する手段を提供するものである。

【0032】

【発明の効果】本発明に依れば、出射光となる導光板内の反射光の角度までも制御でき、塗料等の光吸収を排除できるため高輝度、高生産性の面照明装置を得ることができ、前記効果とともに薄型化が可能となる。さらに、設計によっては高指向性の照明光を得ることもできる。

【図面の簡単な説明】

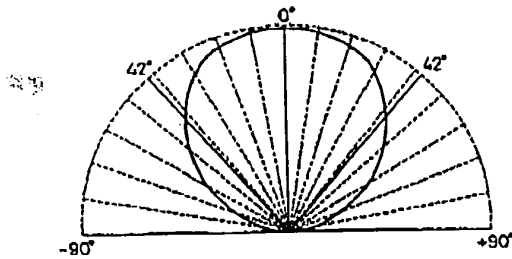
【図1】本発明の第1の実施例を示す図で、(a)は断面図、(b)は(a)図のB部拡大図、(c)は(a)図のC部拡大図(d)は(a)図のD部拡大図である。

【図2】本発明の第1の実施例に用いた導光板の略三角形形状の凹部による反射光角度特性を示す図である。

【図3】本発明の第2の実施例を示す断面図である。 \*30

【図2】

略三角形に±90°の範囲の光線を入れた場合の反射光角度分布図



8

\*【図4】本発明の第3の実施例を示す図で、(a)は断面図、(b)は(a)図のB部拡大図、(c)は(a)図のC部拡大図である。

【図5】本発明の第4の実施例を示す図で、(a)は断面図、(b)は(a)図のB部拡大図、(c)は(a)図のC部拡大図である。

【図6】本発明の第5の実施例を示す断面図である。

【図7】本発明の第6の実施例を示す断面図である。

10 【図8】本発明の照明装置を液晶表示装置の面照明装置に適用した実施例を示す断面図である。

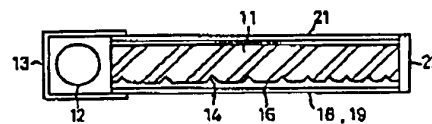
【図9】従来のエッジライト型照明装置の構造を示す図で、(a)は断面図(b)は(a)図の拡散反射層を示す平面図である。

【符号の説明】

- 11…導光板
- 12…光源
- 13…反射カバー
- 14, 34…凹部
- 15, 35…凸部
- 16, 36…透明板
- 17, 37…接着剤
- 13a, 18, 32…Ag薄膜反射層
- 13b, 19, 33…保護層
- 20…発光面
- 21, 38…光拡散板
- 22…アルミ蒸着テープ
- 40…照明装置
- 41…液晶パネル部
- 42…化粧カバー

【図3】

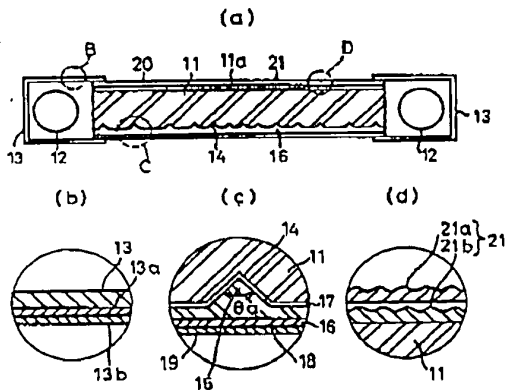
本発明の第2の実施例を示す断面図



- 11…導光板
- 12…光源
- 13…反射カバー
- 14…凹部
- 16…透明板
- 18…Ag薄膜反射層
- 19…保護層
- 21…光拡散板
- 22…アルミ蒸着テープ

【図1】

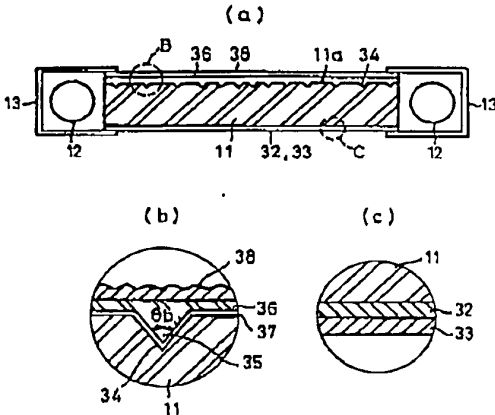
本発明の第1の実施例を示す図



- |                     |                             |
|---------------------|-----------------------------|
| 11...導光板            | 16...透明板                    |
| 12...光源             | 17...接着剤                    |
| 13...反射カバー          | 20...発光面                    |
| 18 a, 18...Ag 薄膜反射層 | 21...光拡散板                   |
| 18 b, 19...保護層      | 21 a, 21 b...ポリカーボネイト樹脂フィルム |
| 14...凹部             |                             |
| 16...凸部             |                             |

【図4】

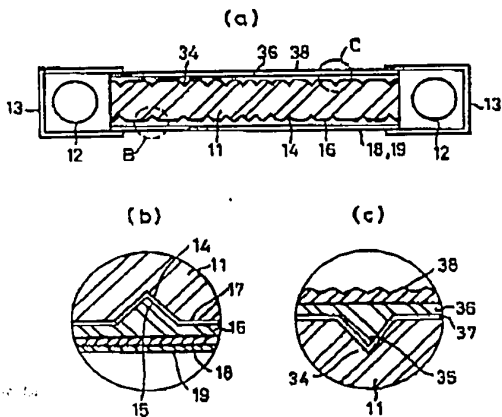
本発明の第3の実施例を示す図



- |               |           |
|---------------|-----------|
| 11...導光板      | 34...凹部   |
| 12...光源       | 35...凸部   |
| 13...反射カバー    | 36...透明板  |
| 32...Ag 薄膜反射層 | 37...接着剤  |
| 33...保護層      | 38...光拡散板 |

【図5】

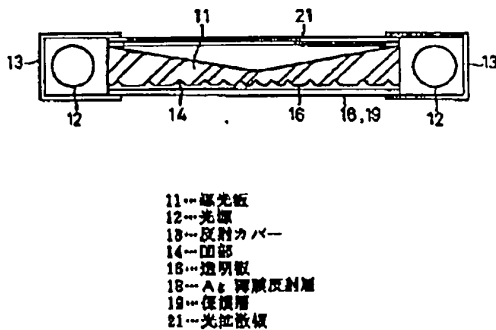
本発明の第4の実施例を示す図



- |             |               |
|-------------|---------------|
| 11...導光板    | 18, 35...透明板  |
| 12...光源     | 17, 37...接着剤  |
| 13...反射カバー  | 18...Ag 薄膜反射層 |
| 14, 34...凹部 | 19...保護層      |
| 16, 35...凸部 | 38...光拡散板     |

【図6】

本発明の第5の実施例を示す断面図



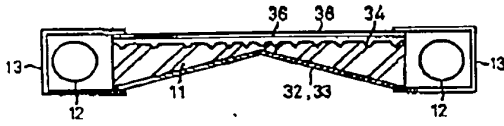
- |               |
|---------------|
| 11...導光板      |
| 12...光源       |
| 13...反射カバー    |
| 14...凹部       |
| 16...透明板      |
| 18...Ag 薄膜反射層 |
| 19...保護層      |
| 21...光拡散板     |

(7)

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【図7】

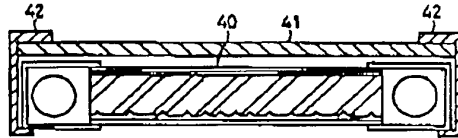
本発明の第6の実施例を示す断面図



- 11...導光板
- 12...光源
- 13...反射カバー
- 32...Ag 導光反射層
- 33...反射層
- 34...凹部
- 36...透明板
- 38...光拡散板

【図8】

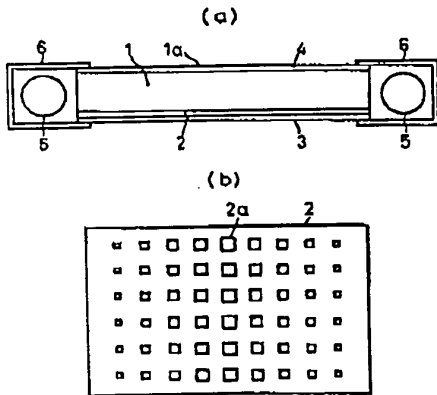
本発明の開口端部を接点表示装置の開口端部に適用した実施例を示す断面図



- 40...開口装置
- 41...レンズ部
- 42...化粧カバー

【図9】

従来のエッジライト型照明装置の構造を示す図



- 1...導光板
- 1a...鏡面
- 2...拡散反射層
- 2a...ドット
- 3...反射板
- 4...導光管
- 5...光源
- 6...反射カバー

フロントページの続き

(51) Int. Cl.<sup>4</sup>  
// F 2 1 V 8/00

識別記号 庁内整理番号  
D 6908-3K

F I

技術表示箇所

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特開平 8 - 3 5 2 6

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⑪ 特許出願公開

⑬ 公開特許公報(A)

昭61-240506

⑫ Int. Cl.<sup>4</sup>

識別記号

庁内整理番号

⑭ 公開 昭和61年(1986)10月25日

F 21 V 8/00  
F 21 P 1/02  
G 02 B 5/02  
5/08

8112-3K  
8212-3K  
7036-2H  
7036-2H

審査請求 未請求 発明の数 1 (全6頁)

⑯ 発明の名称 照明器具

⑰ 特 願 昭60-80292

⑱ 出 願 昭60(1985)4月17日

⑲ 発 明 者 織 間 一 群馬県佐波郡境町大字境333  
⑳ 出 願 人 有限会社 ファスター 群馬県佐波郡境町大字保泉964  
㉑ 代 理 人 弁理士 青木 朗 外4名

明 細 書

1. 発明の名称  
照 明 器 具
2. 特許請求の範囲

背面が反射面となったプレート状の光の通路手段と、該プレートの面に略平行な方向に通路手段内に光を投射する少くとも1個の光源とを有し、上記通路手段内には光を反射して通路手段の前側から対出せしめる背面側から前面側に凹んだ多数の窪みが凹設され、これら窪みはその各々の投影面内に含まれる光束が相互に重畳しないように所定パターンで配列されることを特徴とする照明器具。

3. 発明の詳細な説明  
〔産業上の利用分野〕

本発明は照明器具、特にプレート状の照明器具に関する。

〔従来の技術〕

従来の平板状の照明器具はいずれもガラス板の

裏側においた光源から光を投射しガラス板前面に光を照射するものであり、ガラス板裏側に光源を埋め込むためのスペースを確保する必要があるため照明器具の製作はガラス板の厚さに少くとも光源の収納スペースを加えた大きくなる。そのため例えば狭い場所に取付けたり、あるいは例えば家庭の階段に取り付ける常夜燈の如く壁面からの出っ張りができるだけ小さくなることが望まれるような場合にそのような要求を十分満足し得るものではなかった。

〔発明が解決しようとする問題点〕

本発明が解決すべき課題は上述の如き従来技術に鑑み厚さの薄い照明器具を如何にして実現するかということにある。即ち、本発明の目的は実質上ガラス板の厚さに等しい照明器具を提供することである。

斯かる目的を達成するために本出願人はまず、光源をガラス板の板厚内に埋め込み横方向から板厚内に光を投射することに着眼し、この横方向か

(1)

(2)



らの光を反射面によりガラス板前面から外部に照射する構想を制作したものである。

(問題点を解決するための手段)

上述の如き課題を實現するために本発明に係る照明器具は背面が反射面となったプレート状の光の通路手段と、該プレートの面に略平行な方向に通路手段内に光を投射する少くとも1個の光源とを有し、上記通路手段内には光を反射して通路手段の前面から射出せしめる背面側から前面側に凹んだ多数の窪みが凹設され、これら窪みはその各々の投影面積内に含まれる光束が相互に重複しないように所定パターンで配列されている。

(実施例)

以下、添付図面を参照して本発明の好ましい実施例につき詳細に説明する。

本発明に係る照明器具は基本的に通路手段を構成する板ガラス11と光源33とから構成されている。板ガラス11は好ましくは平板であるが

使用目的に応じ湾曲板としてもよい。またその外周縁部は用途、使用目的等に応じて矩形、円形、だ円形、多角形、その他任意の形状とすることができる。板ガラス11の背面には反射面(鏡面)13が形成され板ガラス11の内部を通る光を内部に反射する。板ガラス11の背面にはまた内方に凹んだ多数の窪み15が形成される。窪み15の形状は角錐、半球あるいは不規則な凸凹形状等任意の形状とすることができる。また、その形状、大きさ、深きはすべての窪みが同一となるようにしてもよいしあるいは不規則となるようにしてもよい。窪み15は通常の窓ガラス等の凹凸面ガラスと同様の方法で製造することができる。

本発明によれば多数の窪み15は第4図に示す如くその投影面積内に含まれる光束S<sub>1</sub>、S<sub>2</sub>、S<sub>3</sub>、S<sub>4</sub>、S<sub>5</sub>、…が相互に重複しないように配列される。即ち、各光束S<sub>1</sub>、S<sub>2</sub>、…内には1個の窪み15のみが存在する。これは各光束が互いの窪みに衝突に到達するようにするためである。そして各光束の到達距離が相互に異なるように窪みを配

(3)

置するのが好ましい。そうすることによりガラス板の全体から光が照明されるようになる。またこれとは別に、窪み15を定型的に局部的に配置することによりガラス板11の例えば中心部のみとかあるいは四つの隅部のみが明るくなるようにすることもできる。窪み15の配置パターンはこのように裝飾的な配慮あるいは照度の観点から任意に決めることができる。

第2、3図に示す如く光源33からの光束は窪み15によつかりそこで反射され、ガラス板11の前面から外部に射出される。窪み15の角度、高さ、形状、大きさを適当に変えることにより光の射出位置及び方向を変えることができる。一般的には例えば裝飾用としては規則正しい照明よりもむしろ不規則的照明の方が裝飾効果が大きいと考えられるので窪み15の配置、大きさ、形状は人為的に作為を加えるよりも不規則の方が好ましい。

光源33は本発明によればガラス板11の一部に形成した凹所21内に組み込まれる。光源と

(5)

(4)

しては小さくて光量の大きな例えばハロゲンランプを利用することができる。ランプ33は交換可能とするためにホルダ35のねじ孔37にねじ込むねじ軸34を有し、ホルダ35にねじ込むことによりねじ孔37の底部の端子43を介してホルダ35に連絡した電源コード41に電気的に接続されるようになっている。ホルダ35自身は例えばガラス板11の凹所21内に着脱自在に圧入される。これとは別に凹所21の入口部にナット部材(図示せず)を固設し、ホルダ35をそのナット部材にねじ込み式にしてもよい。

ガラス板の背面の反射面は例えばアルミ箔を全面コーティングすることにより形成し得る。アルミ箔13は窪み15内にもコーティングされこれにより窪み15の斜面を有効な反射面とする。更にまた、ガラス板11の背面最外層をアルミ箔13の上から補助ガラス層22により被覆することもできる。ガラス板11はくもりガラス、すりガラス、あるいは透明ガラスでもよく、あるいはその前面に適当な染色を施したり、模様や絵を画

(6)

いておくことにより、装飾的效果を一層高めることができる。

光源33としてはハロゲンランプの代りに通常の豆電球あるいは蛍光灯を用いることもできる。また、ガラス板11の厚さは例えば5mm程度のものをを用いることができる。

更にまた、本発明によれば第5図に示す如く光源33をガラス板11の両側に設けた対称形状とすることも可能である。この場合に窪みは必ずしも対称的に配列する必要はないが、対応光源に対する窪みの投影面積に含まれる光束は互いに重複しないという条件は満足するものである。

窪みは第4図に示す如く隣接する窪みの光束S<sub>1</sub>、S<sub>2</sub>、S<sub>3</sub>、S<sub>4</sub>…がすき間なく境接するように配置することにより窪みの配置密度を高めることができかつ光源からの光束を有効に利用でき照明器具としての金体的照度を高めることができる。

第6図は本発明の更に別の実施例を示すもので、第8図においては光の通路手段はホルダ35によ

り隔てられた一対の薄いガラス板11A、11Bにより構成され、これらガラス板11A、11B間の空間26には空気あるいは不活性ガスが満たされる。ホルダ35の厚さWが第2、3図に示す実施例のガラス板11の厚さに略相当する。背面ガラス板11Aの内面には窪み15が形成される。窪み15はガラス板11Aと一体的に形成してもよいしあるいはアルミ箔13により別部品として形成しガラス板11Aに固着してもよい。窪み15をガラス板11Aに直接形成する場合にはガラス板11Aの背面を反射面とすべく適当な材料でコーティングすることが必要である。その他の構成は第1~4図に示す実施例と同様である。尚、第6図の実施例においても第5図の如く光源を両サイドに配置してもよいことは勿論である。

ガラス板11、11A、11Bはガラスの代りに耐熱プラスチックあるいは陶磁器を用いることも可能である。

(7)

(8)

〔発明の効果〕

以上に記載した如く本発明によれば光源はプレートの側方からプレートの面と略平行な方向に光通路内に光を投射するようにしたため、従来の如くガラス板背部から光を投射するものに比しガラス板厚方向の寸法を小さくすることができる。また投射光はプレート内に形成した多数の窪みによってプレート正面から外部に出射されるため、例えば従来の電氣スタンドの笠に相当するものを本発明のガラス板で作ることにより、いわば電球のない笠節のみの電氣スタンドが得られる。また本発明の照明器具は自動車の天井に取り付ける車内燈や、家庭で用いる壁掛燈、あるいは常夜燈としても用いることができ小型でかつ装飾効果の大きな照明器具として極めて有用である。

4. 図面の簡単な説明

第1図は本発明に係る照明器具の正面図、第2図及び第3図は第1図のII-II線及びIII-III線に沿う断面図、第4図は本発明における光束と窪みとの配置関係を説明する図、第5図は第1図の要

形実施例を示す図、第6図は本発明の別の実施例を示す第2図と同様の図。

- 11…ガラス板、
- 13…反射面、
- 15…窪み、
- 33…光源。

特許出願人

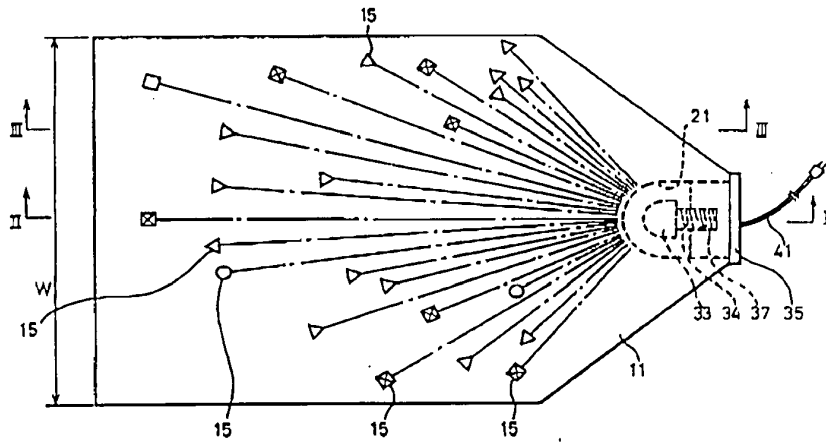
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- 弁理士 山 口 昭 之
- 弁理士 西 山 雅 也

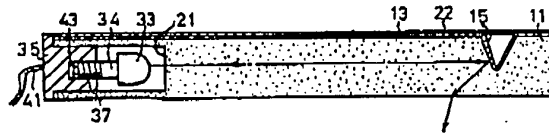
(9)

(10)

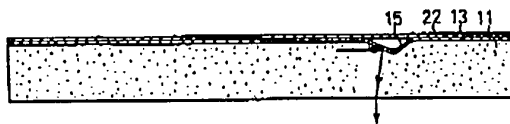


第 1 図

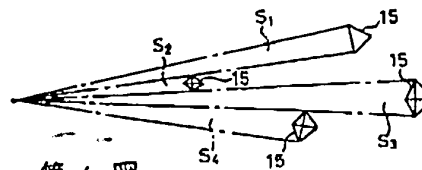
11...ガラス板      13...反射面  
15...幅              33...光線



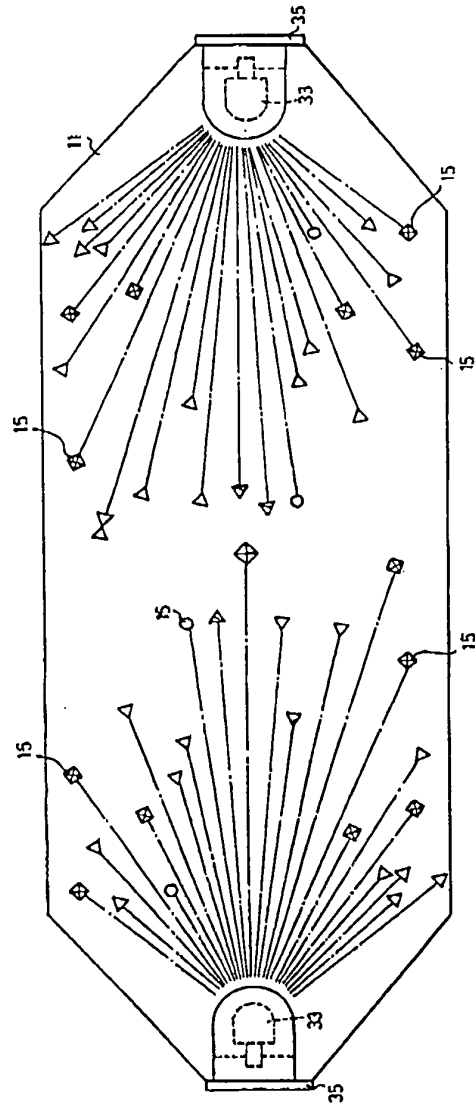
第 2 図



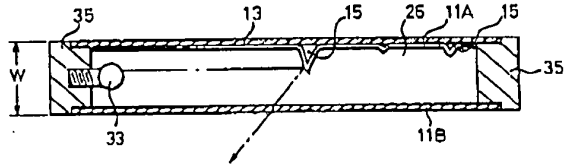
第 3 図



第 4 図



第 5 図



第 6 図

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-159807  
 (43)Date of publication of application : 23.08.1995

(51)Int.Cl. G02B 5/02  
 F21V 8/00  
 G02B 5/04  
 G02F 1/1335

(21)Application number : 05-305395  
 (22)Date of filing : 08.12.1993

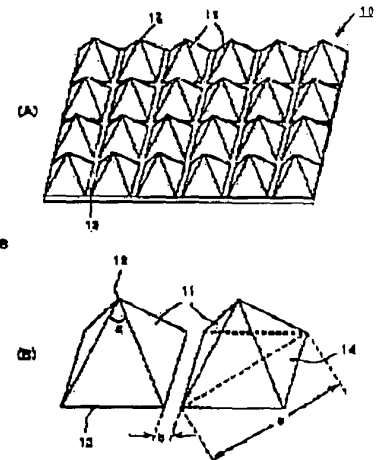
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## (54) OPTICAL CONTROL SHEET AND SURFACE LIGHT EMITTING DEVICE PROVIDED THEREWITH

## (67)Abstract:

PURPOSE: To provide an optical control sheet having light condensing property by which a front direction becomes very bright in the case of using the sheet in a liquid crystal display, a liquid crystal television or an electric decorative sign, viewed to be equally bright in every direction within the range of the angle of visibility to a certain extent and having no projection loss; and a surface light emitting device provided with the sheet.

CONSTITUTION: As for the optical control sheet 10, many nearly pyramid-shaped projections 11 are adjacently formed at least on its one surface. It is desirable that the apex angle  $\alpha$  of the projection 11 is  $\geq 70^\circ$  and  $\leq 120^\circ$ , and it is desirable that the length (a) of the diagonal of the base 13 of the projection 11 is  $\geq 30 \mu\text{m}$  and  $\leq 150 \mu\text{m}$ . Then, it is desirable that a distance (b) between the bases 13 of the adjacent projections 11 is  $\leq 10 \mu\text{m}$ . It is conceivable to round the apex 12 of the projection 11. The surface light emitting device is provided with the sheet 10.



(10) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平7-159607

(43) 公開日 平成7年(1995)6月23日

(51) Int. Cl. <sup>6</sup>	識別記号	序内整理番号	F I	技術表示箇所
G 0 2 B 5/02		C 9224-2K		
F 2 1 V 8/00		D		
G 0 2 B 5/04		A 9224-2K		
G 0 2 F 1/1335	5 3 0			

審査請求 未請求 請求項の数 2 O L (全 5 頁)

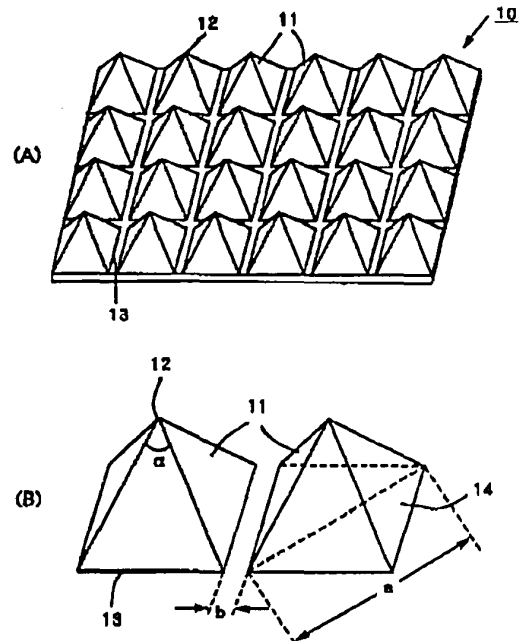
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(54) 【発明の名称】 光制御シート及びこれを備えた面状発光装置

(57) 【要約】

【目的】 液晶ディスプレイや液晶テレビ又は電飾看板等に用いた場合に正面方向が充分明るくなる集光性を有し、ある程度の視野角範囲内であればあらゆる方向に均等に明るく見え、かつ出射ロスのない光制御シート及びこれを備えた面状発光性装置を提供する。

【構成】 光制御シート10は、少なくとも一面に略四角錐形状の多数の突起11が隣接して設けられる。突起11の頂角 $\alpha$ は $70^\circ$ 以上 $120^\circ$ 以下であるのが望ましく、その底面13の対角線長さ $a$ は $30\mu\text{m}$ 以上 $150\mu\text{m}$ 以下であるのが望ましい。隣り合う突起11の底辺13同士の間隔 $b$ は $10\mu\text{m}$ 以下であるのが望ましい。突起11の頂点12に丸みを設けても良い。面状発光装置20は、光制御シート10を備えている。



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【特許請求の範囲】

【請求項1】 少なくとも一面に、略四角錐形状の多数の突起を隣接して設けたことを特徴とする光制御シート。

【請求項2】 請求項1記載の光制御シートを備えた面状発光装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、パーソナルコンピュータやワードプロセッサ等の液晶ディスプレイ、液晶カラーテレビ等を構成する面状発光装置、あるいは電飾看板、施設照明などに用いられる面状発光装置に用いる光制御シート及びこれを備えた面状発光装置に関する。

【0002】

【従来の技術】液晶表示画面は自家発光性を有しないので、視認性を高めるためには他からの照明を必要とし、そのため、液晶表示素子の背面から光を当てる光源ユニット（以下「バックライトユニット」と言う。）が考案された。

【0003】バックライトユニットは、その開発当初においては蛍光管などの光源を液晶表示素子の背面に直接配した構造をとっていたが、最近では全ユニットの厚みを薄くして機器の小型化を図るために、光源を液晶表示素子の少なくとも一側面に配したエッジライト方式をとることが多い。

【0004】図4は、エッジライト方式の面状発光装置の一例を示す。この面状発光装置は、透明な導光板30の一側面に光源として蛍光管31が配されている。導光板30の背面側には塗料のドットパターン32が形成されている。このドットパターン32は、側面の蛍光管31から入射した光を画面のどの位置からも均等に射出させるために導光板30の背面に形成された光散乱性の印刷パターンであり、疑似光源と呼ばれるものである。また、導光板30の背面に沿って反射板33が配されている。

【0005】このような面状発光装置において、蛍光管31から発せられた光線は、導光板30背面のドットパターン32によって乱反射され、導光板30前面より前方へ射出される。この際、図5に示す如く、蛍光管31から発せられた光線による射出光のほとんどは導光板30の法線方向から大きくはずれた方向へ射出され（射出光パターンBの状態）、またその分布も著しく急峻であることから、通常、導光板30の法線方向より観察する使用者にとっては液晶表示画面が非常に暗い画面となってしまう。

【0006】この欠点を解消するため、導光板30の前面に光制御シートが配される（図6～7）。従来の光制御シートとしては、透明なガラス又はプラスチックシートに無機又は有機の光拡散剤が含有されたもの（特開平3-78701号公報）や、透明プラスチックシートの

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前面にマット加工やシボ加工などにより粗度 $R_a = 100 \sim 150 \mu\text{m}$ 程度の微細なランダム凹凸を形成したものが知られている（特開昭62-29618号公報）。

【0007】さらに、他の光制御シートとして、一面が、断面略三角形の多数のプリズム部又は頂部が凸弧状の断面略三角形の多数の山部が平行状に配列された構造面となされているシート（以下「プリズムシート」と言う。）も提案されている（特願平4-11864号）。プリズムシートは片面に多数の小さなプリズムを並列状に並べたものであり、これに入射した光線を屈折あるいは反射させる機能を有する光学機能シートである。

【0008】

【発明が解決しようとする課題】上述した従来の光制御シートのうち、光拡散剤を用いた光制御シート34の場合、図6に示すように、使用者に不用な方向への光線の反射（斜め方向の射出）が多く（射出光パターンCの状態）、また光制御シート34と導光板30の界面での乱反射による光線の損失も無視できない。そのため、液晶表示素子の照明に用いた場合、正面方向への射出光量が少ないという問題があった。

【0009】また、ランダム凹凸面を形成した光制御シートの場合、光拡散剤を用いた上記シートよりは集光性に優れるが、なお射出光量が少ない。そのため、最近のバックライトの高輝度化等の要求に対しては完全なものとはいえない。

【0010】さらに、プリズムシート35を用いた場合、図7に示すように、プリズムシート35の光線の各射出角度における強度分布、すなわち射出光パターンDは法線方向への光線の射出が著しく増加している。しかしながら、この場合、射出光の指向性が強すぎるために視野角度が非常に狭く、使用者の位置が僅かでも移動すると観察される輝度は急激に低下する。特に三角形断面の溝方向と直角方向の視野角は著しく狭い。すなわち面発光性の左右、前後等により視野角特性が異なり、いずれの面から見ても一定の視野角を持たせないという欠点を有する。また、プリズムの断面形状が左右対象な二等辺三角形であることから、図8に示すように法線方向への有効な射出光Xの他に射出光Yのような無用な射出が多く生じる。また液晶表示素子との干渉もより（モアレ）の問題発生する場合がある。

【0011】本発明は上記の点に鑑み、液晶ディスプレイや液晶テレビ又は電飾看板等に用いた場合に正面方向が充分明るくなる集光性を有し、ある程度の視野角範囲内であればあらゆる方向に均等に明るく見え、かつ射出ロスのない光制御シート及びこれを備えた面状発光性装置を提供することを目的とする。

【0012】

【課題を解決するための手段】本発明は、少なくとも一面に、略四角錐形状の多数の突起を隣接して設けたことを特徴とする光制御シートを提供する。



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【0013】前記略四角錐形状の突起の頂角は $70^\circ$ 以上 $120^\circ$ 以下であるのが望ましい。また、前記略四角錐形状の突起の底面の対角線長さは $30\mu\text{m}$ 以上 $150\mu\text{m}$ 以下であるのが望ましい。さらに、隣り合う前記突起の底辺同士の間隔は $10\mu\text{m}$ 以下であるのが望ましい。なお、前記略四角錐形状の突起の頂点に丸みを設けても良い。

【0014】また本発明は、請求項1記載の光制御シートを備えた面状発光装置を提供する。

【0015】以下、本発明をさらに詳細に説明する。

【0016】図1(A)は本発明の光制御シート10の一例を示す。本発明の光制御シート10は、少なくとも一面に、略四角錐形状の多数の突起11を隣接して設けたものである。具体的には、略四角錐形状の突起をすきまなく、且つ底辺13が隣接するように多数個配列したものである。

【0017】前記略四角錐形状の突起11は、図1(B)に拡大して示すように、その頂点12の頂角 $\alpha$ (四角錐の側面を構成する三角形の一つの角で頂点12と共通の点を有する角)は $70^\circ$ 以上 $120^\circ$ 以下であるのが望ましく、特に $90^\circ$ が最適である。前記範囲外の角度では光制御シート10の集光性が低下する。

【0018】前記略四角錐形状の突起11の四角形状の底面14の対角線長さ $a$ は $30\mu\text{m}$ 以上 $150\mu\text{m}$ 以下であるのが望ましい。また、 $30\mu\text{m}$ 以下では工業的に経済性高く賦形することが困難であり、 $150\mu\text{m}$ 以上では集光能力及び画質の低下を招く。

【0019】隣り合う前記突起11の底辺13同士の間隔 $b$ は $10\mu\text{m}$ 以下であるのが望ましい。すなわち、隣り合う底辺13と底辺13の間(谷部)は集光に寄与しないので、その間隔 $b$ は狭ければ狭いほど良い。この間隔 $b$ が $10\mu\text{m}$ を超えると、集光密度に問題が生じて正面輝度の低下や画質低下を招く。

【0020】前記略四角錐形状の突起11の頂点12は、丸みを設けてあってもよいし、前記突起11の底面と平行な平面を有する構造でも良い。これにより視野角の絶対値が調整可能となる。

【0021】光制御シートの材質は透明な樹脂であれば特に限定するものではないが、ポリメチルメタクリレートやポリカーボネート等の光透過性の良好な樹脂が好適である。そして、これらの樹脂を熱溶融又は光硬化等の方法により賦形することにより所定のシートが得られるが、製法は特に限定するものではない。

【0022】光制御シートの全体厚さは $0.10\sim 0.50\text{mm}$ が好ましい。また、 $0.10\text{mm}$ 以下だと、光制御シートの膜がなくハンドリングしにくい。また、 $0.50\text{mm}$ 以上になると、これを用いた面状発光装置の小形化が難しくなる等の点で難点がある。

【0023】光制御シートの前記突起を設けた構造面の反対面は、拡散性を付与する等の目的でマット加工を施

しても良い。

【0024】図2は上記光制御シートを備えた面状発光装置の一例を示す。この面状発光装置20は、透明な導光板23の側面に光源として蛍光管21が配され、導光板23の背面側にドットパターン22が形成され、さらに導光板23の背面に沿って反射板24が配されている。そして、導光板23の前面に前記した光制御シート10が配されている。

【0025】図3は、本発明の面状発光装置20の出射光分布を示す。図からわかるように、本発明の面状発光装置20は法線方向の出射光量が十分で且つその出射光パターンAはあまり急峻でなく、適度な広がりを持った出射光分布が得られる。

【0026】

【実施例】次に、本発明の実施例について説明する。なお、本発明は以下に挙げる実施例のみに限定されず、本発明の趣旨を逸脱しない範囲で種々の変更が可能である。

【0027】以下に示す面状発光装置に各実施例又は比較例の光制御シートを装着し、その正面輝度、視野角及び発光外観品位を調べた。

【0028】(使用した面状発光装置)

方式：片側エッジライト方式(短辺1灯)

光源：太さ $3.5\text{mm}$ 、長さ $135\text{mm}$ の冷陰極管導光板：厚さ $3\text{mm}$ 、横 $205\text{mm}$ 、縦 $135\text{mm}$ のPMMA板光拡散シート：導光板裏面の拡散性付与の為のドットパターンの視認防止の為、厚さ $0.20\text{mm}$ のポリカーボネート製の市販光拡散シート(表面に微細凹凸からなるエンボスを付与)を使用した。印加重圧： $12\text{V}$ 

【0029】(評価方法)

正面輝度：バックライトの決められた9点の正面方向からの輝度(法線方向)をJIS-C761に基づいて測定し、その平均値を求めた。

視野角：バックライトの中央1点について、冷陰極管と平行方向及び直角方向の両方向にて角度を変えた輝度を測定し、正面輝度(法線方向輝度)の50%の値を有する角度を求めた。

【0030】突起形状及びシートの厚さが以下のような実施例及び比較例の光制御シートを作成した。

【0031】(実施例1)

突起頂角： $90^\circ$ 突起底面の対角線長さ： $75\mu\text{m}$ 隣り合う突起の底辺同士の間隔： $5\mu\text{m}$ シートの厚さ： $200\mu\text{m}$ 

【0032】(実施例2)

突起頂角： $100^\circ$ 突起底面の対角線長さ： $100\mu\text{m}$ 隣り合う突起の底辺同士の間隔： $5\mu\text{m}$

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突起頂点の形状：突起頂点を底面と平行にスライスし、そのスライス面（四角形）の対角線長さが5 μmであるような形状とした。

シートの厚さ：200 μm

【0033】（比較例1）

市販プリズムシートを用いた。

プリズム頂角：90°

プリズムピッチ：35 μm

プリズムシートの配置：冷陰極管に平行にプリズム溝を配置した。

\*【0034】（比較例2）隣り合う突起の底辺同士の間隔を15 μmとした以外は実施例1と同じ光制御シートを用いた。すなわち、突起密度を実施例1よりも低下させたものを用いた。

【0035】（比較例3）突起の頂角を125°とした以外は実施例1と同じ光制御シートを用いた。

【0036】評価結果を表1に示す。

【0037】

【表1】

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		実施例		比較例		
		1	2	1	2	3
正面輝度 (cd/m <sup>2</sup> )		520	470	500	980	340
視野角 (°)	冷陰極管と平行方向	43	48	47	63	55
	冷陰極管と直角方向	42	45	28	50	53
発光外観品位		良好	良好	良好	面質粗い	良好

【0038】

【発明の効果】以上説明したように本発明によれば、液晶ディスプレイや液晶テレビ又は電飾看板等に用いた場合に正面方向が充分明るくなるような集光性が得られ、ある程度の視野角範囲内であればあらゆる方向に均等に明るく見え、かつ出射ロスも抑えることができる。

【図面の簡単な説明】

【図1】本発明による光制御シートの一実施例を示し、(A)は斜視図、(B)は突起11を拡大して示す説明図である。

【図2】本発明による光制御シートを用いた面状発光装置の一実施例を示す断面図である。

【図3】本発明による光制御シートを用いた面状発光装置の出射光分布を示す説明図である。

【図4】従来の面状発光装置の一実施例を示す断面図である。

【図5】光制御シートを用いない従来の面状発光装置の出射光分布を示す説明図である。

※【図6】光制御シートを用いた従来の面状発光装置の出射光分布を示す説明図である。

【図7】プリズムシートを用いた従来の面状発光装置の出射光分布を示す説明図である。

【図8】プリズムシートを用いた従来の面状発光装置の出射光の様子を示す説明図である。

【符号の説明】

10 光拡散シート

11 突起

12 頂点

13 底辺

14 底面

20 面状発光装置

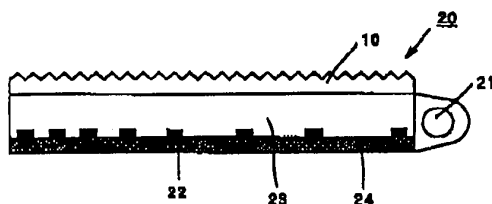
21 蛍光管

22 ドットパターン

23 導光板

24 反射板

【図2】



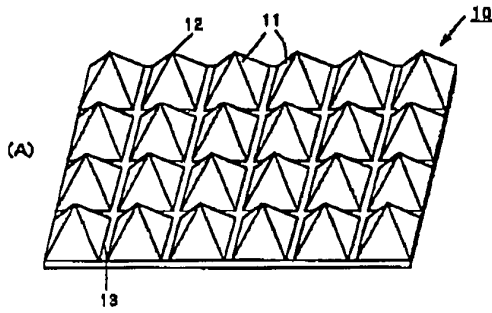
【図4】



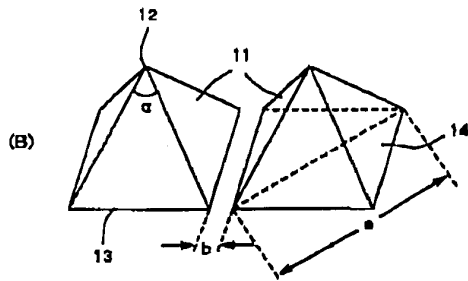
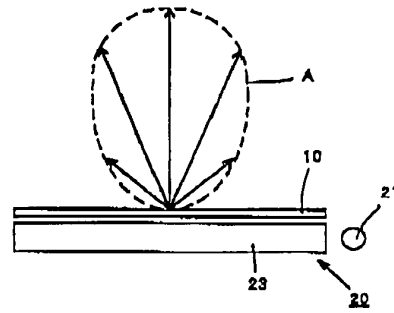
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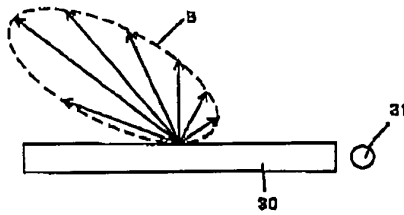
【図1】



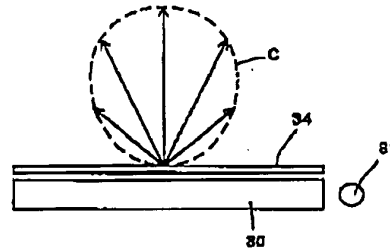
【図3】



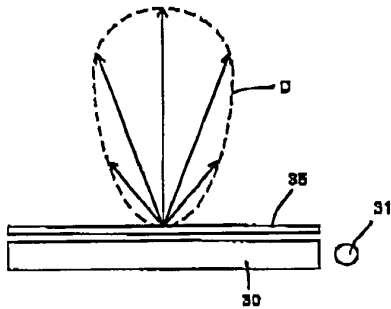
【図5】



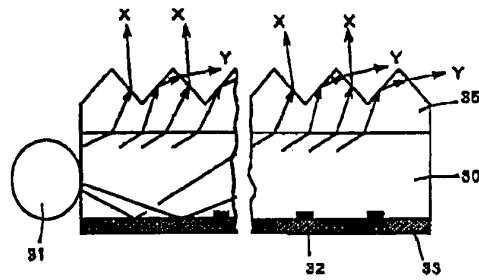
【図6】



【図7】



【図8】



## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-120605

(43)Date of publication of application : 12.05.1995

(51)Int.Cl. G02B 5/04  
F21V 8/00  
G02B 6/00  
G02F 1/1335

(21)Application number : 05-289911

(71)Applicant : MINEBEA CO LTD

(22)Date of filing : 26.10.1993

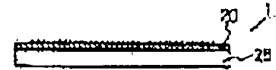
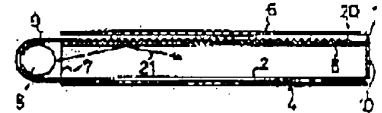
(72)Inventor : SUZUKI SHINGO

### (54) SURFACE LIGHT SOURCE DEVICE AND MANUFACTURE THEREOF

(57)Abstract:

**PURPOSE:** To make a so-called side light system surface light source device highly efficient and provide a manufacturing method thereof.

**CONSTITUTION:** In the side light system surface light source device formed by bringing one or plural linear fluorescent tubes into contact with at least one end face of a transparent resin base 1, the transparent resin base 1 is formed by forming a micro prism group layer 20, formed, out of transparent material lower in the refractive index than transparent resin base material 25 to be the transparent resin base 1, integrally in close contact on the surface of the transparent resin base material 25. The number of constituent members is reduced so as to reduce the cost and to improve manageability while being of high efficiency.



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平7-120605

(43) 公開日 平成7年(1995)5月12日

(51) Int.Cl. <sup>8</sup>	識別記号	片内整理番号	F I	技術表示箇所
G 0 2 B 5/04		E 9224-2K		
		A 9224-2K		
F 2 1 V 8/00		D		
G 0 2 B 6/00	8 3 1	6620-2K		
G 0 2 F 1/1335	5 3 0			

審査請求 未請求 請求項の数 5 F D (全 5 頁)

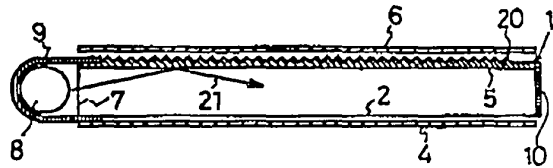
(21) 出願番号 特願平5-289811  
 (22) 出願日 平成5年(1993)10月28日

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 (74) 代理人 弁理士 葛 経夫 (外2名)

(54) 【発明の名称】 面状光源装置およびその製造方法

(57) 【要約】

【目的】 いわゆるサイドライト方式の面状光源装置を、高効率にすると共に、その製造方法を提供する。  
 【構成】 透明樹脂基板1の少なくとも一つ以上の端面に1本または複数本の線状の蛍光管を当接させて構成するサイドライト方式の面状光源装置において、透明樹脂基板1である透明樹脂基材25の表面に少なくとも該透明樹脂基材25よりも屈折率の低い透明材料で構成された微小プリズム群層20を密着形成させ一体化して透明樹脂基板1を形成するものである。部材の構成枚数を低減させ、高効率で低コスト及び取扱い性を改善することができる。



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## 【特許請求の範囲】

【請求項1】 透明樹脂基板の少なくとも一つ以上の端面に1本または複数本の線状の蛍光管を当接させて構成するサイドライト方式の面状光源装置において、前記透明樹脂基板となる透明樹脂基材の表面に、少なくとも該透明樹脂基材よりも屈折率の低い透明材料で構成された微小プリズム群層を密着形成させ一体化して透明樹脂基板を形成したことを特徴とする面状光源装置。

【請求項2】 微小プリズム群を形成させるための型内に液状樹脂を注入し、該注入した液状樹脂に板状の透明樹脂基材を密接させ、該密着させた状態で液状樹脂を重合硬化させることにより、透明樹脂基材と硬化した樹脂とを一体的に形成することを特徴とする面状光源装置の製造方法。

【請求項3】 液状樹脂に紫外線を照射することにより重合硬化させることを特徴とする請求項2記載の面状光源装置の製造方法。

【請求項4】 透明樹脂基材の表面に、該透明樹脂基材よりも低屈折率の薄層を形成して透明樹脂基板を得、該透明樹脂基板に微小プリズム群を形成させるための型を押し当てて熱加圧成形することにより、透明樹脂基板に微小プリズム群層を一体的に形成することを特徴とする面状光源装置の製造方法。

【請求項5】 塗装または印刷により前記透明樹脂基材よりも低屈折率の薄層を形成することを特徴とする請求項4記載の面状光源装置の製造方法。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、看板や各種表示装置等の背面照明に用いる薄型の面状光源装置に関するものであり、特に液晶表示装置の背面照明手段として好適に使用されるものである。

【0002】

【従来の技術】従来よりこの種の薄型面状光源を実現する手段として、サイドライト方式（導光板方式）が知られている。図5はその一例を示すものである。この図において1は透明樹脂基板であり、アクリル等の透光性の高い材料による略断面矩形状のものである。この透明樹脂基板1の裏面2には白色または乳白色のインクを、たとえば特開昭63-62105号公報に示されるように一端側から他端側に行くにつれてその密度が変化するように印刷された散乱パターン3が施されている（図6参照）。

【0003】さらにその後方には、反射板4が配置されている。また透明樹脂基板1の表面5（観察側）の上には拡散板6が置かれている。一方、透明樹脂基板1の少なくとも一つ以上の端部7には、1本または複数本の線状光源である冷陰極または熱陰極の蛍光管8が透明樹脂基板1の端部7とほぼ当接するように置かれており、その外周は銀等を蒸着した反射フィルム9で覆われている。この反射フィルム9の両端は透明樹脂基板1の表裏

それぞれに接合されている。蛍光管8が置かれているところ以外の少なくとも一つ以上の透明樹脂基板1の端部には、反射テープ等の反射剤10が付加されている。

【0004】図6は、このように構成されたサイドライト方式の薄型面状光源における光線の挙動を説明するための模式的な断面図である。これを説明すると、蛍光管8からの発光光線は、反射フィルム9により閉じ込められ、その多くが透明樹脂基板1の端部7に到達し、透明樹脂基板1の内部に進入する。この光線の内、透明樹脂基板1の裏面に印刷されている散乱パターン3に当たった光線11だけが散乱され、そのまま反射して、透明樹脂基板1の表面に達する光線12及び裏面に抜けて反射板4に当たって反射し、透明樹脂基板1の表面に向かう光線13の二つは、符号14で示すように、拡散板6を透過して透明樹脂基板1の表面に放射される。

【0005】透明樹脂基板1の裏面2の散乱パターン3に当たらなかった光線15及び表面5側に当たった光線16は散乱パターンに到達するまで、そのまま透明樹脂基板1の内部で全反射を繰り返して進む。出射光が全面面上で均一な発光強度になるよう散乱パターンに密度分布を与えておくことにより、比較的高輝度でしかも均一な面状光源が実現可能となる。

【0006】しかしながら近年、透過率のより低いカラー液晶パネルの出現により、面状光源装置のさらなる高輝度化が要求されるに至った。これを解決する方法として、図7に示すようにその表面に頂角90度程度の微小プリズム群を形成した透明樹脂シート（プリズムシート）17を図5に示す面状光源の表面に付加することが提案されている。

【0007】このプリズムシートは、外側に発散していく光線を観察位置であるパネルの略垂直方向へ屈曲させることにより高輝度化を図るものである。なお、透明樹脂シート17は、図7に示すようにもともと観察側近くに置いてよいが、透明樹脂基板1より手前であれば、拡散板6の裏面または拡散板6を2枚構成にしてその間に挿入するようにしてもよい。

【0008】このように多種の光学部材を付加していくことにより、所望の特性が得られるようになっていくが、部材の構成枚数が増加することにより、間にある空気層と部材の界面が増える結果、表面反射率が増大し光線透過率（効率）が低下する等の問題があり、また部品点数の増加による高コスト化のみならず、組立時の取扱性が悪化することによる不良の増加等の問題もあった。

【0009】図8は部材数量を低減させることを意図して、微小プリズム群を、基材となる透明樹脂基板1と同一材料で一体的に構成した板材18を使用した例である。しかしながらこのような構成にすると、蛍光管8から発した光線のうち、板材18の表面5側に向かう光線19が図6のように全反射して板材18の内部に戻ることなく表面

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から外側へ抜け出てしまう。このことにより画面上での明るさのバランスが崩れてしまうため、この方式で画面全体に渡って均一な面状光源を実現することは極めて困難である。

【0010】

【発明が解決しようとする課題】本発明はこれらの点に鑑みてなされたものであり、高機能を維持したままで、部材の構成枚数を低減させ、高効率で低コスト及び取扱い性を改善した面状光源装置を提供することを目的とする。

【0011】

【課題を解決するための手段】本発明は上記課題を解決するための手段として、透明樹脂基板の少なくとも一つ以上の端面に1本または複数本の線状の蛍光管を当接させて構成するサイドライト方式の面状光源装置において、前記透明樹脂基板となる透明樹脂基材の表面に、少なくとも該透明樹脂基材よりも屈折率の低い透明材料で構成された微小プリズム群層を密着形成させ一体化して透明樹脂基板を形成した構成としたものである。

【0012】また、微小プリズム群を形成させるための型内に液状樹脂を注入し、該注入した液状樹脂に板状の透明樹脂基材を密着させ、該密着させた状態で液状樹脂を重合硬化させることにより、透明樹脂基材と硬化した樹脂とを一体的に形成することを特徴とする面状光源装置の製造方法である。

【0013】また、液状樹脂に紫外線を照射することにより重合硬化させることを特徴とする面状光源装置の製造方法である。

【0014】さらに、透明樹脂基材の表面に、該透明樹脂基材よりも低屈折率の薄層を形成して透明樹脂基板を得、該透明樹脂基板に微小プリズム群を形成させるための型を押し当てて熱加圧成形することにより、透明樹脂基板に微小プリズム群層を一体的に形成することを特徴とする面状光源装置の製造方法である。

【0015】そして、塗装または印刷により前記透明樹脂基材よりも低屈折率の薄層を形成することを特徴とする面状光源装置の製造方法である。

【0016】

【作用】このような構成とした面状光源装置においては、蛍光管を発した光線のうち、透明樹脂基板の表面に到達する光線は、そのままプリズム面に到達することなく、プリズム層側の屈折率が低いことによりこの界面で全反射し、裏面側に進行する。そして構成要素が少なく簡単な製造方法により、安定した面状光源装置を得ることができることになる。

【0017】

【実施例】次に、本発明に係る面状光源装置を図について説明する。図1は本発明の基本的な構成を示す一例である。この図において1は透明樹脂基板であり、アクリル等の透光性の高い材料による略断面矩形状のものであ

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る。この透明樹脂基板1の裏面2には白色または乳白色のインクを、図5に示すものと同様に、一端側から他端側にいくにつれてその密度が変化するように印刷された散乱パターン3が施されている(図6参照)。

【0018】さらにその後方には、反射板4が配置されている。また透明樹脂基板1の表面5(観察側)の上には拡散板6が置かれている。一方、透明樹脂基板1の少なくとも一つ以上の端部7には、1本または複数本の線状光源である冷陰極または熱陰極の蛍光管8が透明樹脂基板1の端部7とほぼ当接するように置かれており、その外周は銀等を蒸着した反射フィルム9で覆われている。この反射フィルム9の両端は透明樹脂基板1の表裏それぞれに接着されている。蛍光管8が置かれているところ以外の少なくとも一つ以上の透明樹脂基板1の端部には、反射テープ等の反射剤10が付加されている。

【0019】透明樹脂基板1の表面5には、少なくとも透明樹脂基板1よりも屈折率の低い微小プリズム群層20が密着形成させてある。

【0020】このような構成からなる本発明の面状光源装置は、次のように作用する。蛍光管8を発した光線のうち、透明樹脂基板1の表面5に到達する光線21は、図8に示す光線19のようにそのままプリズム面に到達することなく、微小プリズム群層10側の屈折率が低いことによりこの表面5で全反射し、裏面2側に進行する。つまり、微小プリズム群層20が一体的に構成されているにもかかわらず、図6における透明樹脂基板1内での光線の軌跡と同一となる。

【0021】図2は本発明にかかる微小プリズム群層20と一体化した透明樹脂基板1を示すものであり、図3はこの図2における微小プリズム群層20と一体化した透明樹脂基板1の製造方法の一例を示すものである。これを説明すると、微小プリズム群層20を形成させるための型22内に容器23内の透明液状樹脂24を注入し、透明樹脂基材25を上からかぶせる(図3a)。そしてこのようにして透明樹脂基材25を密着させた状態で、この透明液状基材25を重合硬化させる(図3b)。この後、型22を剥離することにより、図2に示すような、微小プリズム群層20と透明樹脂基材25とが一体化された透明樹脂基板1が製造できる。

【0022】ここで使用する透明液状樹脂24は重合硬化後に屈折率が透明樹脂基材25よりも低くなるものであれば、硬化条件を限定するものではないが、紫外線を照射することにより重合硬化する液状樹脂を使用すると、比較的短時間で硬化が終了するため、生産性の点で有利である。

【0023】また図4は図2における微小プリズム群層20を一体化した透明樹脂基板1の製造方法の別の一例を示すものである。表面に、透明樹脂基材25よりも低屈折率の薄層26を形成した透明樹脂基材25を微小プリズム群層20を形成させるための型27を用い、熱加圧成形するこ

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とにより図2に示すような、微小プリズム群層20と透明樹脂基材25とが一体化された透明樹脂基板1が製造できる。

【0024】本発明にかかる低屈折率の薄層26は特に限定されるものではないが、溶剤に溶解させ塗料化した材料を用い、形成することができる。また透明樹脂基材25よりも屈折率が低く、かつ、基材と相溶性のよい透明フィルムを使い、熱加圧成形により、一体化することも可能である。

【0025】本発明を実施するに際して用いる透明樹脂基材25は、その透明性からアクリル樹脂がもっとも適しているが、特にこれに限定されるものではなく、ポリカーボネート、ポリスチレン、AS樹脂等の各種熱可塑性の透明樹脂等が使用可能であり、またCR-39等の熱硬化性樹脂や各種ガラス材料等の無機材料も透明であれば場合によっては適用可能である。

【0026】また本発明にかかる微小プリズム群層20と一体化した透明樹脂基板1の製造方法についても、上記の例に限定されるものではなく、インサート成形、2色成形等の射出成形法その他の方法によって製造してもよい。

【0027】実施例1：屈折率1.49の紫外線吸収材の混入されていない透明アクリル樹脂板を基材とし、屈折率1.42の紫外線硬化型の液状樹脂を用い、図3に示す要領で図2に示す一体化基板を作成した。プリズム形成用の型はシリコンゴム製で、アクリル板上面から紫外線を照射して下部の液状樹脂を重合硬化させた。

【0028】実施例2：屈折率1.49の通常の透明アクリル樹脂板上にケトン系の溶媒で溶解した屈折率1.41のフッ化ビニリデン樹脂をスプレーにより塗布した。充分溶剤を乾燥させた後、図4に示す方法で図2に示す一体化基板を作成した。プリズム形成用の型は黄銅製を使用し、温度180℃、圧力50kg/m<sup>2</sup>の条件で熱加圧成形を行った。これら実施例のいずれの場合も、プリズム断面形状はいずれもピッチ0.3mm、頂角90°である。

【0029】上記2通りの方法で作成した一体化基板を図1に示す構成により面状光源装置として評価を行なっ\*

\*た結果、発光面上での明るさ及びその均一性に優れていたことが確認された。

【0030】

【発明の効果】以上詳述した通り、本発明により高機能を維持したままで、部材の構成枚数を低減させ、高効率で低コスト及び取扱い性を改善した面状光源装置が実現できる。

【図面の簡単な説明】

【図1】本発明の一実施例の基本構成を示す断面図である。

【図2】図1中の一体化樹脂基板を示す断面図である。

【図3】(a)、(b)は図2に示す一体化樹脂基板の製造方法の一例を示す説明図である。

【図4】図2に示す一体化樹脂基板の製造方法の他の例を示す説明図である。

【図5】従来構造の基本構成を示す断面図である。

【図6】図5のものの作用を説明する説明図である。

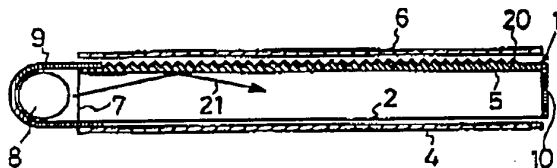
【図7】図6のものの改良構造を示す断面図である。

【図8】図6のものの改良構造の他の例を示す断面図である。

【符号の説明】

- 1 透明樹脂基板
- 4 反射板
- 5 表面
- 6 拡散板
- 7 端部
- 8 蛍光管
- 9 反射フィルム
- 10 反射剤
- 20 微小プリズム群層
- 21 光線
- 22 型
- 24 透明液状樹脂
- 25 透明樹脂基材
- 26 薄層
- 27 型

【図1】



【図2】

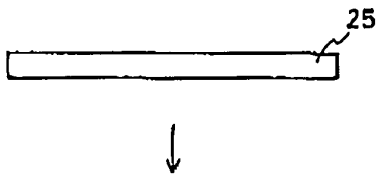




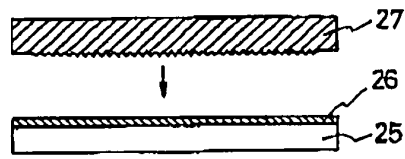
(5)

特開平7-120605

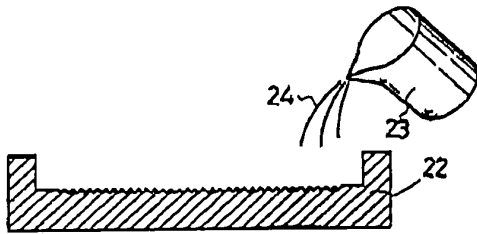
【図3】



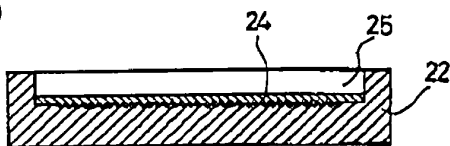
【図4】



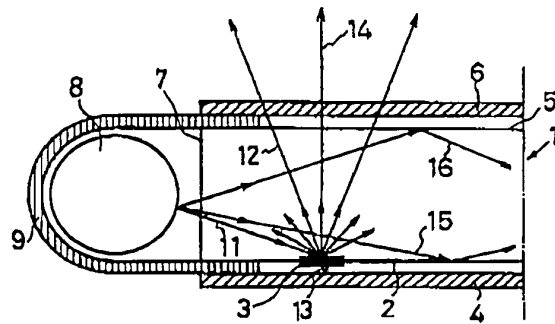
(a)



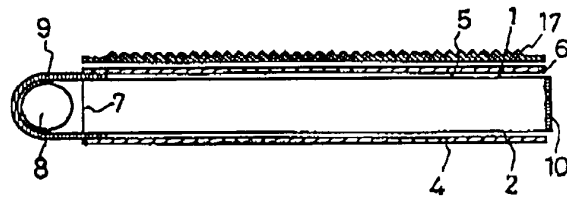
(b)



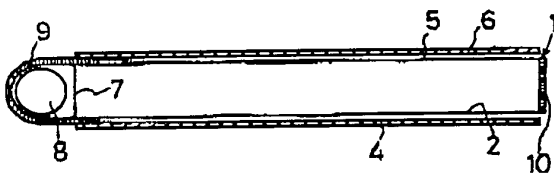
【図6】



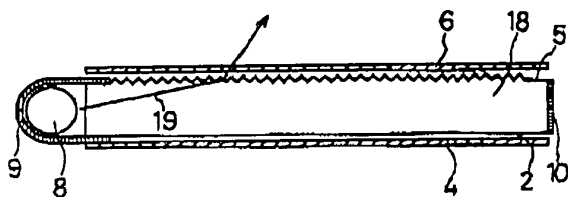
【図7】



【図5】



【図8】



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	11548330
<b>Filing Date:</b>	11-Oct-2006
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Attorney Docket Number:</b>	GLOLP0108USAL

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Independent claims in excess of 3	1201	3	220	660

### Miscellaneous-Filing:

**Petition:**

**Patent-Appeals-and-Interference:**

**Post-Allowance-and-Post-Issuance:**

**Extension-of-Time:**

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>840</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	4619033
<b>Application Number:</b>	11548330
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	15-JAN-2009
<b>Filing Date:</b>	11-OCT-2006
<b>Time Stamp:</b>	14:00:07
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$840
RAM confirmation Number	8377
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1		GLOLP0108USALreply.pdf	428529 18067a3a1ef3cc4e0297ce91a9259daa22a2d271	yes	15
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		<b>Document Description</b>	<b>Start</b>	<b>End</b>	
		Amendment/Req. Reconsideration-After Non-Final Reject	1	1	
		Claims	2	12	
		Applicant Arguments/Remarks Made in an Amendment	13	15	
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<b>Information:</b>					
2	Information Disclosure Statement (IDS) Filed (SB/08)	GLOLP0108USALsuppids.pdf	141698 61b100f81bfc19cc16ec58ea701f3add306919b9	no	3
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<b>Information:</b>					
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3	Foreign Reference	JP625802.pdf	245680 64615eb1a0551a653c2857d6b7014c75c2731e5e	no	7
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8	Fee Worksheet (PTO-06)	fee-info.pdf	32107	no	2
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	2221233
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**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**


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being transmitted via the USPTO Electronic Filing System.

Date: January 15, 2009

  
\_\_\_\_\_  
Jeanne Murphy

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Attorney Docket GLOLP0108USAL

In re PATENT application of

Jeffery R. Parker

Serial No. 11/548,330

Confirmation No. 5221

Filed October 11, 2006

For: LIGHT EMITTING PANEL ASSEMBLIES

Art Unit 2885

Thomas M. Sember, Primary Examiner

**REPLY TO OFFICE ACTION OF OCTOBER 15, 2008**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

In reply to the Office Action of October 15, 2008, please amend the above-identified application as follows:

**Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper.

**Remarks/Arguments** begin on page 13 of this paper.

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. (currently amended): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from the at least one a light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides are of a different type or shape than the light extracting deformities on or in the other side of the panel member, and at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

2. (original): The assembly of claim 1 wherein the deformities on or in one of the sides are prismatic.



3. (original): The assembly of claim 1 wherein the deformities on or in one of the sides are lenticular.

4. (original): The assembly of claim 1 wherein the deformities on or in one of the sides run the full length or width of the one side.

5. (withdrawn): The assembly of claim 1 wherein the deformities on or in one of the sides are quite small in relation to the length and width of the panel member.

6. (original): The assembly of claim 1 wherein the deformities on or in one of the sides have at least one diffuse surface.

7. (withdrawn): The assembly of claim 1 wherein the deformities on or in one of the sides are etched dots.

8. (withdrawn): The assembly of claim 1 wherein the deformities on or in one of the sides vary randomly.

9. (original): The assembly of claim 1 wherein the panel member is flat.

10. (withdrawn): The assembly of claim 1 wherein the panel member is tapered.

11. (currently amended): The assembly of claim 1 wherein the deformities on or in one of the sides vary in at least one of the following characteristics: slope angle, density, ~~position~~, orientation, height or depth, and size.

12. (cancelled)

13. (currently amended): The assembly of claim 42 1 wherein at least one side of the sheet, film or substrate has deformities or optical elements.

14. (cancelled)

15. (currently amended): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from the at least one light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides are of a different type than the light extracting deformities on or in the other side of the panel member, wherein the panel member has a transition region between the at least one input edge

and the patterns of light extracting deformities to allow the light from the at least one light source to mix and spread. ~~The assembly of claim 14~~ and at least one side of the transition region contains optical elements for reflecting or refracting light from the at least one light source.

16. (original): The assembly of claim 15 wherein the optical elements are faceted.

17. (currently amended): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a the at least one light source, the panel member having front and back sides and a greater cross sectional width than thickness, at least one of the sides having a pattern of light extracting deformities that are projections or depressions on or in the at least one side to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in the at least one side has at least two different types or shapes of light extracting deformities and at least one of the types or shapes of deformities on or in the at least one side varies along at least one of the length and width of the panel member, and at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

18. (currently amended): The assembly of claim 17 wherein at least one of the types ~~or shapes~~ of deformities is prismatic.

19. (currently amended): The assembly of claim 17 wherein at least one of the types ~~or shapes~~ of deformities is lenticular.

20. (original): The assembly of claim 17 wherein the deformities on or in the one side run the full length or width of the one side.

21. (withdrawn - currently amended): The assembly of claim 17 wherein at least one of the types ~~or shapes~~ of deformities is quite small in relation to the length and width of the panel member.

22. (currently amended): The assembly of claim 17 wherein at least one of the types ~~or shapes~~ of deformities has at least one diffuse surface.

23. (withdrawn - currently amended): The assembly of claim 17 wherein at least one of the types ~~or shapes~~ of deformities is etched dots.

24. (withdrawn - currently amended): The assembly of claim 17 wherein at least one of the types ~~or shapes~~ of deformities varies randomly.

25. (original): The assembly of claim 17 wherein the panel member is flat.

26. (withdrawn): The assembly of claim 17 wherein the panel member is tapered.

27. (currently amended): The assembly of claim 17 wherein at least one of the types or shapes of deformities varies in at least one of the following characteristics: slope angle, density, position, orientation, height or depth, and size.

28. (cancelled)

29. (currently amended): The assembly of claim ~~28~~ 17 wherein at least one side of the film, sheet or substrate has deformities or optical elements.

30. (cancelled)

31. (currently amended): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from the at least one light source, the panel member having front and back sides and a greater cross sectional width than thickness, at least one of the sides having a pattern of light extracting deformities that are projections or depressions on or in the at least one side to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in the at least one side has at least

two different types of light extracting deformities and at least one of the types of deformities on or in the at least one side varies along at least one of the length and width of the panel member, wherein the panel member has a transition region between the at least one input edge and the patterns of light extracting deformities to allow the light from the at least one light source to mix and spread.  
~~The assembly of claim 30 wherein~~ and at least one side of the transition region contains optical elements for reflecting or refracting light from the at least one light source.

32. (original): The assembly of claim 31 wherein the optical elements are faceted.

33. (currently amended): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a the at least one light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides vary in a different way or manner than the light extracting deformities on or in the other side of the panel member,

and at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

34. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in density.

35. (currently amended): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in slope angle relative to one another.

36. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in position.

37. (currently amended): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in angle of orientation relative to one another.

38. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in height or depth.

39. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in size.

40. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side do not vary.

41. (withdrawn): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary randomly.

42. (currently amended): The assembly of claim 33 wherein at least ~~one~~ of the ~~types or shapes of~~ some of the deformities is are prismatic.

43. (currently amended): The assembly of claim 33 wherein at least ~~one~~ of the ~~types or shapes of~~ some of the deformities is are lenticular.

44. (original): The assembly of claim 33 wherein the deformities on or in one of the sides run the full length or width of the one side.

45. (withdrawn - currently amended): The assembly of claim 33 wherein at least ~~one~~ of the ~~types or shapes of~~ some of the deformities is are quite small in relation to the length and width of the panel member.

46. (currently amended): The assembly of claim 33 wherein at least ~~one~~ of the ~~types or shapes of~~ some of the deformities ~~has~~ have at least one diffuse surface.



47. (withdrawn - currently amended): The assembly of claim 33 wherein at least ~~one of the types or shapes of~~ some of the deformities is are etched dots.

48. (original): The assembly of claim 33 wherein the panel member is flat.

49. (withdrawn): The assembly of claim 33 wherein the panel member is tapered.

50. (cancelled)

51. (currently amended): The assembly of claim ~~50~~ 33 wherein at least one side of the sheet, film or substrate has deformities or optical elements.

52. (cancelled)

53. (currently amended): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from the at least one light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one

of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides vary in a different way or manner than the light extracting deformities on or in the other side of the panel member, wherein the panel member has a transition region between the at least one input edge and the patterns of light extracting deformities to allow the light from the at least one light source to mix and spread, The assembly of claim 52 wherein and at least one side of the transition region contains optical elements for reflecting or refracting light from the at least one light source.

54. (original): The assembly of claim 53 wherein the optical elements are faceted.

### REMARKS/ARGUMENTS

Claims 1-11, 13, 15-27, 29, 31-49, 51, 53 and 54 are pending in the application, claims 1, 15, 17, 31, 33 and 53 being independent.

Claims 1, 11, 15, 17-19, 21-24, 27, 29, 31, 33, 35, 37, 42, 43, 45-47, 51 and 53 have been amended. Claims 12, 14, 28, 30, 50 and 52 have been cancelled.

Claims 1-4, 6, 9, 11, 13, 15-20, 22, 25, 27, 29, 31-40, 42-44, 46, 48, 51, 53 and 54 read on the elected species of Figs. 3 and 5.

Claims 5, 7, 8, 10, 21, 23, 24, 26, 41, 45, 47 and 49 are withdrawn from consideration as being drawn to non-elected species.

The allowance of claims 12, 13, 15, 16, 28, 29, 31, 32, 50, 51, 53 and 54 subject to being rewritten in independent form including all of the limitations of the base claim and any intervening claims is noted with appreciation. Claim 1 has been amended to include all of the limitations of allowable claim 12 and is now presumed allowable.

Claims 2-6, 9, 11 and 13 depend from claim 1 and are also submitted as allowable.

Claim 15 has been amended to include substantially all of the limitations of original claims 1 and 14 to make claim 15 independent. Accordingly, claim 15 is now presumed allowable.

Claim 16 depends from claim 15 and is also submitted as allowable.

Claim 17 has been amended to include all of the limitations of allowable claim 28 and is now presumed allowable.

Claims 18-20, 22, 25, 27 and 29 depend from claim 17 and are also submitted as allowable.

Claim 31 has been amended to include substantially all of the limitations of original claims 17 and 30 to make claim 31 independent. Accordingly, claim 31 is now presumed allowable.

Claim 32 depends from claim 31 and is also submitted as allowable.

Claim 33 has been amended to include all of the limitations of allowable claim 50 and is now presumed allowable.

Claims 34-40, 42-44, 46, 48 and 51 depend from claim 33 and are also submitted as allowable.

Claim 53 has been amended to include substantially all of the limitations of original claims 33 and 52 to make claim 53 independent. Accordingly claim 53 is now presumed allowable.

Claim 54 depends from claim 53 and is also submitted as allowable.

Claims 5, 7, 8, 10, 21, 23, 24, 26, 41, 45, 47 and 49 are non-elected. However, non-elected claims 5, 7, 8 and 10 depend from allowable claim 1, non-elected claims 21, 23, 24 and 26 depend from allowable claim 17 and non-elected claims 41, 45, 47 and 49 depend from allowable claim 33. Accordingly, allowance of the non-elected claims is also respectfully requested.

For the foregoing reasons, this application is now believed to be in condition for final allowance of all of the pending claims 1-11, 13, 15-27, 29, 31-49, 51, 53 and 54, and early action to that end is respectfully requested.

In the event an extension of time is necessary, this should be considered a petition for such an extension. If required, fees are enclosed for the extension of time and/or for the presentation of new and/or amended claims. In the event any additional fees are due in connection with the filing of this reply, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 under Docket No. GLOLP0108USAL.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11/548,330</b>	Filing Date <b>10/11/2006</b>	<input checked="" type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	SMALL ENTITY <input type="checkbox"/>	OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>						
* If the difference in column 1 is less than zero, enter "0" in column 2.						
			TOTAL		TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	(Column 3)		SMALL ENTITY	OR	OTHER THAN SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
<b>01/15/2009</b>								
Total <small>(37 CFR 1.16(j))</small>	* 48	Minus ** 54	= 0	X \$ =		OR X \$52=	0	
Independent <small>(37 CFR 1.16(h))</small>	* 6	Minus *** 3	= 3	X \$ =		OR X \$220=	660	
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>								
				TOTAL ADD'L FEE		OR TOTAL ADD'L FEE	<b>660</b>	

	(Column 1)	(Column 2)	(Column 3)		SMALL ENTITY	OR	OTHER THAN SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
Total <small>(37 CFR 1.16(j))</small>	*	Minus **	=	X \$ =		OR X \$ =		
Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =		OR X \$ =		
<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>								
				TOTAL ADD'L FEE		OR TOTAL ADD'L FEE		

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:  
 /NICHELE PETERSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/548,330	10/11/2006	Jeffery R. Parker	GLOLP0108USAL	5221
23908	7590	10/15/2008	EXAMINER	
RENNER OTTO BOISSELLE & SKLAR, LLP			SEMBER, THOMAS M	
1621 EUCLID AVENUE			ART UNIT	PAPER NUMBER
NINETEENTH FLOOR			2885	
CLEVELAND, OH 44115			MAIL DATE	DELIVERY MODE
			10/15/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 11/548,330	<b>Applicant(s)</b> PARKER, JEFFERY R.	
	<b>Examiner</b> Thomas M. Sember	<b>Art Unit</b> 2885	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 10 July 2008.
- 2a)  This action is **FINAL**.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-54 is/are pending in the application.
  - 4a) Of the above claim(s) 5, 7, 8, 10, 21, 23, 24, 26, 41, 45, 47 and 49 is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-4, 6, 9, 11, 14, 17-20, 22, 25, 27, 30, 33-40, 42-44, 46, 48 and 52 is/are rejected.
- 7)  Claim(s) 12, 13, 15, 16, 28, 29, 31, 32, 50, 51, 53 and 54 is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some \*    c)  None of:
  - 1.  Certified copies of the priority documents have been received.
  - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_.



**DETAILED ACTION**

***Election/Restrictions***

1. Newly submitted claims 10, 26 and 49 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the elected species of figures 3 and 5 does include a tapered body.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 10, 26 and 49 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 9, 11, 14, 17-20, 22, 25, 27, 30, 33-40, 42, 43, 44, 46, 48 and 52 are rejected under 35 U.S.C. 102(b) as being anticipated by Blanchet '507. Blanchet '507 discloses at least one light source, an optical panel member 1 having at least one input edge 1b for receiving light from a light source 2, the panel member 1 having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities (4 or 5) that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a

predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides are of a different type or shape (4 and 5 located on both sides of panel 1 but indirectly opposed to each other are of different triangular types and shapes) than the light extracting deformities on or in the other side of the panel member.

### ***Response to Arguments***

Applicant's arguments filed 07/10/08 have been fully considered but they are not persuasive. Applicant argues that Blanchet '507 fails to teach "projections or depressions on or in one side of a transparent plate that has the one type or shape of depressions or striations 4 or 5 in the other side as recited in claim 1. Nor does the pattern of depressions or striations 4, 5 on or in at least one side of the transparent plate of Blanchet have at least two different types or shapes of light extracting deformities with at least one of the types or shapes of deformities varying along at least one of the length and width of the panel member as recited in claim 17, or wherein at least some of the light extracting deformities on or in one of the sides varies in a different way or manner than the light extracting deformities on or in the other side of the panel member as recited in claim 33. See Fig. 1 of Blanchet which shows the front and back striations arranged with the same spacing relative to each other and with the same trend of increasing depth with increased distance from the light source. Also see

column 2, lines 50-53 of Blanchet which states that the striations 4 and 5 are distributed in super-imposed horizontal lines and are spaced from one another on each line horizontally. Accordingly, withdrawal of the rejection of claims 1, 17 and 33 based on Blanchet is respectfully requested.”

The examiner disagrees. As broadly claimed and clearly shown in figure 1 of Blanchet '507 the depression (4 or 5) are on both sides of the transparent pane 1. Each of the depressions (4 and 5) vary along the length of light panel in size, type and shape. At least one depression (4 or 5) on one side is of a different type, size or shape than the some of the depressions (4 or 5) located on an opposite side (those depressions indirectly opposed to each other).

Finally applicant argues that Blanchet '507 fails to teach “the depressions or striations 4, 5 on or in at least one side of the transparent plate of Blanchet vary in slope angle as recited in claim 35 or vary in orientation as recited in claim 37. The examiner disagrees. The depressions 4 and 5 of Blanchet '507 vary in slope angles or orientation as shown in figure 1.

***Allowable Subject Matter***

1. Claims 12, 13, 15, 16, 28, 29, 31, 32, 50, 51 and 53-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Sember whose telephone number is 571-272-2381. The examiner can normally be reached on M-F 9 a.m.- 5.30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong Suk (James) Lee can be reached on 571-272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas M Sember/  
Primary Examiner, Art Unit 2885

<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 11548330	<b>Applicant(s)/Patent Under Reexamination</b> PARKER, JEFFERY R.
	<b>Examiner</b> Thomas M Sember	<b>Art Unit</b> 2885

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE									
Final	Original	10/01/2008									
	1	✓									
	2	✓									
	3	✓									
	4	✓									
	5	N									
	6	✓									
	7	N									
	8	✓									
	9	✓									
	10	N									
	11	✓									
	12	O									
	13	O									
	14	✓									
	15	O									
	16	O									
	17	✓									
	18	✓									
	19	✓									
	20	✓									
	21	N									
	22	✓									
	23	N									
	24	N									
	25	✓									
	26	N									
	27	✓									
	28	O									
	29	O									
	30	✓									
	31	O									
	32	O									
	33	✓									
	34	✓									
	35	✓									
	36	✓									

<b>Index of Claims</b> 	<b>Application/Control No.</b> 11548330	<b>Applicant(s)/Patent Under Reexamination</b> PARKER, JEFFERY R.
	<b>Examiner</b> Thomas M Sember	<b>Art Unit</b> 2885

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE								
Final	Original	10/01/2008								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	N								
	42	✓								
	43	✓								
	44	✓								
	45	N								
	46	✓								
	47	N								
	48	✓								
	49	✓								
	50	O								
	51	O								
	52	✓								
	53	O								
	54	O								


<b>Search Notes</b>  	<b>Application/Control No.</b> 11548330	<b>Applicant(s)/Patent Under Reexamination</b> PARKER, JEFFERY R.
	<b>Examiner</b> Thomas M Sember	<b>Art Unit</b> 2885

<b>SEARCHED</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>

<b>SEARCH NOTES</b>		
<b>Search Notes</b>	<b>Date</b>	<b>Examiner</b>
Updated search	10/01/08	/TS/

<b>INTERFERENCE SEARCH</b>			
<b>Class</b>	<b>Subclass</b>	<b>Date</b>	<b>Examiner</b>

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<b>Application Number</b> 	<b>Application/Control No.</b> 11/548,330	<b>Applicant(s)/Patent under Reexamination</b> PARKER, JEFFERY R.

<b>Document Code - DISQ</b>	<b>Internal Document – DO NOT MAIL</b>
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<b>TERMINAL DISCLAIMER</b>	<input checked="" type="checkbox"/> <b>APPROVED</b>	<input type="checkbox"/> <b>DISAPPROVED</b>
Date Filed : 10 JULY 2008	<b>This patent is subject to a Terminal Disclaimer</b>	

<b>Approved/Disapproved by:</b>
SHANETTE BROWN

U.S. Patent and Trademark Office

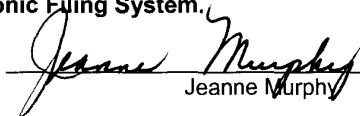


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Date: July 10, 2008

  
\_\_\_\_\_  
Jeanne Murphy

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Attorney Docket GLOLP0108USAL

In re PATENT application of

Jeffery R. Parker

Serial No. 11/548,330

Confirmation No. 5221

Filed October 11, 2006

For: LIGHT EMITTING PANEL ASSEMBLIES

Art Unit 2885

Thomas M. Sember, Primary Examiner

**REPLY TO OFFICE ACTION OF FEBRUARY 12, 2008**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

In reply to the Office Action of February 12, 2008, further and favorable consideration of this application is respectfully requested for the reasons set forth hereafter.

The listing of claims in the application indicating their current status begins on page 2 of this paper.

**Remarks/Arguments** begin on page 9 of this paper.

**Listing of Claims:**

1. (original): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides are of a different type or shape than the light extracting deformities on or in the other side of the panel member.

2. (original): The assembly of claim 1 wherein the deformities on or in one of the sides are prismatic.

3. (original): The assembly of claim 1 wherein the deformities on or in one of the sides are lenticular.

4. (original): The assembly of claim 1 wherein the deformities on or in one of the sides run the full length or width of the one side.

5. (original - withdrawn): The assembly of claim 1 wherein the deformities on or in one of the sides are quite small in relation to the length and width of the panel member.

6. (original): The assembly of claim 1 wherein the deformities on or in one of the sides have at least one diffuse surface.

7. (original - withdrawn): The assembly of claim 1 wherein the deformities on or in one of the sides are etched dots.

8. (original - withdrawn): The assembly of claim 1 wherein the deformities on or in one of the sides vary randomly.

9. (original): The assembly of claim 1 wherein the panel member is flat.

10. (original): The assembly of claim 1 wherein the panel member is tapered.

11. (original): The assembly of claim 1 wherein the deformities on or in one of the sides vary in at least one of the following characteristics: slope angle, density, position, orientation, height or depth, and size.

12. (original): The assembly of claim 1 further comprising at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

13. (original): The assembly of claim 12 wherein at least one side of the sheet, film or substrate has deformities or optical elements.

14. (original): The assembly of claim 1 wherein the panel member has a transition region between the input edge and the pattern of light extracting deformities to allow the light from the light source to mix and spread.

15. (original): The assembly of claim 14 wherein at least one side of the transition region contains optical elements for reflecting or refracting light.

16. (original): The assembly of claim 15 wherein the optical elements are faceted.

17. (original): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from

a light source, the panel member having front and back sides and a greater cross sectional width than thickness, at least one of the sides having a pattern of light extracting deformities that are projections or depressions on or in the at least one side to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in the at least one side has at least two different types or shapes of light extracting deformities and at least one of the types or shapes of deformities varies along at least one of the length and width of the panel member.

18. (original): The assembly of claim 17 wherein at least one of the types or shapes of deformities is prismatic.

19. (original): The assembly of claim 17 wherein at least one of the types or shapes of deformities is lenticular.

20. (original): The assembly of claim 17 wherein the deformities on or in the one side run the full length or width of the one side.

21. (original - withdrawn): The assembly of claim 17 wherein at least one of the types or shapes of deformities is quite small in relation to the length and width of the panel member.

22. (original): The assembly of claim 17 wherein at least one of the types or shapes of deformities has at least one diffuse surface.

23. (original - withdrawn): The assembly of claim 17 wherein at least one of the types or shapes of deformities is etched dots.

24. (original - withdrawn): The assembly of claim 17 wherein at least one of the types or shapes of deformities varies randomly.

25. (original): The assembly of claim 17 wherein the panel member is flat.

26. (original): The assembly of claim 17 wherein the panel member is tapered.

27. (original): The assembly of claim 17 wherein at least one of the types or shapes of deformities varies in at least one of the following characteristics: slope angle, density, position, orientation, height or depth, and size.

28. (original): The assembly of claim 17 further comprising at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

29. (original): The assembly of claim 28 wherein at least one side of the film, sheet or substrate has deformities or optical elements.

30. (original): The assembly of claim 17 wherein the panel member has a transition region between the input edge and the pattern of light extracting deformities to allow the light from the light source to mix and spread.

31. (original): The assembly of claim 30 wherein at least one side of the transition region contains optical elements for reflecting or refracting light.

32. (original): The assembly of claim 31 wherein the optical elements are faceted.

33. (original): A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause

light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides vary in a different way or manner than the light extracting deformities on or in the other side of the panel member.

34. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in density.

35. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in slope angle.

36. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in position.

37. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in orientation.

38. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in height or depth.

39. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in size.

40. (original): The assembly of claim 33 wherein at least some of the deformities on or in at least one side do not vary.

41. (original - withdrawn): The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary randomly.

42. (original): The assembly of claim 33 wherein at least one of the types or shapes of deformities is prismatic.

43. (original): The assembly of claim 33 wherein at least one of the types or shapes of deformities is lenticular.

44. (original): The assembly of claim 33 wherein the deformities on or in one of the sides run the full length or width of the one side.

45. (original - withdrawn): The assembly of claim 33 wherein at least one of the types or shapes of deformities is quite small in relation to the length and width of the panel member.

46. (original): The assembly of claim 33 wherein at least one of the types or shapes of deformities has at least one diffuse surface.

47. (original - withdrawn): The assembly of claim 33 wherein at least one of the types or shapes of deformities is etched dots.

48. (original): The assembly of claim 33 wherein the panel member is flat.

49. (original): The assembly of claim 33 wherein the panel member is tapered.

50. (original): The assembly of claim 33 further comprising at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

51. (original): The assembly of claim 50 wherein at least one side of the sheet, film or substrate has deformities or optical elements.

52. (original): The assembly of claim 33 wherein the panel member has a transition region between the input edge and the pattern of light extracting deformities to allow the light from the light source to mix and spread.

53. (original): The assembly of claim 52 wherein at least one side of the transition region contains optical elements for reflecting or refracting light.

54. (original): The assembly of claim 53 wherein the optical elements are faceted.



## REMARKS/ARGUMENTS

Claims 1-54 are pending in the application, claims 1, 17 and 33 being independent.

Claims 1-4, 6, 9-20, 22, 25-40, 42-44, 46 and 48-54 read on the elected species of Figs. 3 and 5.

Claims 5, 7, 8, 21, 23, 24, 41, 45 and 47 are withdrawn from consideration as being drawn to non-elected species.

Claims 1-4, 6, 9-20, 22, 25-40 and 42-44 are provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1, 3-6, 10, 13, 16, 18-21, 28 and 30-35 of copending Application No. 11/504,204; and claims 1, 4, 7, 9-14, 17, 22 and 24-36 of copending Application No. 111/504,203.

According to the Examiner, although the allegedly conflicting claims are not identical, they are not patentably distinct from each other because applicant merely uses slightly different claim language to claim the same invention.

Applicant respectfully disagrees with this rejection. Nevertheless, terminal disclaimers in compliance with 37 CFR 1.321(c) are filed herewith to overcome this provisional obviousness-type double patenting rejection based on the cited copending applications.

Claims 1-3, 6, 9, 11-19, 22, 25, 27-39, 42, 43, 46, 48 and 50-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Blanchet (US 4,811,507). According to the Examiner, Blanchet discloses, *inter alia*, an optical panel member having a pattern of light extracting deformities that are projections or depressions on or in the front and back sides to cause light to be emitted from the panel member in a predetermined

output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member, and at least some of the light extracting deformities on or in one of the sides are of a different type or shape than the light extracting deformities on or in the other side of the panel member.

Blanchet discloses two types or shapes of "light-re-emitting elements", (1) depressions or striations 4, 5 on the front and back sides that act the role of light-re-emitting elements (column 2, lines 32-35), and (2) inserts 6 such as microballs or microbubbles that are provided in the transparent plate (column 2, lines 62-68; Fig. 3). These microballs or microbubbles, while of a different type or shape than the depressions or striations 4, 5 in one or both sides of the transparent plate, are not projections or depressions on or in one side of a transparent plate that has the one type or shape of depressions or striations 4 or 5 in the other side as recited in claim 1. Nor does the pattern of depressions or striations 4, 5 on or in at least one side of the transparent plate of Blanchet have at least two different types or shapes of light extracting deformities with at least one of the types or shapes of deformities varying along at least one of the length and width of the panel member as recited in claim 17, or wherein at least some of the light extracting deformities on or in one of the sides varies in a different way or manner than the light extracting deformities on or in the other side of the panel member as recited in claim 33. See Fig. 1 of Blanchet which shows the front and back striations arranged with the same spacing relative to each other and with the same trend of increasing depth with increased distance from the light source. Also see column 2, lines 50-53 of Blanchet which states that the striations 4 and 5 are

distributed in super-imposed horizontal lines and are spaced from one another on each line horizontally. Accordingly, withdrawal of the rejection of claims 1, 17 and 33 based on Blanchet is respectfully requested.

Claims 2, 3, 6, 9 and 11-16 depend from claim 1, claims 18, 19, 22, 25 and 27-32 depend from claim 17, and claims 34-39, 42, 43, 46, 48 and 50-54 depend from claim 33 and are allowable over Blanchet for at least the same reasons.

Moreover, it is not seen wherein there is at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member of Blanchet to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss as recited in claims 12, 13, 28, 29, 50 and 51, or wherein the panel member of Blanchet has a transition region between the input edge and the pattern of light extracting deformities containing optical elements on at least one side of the transition region for reflecting or refracting light as recited in claims 15, 31 and 53, or wherein the optical elements on at least the one side of the transition region are faceted as further recited in claims 16, 32 and 54. Nor is it seen wherein the depressions or striations 4, 5 on or in at least one side of the transparent plate of Blanchet vary in slope angle as recited in claim 35 or vary in orientation as recited in claim 37. Accordingly, claims 12, 13, 15, 16, 28, 29, 31, 32, 35, 37, 50, 51, 53 and 54 are further submitted as allowable over Blanchet in their own right in addition to being dependent on one of claims 1, 17 and 33.

Claims 17, 19, 22 and 25-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Albinger, Jr. (US 3,043,947). According to the Examiner, at least one of the sides of the optical panel member 1 of Albinger, Jr. has a pattern of light extracting

deformities 10 that are projections or depressions on or in at least one side, where the pattern of light extracting deformities on or in at least one side has at least two different types or shapes of light extracting deformities and at least one of the types or shapes of deformities varies along at least one of the length and width of the panel member as recited in claim 17. However, all of the light extracting deformities 10 of Albinger, Jr. are semi-spherical depressions (column 2, lines 56-60). Thus they are all of the same type or shape, even though some of the semi-spherical depressions intersect each other. Accordingly, withdrawal of the rejection of claim 17 based on Albinger, Jr. is respectfully requested.

Claims 19, 22 and 25-32 depend from claim 17 and are submitted as allowable over Albinger, Jr. for at least the same reasons. Moreover, it is not seen wherein there is at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member of Albinger, Jr. to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss as recited in claims 28 and 29. Nor is it seen wherein the panel member of Albinger, Jr. has a transition region between the input edge and the pattern of light extracting deformities containing optical elements on at least one side of the transition region for reflecting or refracting light as recited in claim 31, or wherein the optical elements on at least the one side of the transition region are faceted as further recited in claim 32. Accordingly, claims 28, 29, 31 and 32 are further submitted as allowable over Albinger, Jr. in their own right in addition to being dependent on claim 17.

Claims 17-20, 22, 25, 27 and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Balchunas (US 3,328,570). According to the Examiner, at least one of

the sides of the optical panel member 1 of Balchunas has a pattern of light extracting deformities 17 that are projections or depressions on or in the at least one side and that has at least two different types or shapes of light extracting deformities and at least one of the types or shapes of deformities varies along at least one of the length and width of the panel member as recited in claim 17. However, the light extracting deformities 17 of Balchunas are grooves of the same type and shape as shown in Fig. 4, only varying in depth as the distance between the light source and the grooves increases (column 4, lines 45-52). There are not at least two different types or shapes of light extracting deformities on or in at least one of the sides, with at least one of the types or shapes of deformities varying along at least one of the length and width of the panel member as recited in claim 17. Accordingly, withdrawal of the rejection of claim 17 based on Balchunas is respectfully requested.

Claims 18-20, 22, 25, 27 and 30-32 depend from claim 17 and are submitted as allowable for substantially the same reasons. Moreover, it is not seen wherein the panel member of Balchunas has a transition region between the input edge and the pattern of light extracting deformities containing optical elements on at least one side for reflecting or refracting light as recited in claim 31, or wherein the optical elements on the one side are faceted as further recited in claim 32. Accordingly, claims 31 and 32 are further submitted as allowable over Balchunas in their own right in addition to being dependent on claim 17.

Claims 4, 10, 40, 44 and 49 were not rejected on prior art. Claims 4 and 10 depend from claim 1 and claims 40, 44 and 49 depend from claim 33 and are also submitted as clearly allowable.

For the foregoing reasons, this application is believed to be in condition for final allowance of all of the elected claims 1-4, 6, 9-20, 22, 25-40, 42-44, 46 and 48-54, and early action to that end is respectfully requested.

Claims 5, 7, 8, 21, 23, 24, 41,45 and 47 are non-elected. However, non-elected claims 5, 7 and 8 depend from elected claim 1, non-elected claims 21, 23 and 24 depend from elected claim 17 and non-elected claims 41, 45 and 47 depend from elected claim 33. Accordingly, upon allowance of claims 1, 17 and 33, allowance of the non-elected claims is also respectfully requested.

In the event an extension of time is necessary, this should be considered a petition for such an extension. If required, fees are enclosed for the extension of time and/or for the presentation of new and/or amended claims. In the event any additional fees are due in connection with the filing of this reply, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 under Docket No. GLOLP0108USAL.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

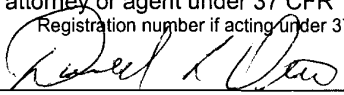
By 

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<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b> <b>FY 2008</b> <i>(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)</i>		Docket Number (Optional) GLOLP0108USAL	
Application Number 11/548,330		Filed October 11, 2006	
For LIGHT EMITTING PANEL ASSEMBLIES			
Art Unit 2885		Examiner Thomas M. Sember	
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.			
The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):			
		<u>Fee</u>	<u>Small Entity Fee</u>
<input type="checkbox"/>	One month (37 CFR 1.17(a)(1))	\$120	\$60
<input checked="" type="checkbox"/>	Two months (37 CFR 1.17(a)(2))	\$460	\$ <u>460</u>
<input type="checkbox"/>	Three months (37 CFR 1.17(a)(3))	\$1050	\$525
<input type="checkbox"/>	Four months (37 CFR 1.17(a)(4))	\$1640	\$820
<input type="checkbox"/>	Five months (37 CFR 1.17(a)(5))	\$2230	\$1115
<input type="checkbox"/>	Applicant claims small entity status. See 37 CFR 1.27.		
<input type="checkbox"/>	A check in the amount of the fee is enclosed.		
<input checked="" type="checkbox"/>	Payment by credit card. VIA EFS WEB		
<input type="checkbox"/>	The Director has already been authorized to charge fees in this application to a Deposit Account.		
<input checked="" type="checkbox"/>	The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>18-0988</u> . I have enclosed a duplicate copy of this sheet.		
<b>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</b>			
I am the	<input type="checkbox"/>	applicant/inventor.	
	<input type="checkbox"/>	assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).	
	<input checked="" type="checkbox"/>	attorney or agent of record. Registration Number <u>22,125</u>	
	<input type="checkbox"/>	attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____	
			<u>2/10/08</u>
	Signature		Date
	Donald L. Otto		216.621.1113
	Typed or printed name		Telephone Number
NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.			
<input type="checkbox"/>	Total of _____ forms are submitted.		

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING  
REJECTION OVER A PENDING "REFERENCE" APPLICATION**

Docket No.: GLOLP0108USAL  
In re Application of: Jeffery R. Parker  
Application No.: 11/548,330  
Filed: October 11, 2006  
For: LIGHT EMITTING PANEL ASSEMBLIES

The owner\*, **Solid State Opto Limited** of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending **reference** Application Numbers **11/504,204**, filed on **August 15, 2006**, and **11/504,203**, filed on **August 15, 2006** as such term is defined in 35 U.S.C. 154 and 173, and as the term of any patent granted on said **reference** applications may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** applications. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the **reference** applications are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.


In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of any patent granted on said **reference** applications, "as the term of any patent granted on said **reference** applications may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending **reference** applications", in the event that: any such patent: granted on the pending **reference** applications: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

Check either box 1 or 2 below, if appropriate.

1.  For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2.  The undersigned is an attorney or agent of record. **Reg. No. 22,125.**

  
\_\_\_\_\_  
Donald L. Otto

7/10/08  
\_\_\_\_\_  
Date

Telephone Number: 216-621-1113

- Terminal disclaimer fee under 37 CFR 1.20(d) is included.

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\* Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).  
Form PTO/SB/96 may be used for making this statement. See MPEP § 324.

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## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	11548330			
<b>Filing Date:</b>	11-Oct-2006			
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES			
First Named Inventor/Applicant Name:	Jeffery R. Parker			
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy			
<b>Attorney Docket Number:</b>	GLOLP0108USAL			
Filed as Large Entity				
<b>Utility Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
Post-Allowance-and-Post-Issuance:				
Statutory disclaimer	1814	1	130	130
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 2 months with \$0 paid	1252	1	460	460
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>590</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	3596667
<b>Application Number:</b>	11548330
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	10-JUL-2008
<b>Filing Date:</b>	11-OCT-2006
<b>Time Stamp:</b>	15:49:48
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 590
RAM confirmation Number	1043
Deposit Account	
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
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1		GLOLP0108USALreply.pdf	487682 820eb9e5bd1546ee0d96e0a17727dbc8 9636ad1f	yes	14
<b>Multipart Description/PDF files in .zip description</b>					
		<b>Document Description</b>	<b>Start</b>	<b>End</b>	
		Amendment - After Non-Final Rejection	1	1	
		Claims	2	8	
		Applicant Arguments/Remarks Made in an Amendment	9	14	
<b>Warnings:</b>					
<b>Information:</b>					
2	Extension of Time	GLOLP0108USALext.pdf	54952 79cc7e5d96ec30ca46e721d38878a87b f5e02a8e	no	1
<b>Warnings:</b>					
<b>Information:</b>					
3	Terminal Disclaimer Filed	GLOLP0108USALtd.pdf	59295 b012a64aa9225a8649704eb241a16c1 c9ad93e01	no	1
<b>Warnings:</b>					
<b>Information:</b>					
4	Fee Worksheet (PTO-06)	fee-info.pdf	8305 08e5cc6d8a113a7f5a71809fa9b69480 c1ef71e	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			610234		

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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11/548,330</b>	Filing Date <b>10/11/2006</b>	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	SMALL ENTITY <input type="checkbox"/>	OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =		X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>						
* If the difference in column 1 is less than zero, enter "0" in column 2.						
TOTAL					TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY				
	(Column 1)	(Column 2)	(Column 3)		SMALL ENTITY	OR	OTHER THAN SMALL ENTITY		
AMENDMENT	<b>07/10/2008</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(j))</small>	* 54	Minus	** 54	=	0	OR	X \$50=	0
	Independent <small>(37 CFR 1.16(h))</small>	* 3	Minus	***3	=	0	OR	X \$210=	0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>								
					TOTAL ADD'L FEE		TOTAL ADD'L FEE	<b>0</b>	

	(Column 1)	(Column 2)	(Column 3)		SMALL ENTITY	OR	OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total <small>(37 CFR 1.16(j))</small>	*	Minus	**	=		OR	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=		OR	X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>								
					TOTAL ADD'L FEE		TOTAL ADD'L FEE		

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:  
 /GAIL D. D. WOOTEN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/548,330	10/11/2006	Jeffery R. Parker	GLOLP0108USAL	5221
23908	7590	02/12/2008	EXAMINER	
RENNER OTTO BOISSELLE & SKLAR, LLP			SEMBER, THOMAS M	
1621 EUCLID AVENUE			ART UNIT	PAPER NUMBER
NINETEENTH FLOOR			2885	
CLEVELAND, OH 44115			MAIL DATE	DELIVERY MODE
			02/12/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 11/548,330	<b>Applicant(s)</b> PARKER, JEFFERY R.	
	<b>Examiner</b> Thomas M. Sember	<b>Art Unit</b> 2885	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 29 November 2007.
- 2a)  This action is **FINAL**.
- 2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-54 is/are pending in the application.
  - 4a) Of the above claim(s) 5, 7, 8, 21, 23, 24, 41, 45 and 47 is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-4, 6, 9-20, 22, 25-40, 42-44, 46 and 48-54 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some \*    c)  None of:
  - 1.  Certified copies of the priority documents have been received.
  - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 02/02/07.
- 4)  Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5)  Notice of Informal Patent Application
- 6)  Other: \_\_\_\_\_.



**DETAILED ACTION**

***/Thomas M Sember/***

***Primary Examiner, Art Unit 2885 Election/Restrictions***

1. Claims 5, 7-8, 21, 23-24, 41, 45 and 47 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species of figures 3 and 5, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 11/29/07. The applicant argued that the deformities of species of figures 4a-4c can also be used for the light deformities of the species of figures 3 and 5, species of figures 3-5 should be examined together. The examiner disagrees. The various type of deformities in illumination art is an extensive and burdensome search for the examiner and since applicant hasn't argued that such various deformities are not patentably distinct, the restriction stands.

***Double Patenting***

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-4, 6, 9-20, 22, 25-40 and 42-44 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3-6, 10, 13, 16, 18-21, 28 and 30-35 of copending Application No. 11/504,204; and claims 1, 4, 7, 9-14, 17, 22 and 24-36 of copending Application No. 11/504,203.

Although the conflicting claims are not identical, they are not patentably distinct from each other because applicant merely uses slightly different claim language to claim the same invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6, 9, 11-19, 22, 25, 27-39, 42-43, 46, 48 and 50-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Blanchet '507. Blanchet '507 discloses at least one light source, an optical panel member having at least one input edge for receiving light from a light source, the panel member having front and back sides and a

greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides are of a different type or shape than the light extracting deformities on or in the other side of the panel member.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 17, 19, 22 and 25-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Albinger, Jr. '947. Albinger, Jr. '947 discloses at least one light source 8 an optical panel member 1 having at least one input edge for receiving light from a light source 8, the panel member 1 having front and back sides and a greater cross sectional width than thickness, at least one of the sides having a pattern of light extracting deformities 10 that are projections or depressions on or in the at least one side to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in the at least one side has at least two different types or shapes of light extracting deformities 10 and at least one of the types

or shapes of deformities 10 varies along at east one of the length and width of the panel member.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 17-20, 22, 25, 27 and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Balchunas '570. Balchunas '570 discloses at least one light source 16 an optical panel member 1 having at least one input edge for receiving light from a light source, the panel member 1 having front and back sides and a greater cross sectional width than thickness, at least one of the sides having a pattern of light extracting deformities 17 that are projections or depressions on or in the at least one side to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities 17 on or in the at east one side has at least two different types or shapes of light extracting deformities 17 and at least one of the types or shapes of deformities varies along at east one of the length and width of the panel member 1.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Sember whose telephone number is 571-272-2381. The examiner can normally be reached on M-F 9 a.m.- 5.30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong Suk (James) Lee can be reached on 571-272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas M Sember /Thomas M  
Sember/  
Primary Examiner, Art Unit 2885

<b>Notice of References Cited</b>	Application/Control No. 11/548,330	Applicant(s)/Patent Under Reexamination PARKER, JEFFERY R.	
	Examiner Thomas M. Sember	Art Unit 2885	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A US-			
	B US-			
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			


**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U
	V
	W
	X

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Application Number</b> 	<b>Application/Control No.</b> 11/548,330	<b>Applicant(s)/Patent under Reexamination</b> PARKER, JEFFERY R.	
	<b>Examiner</b> Thomas M. Sember	<b>Art Unit</b> 2885	

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## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"3044947".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 16:57
L2	1	"3043947".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:00
L3	64	parker.in. and deformities.clm. and "362"/\$. ccls.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:14
L4	1	"3328570".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:20
L5	1	"3043947".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:22
L6	188	parker.in. and "362"/\$.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 17:49
L7	65	"4811507"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 17:59
L8	2	"4621306".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:06
L9	2	"4373282".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:06



L10	5	"3328570".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:07
L11	4	"3241256".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:07
L12	5	"3043947".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:08

2/ 6/ 2008 6:11:08 PM

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Docket No. GLOLP0108USAL**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of

Applicant: Jeffery R. Parker  
 Serial No.: 11/548,330  
 Filed: October 11, 2006  
 For: LIGHT EMITTING PANEL ASSEMBLIES  
 Art Unit:  
 Examiner:

**INFORMATION DISCLOSURE STATEMENT**

Mail Stop Amendment  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

1. Pursuant to 37 C.F.R. 1.97 and 1.98, and in compliance with 37 C.F.R. 1.56, the Office's attention is directed to the patents, pending applications, publications and other information listed on the attached PTO-1449. A copy of each listed document is enclosed, except for (a) those previously cited or submitted to the Office in the following application(s) upon which this application relies for an earlier filing date under 35 U.S.C. 120, and (b) any U.S. patent or U.S. patent application publication if the present application was filed after June 30, 2003 or entered the national stage under 35 USC § 371 after June 30, 2003:

Serial No.:	<u>10,784,527</u>	<u>09/256,275</u>	<u>08/778,089</u>	<u>08/495,176</u>
Filing Date:	<u>2/23/04</u>	<u>2/23/99</u>	<u>1/2/97</u>	<u>6/27/95</u>
Patent No.:		<u>6,712,481</u>	<u>6,079,838</u>	<u>5,613,751</u>

Regarding any document, publication or other information for which a date is not given on the attached PTO-1449, Applicant(s) believe(s) the same may qualify as "prior" art to this application and should be treated accordingly, although Applicant(s) reserve(s) the right to contest the prior art status of any document, publication or information, should issue arise.

2. Regarding each listed document that is not in the English language, an English-language translation accompanies this Statement as indicated on the attached PTO-1449 or a concise explanation of the relevance of the document is set forth in the following document(s):

- (a)  A copy of each English language version of a search report (or EPO Search Report) indicating the degree of relevance found by the foreign office of each document being submitted from the search report, is being submitted herewith or has previously been submitted.
- (b)  Attached is a "Concise Explanation of Relevance of Non-English Language Documents".

3. Pursuant to 37 C.F.R. 1.97(b) this Statement is being filed (one must be checked):

- (a)  Within 3 months of the filing date or date of entry into the National Stage.
- (b)  Before the mailing date of a first Office Action on the merits. If this Statement is not filed before the mailing date of a first Office Action on the merits, the required certification is given below or, in the absence thereof, the Office is authorized to charge the required fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988 for consideration of this Statement.
- (c)  Before the mailing date of a first Office Action on the merits after a first or second submission after final rejection under 37 C.F.R. 1.129(a).

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /TS/

- (d) \_\_\_ After the period set forth in 37 C.F.R. 1.97(b) but before the mailing date of either a final action or a notice of allowance.
  - (1) \_\_\_ The required certification is given below, or
  - (2) \_\_\_ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p) for consideration of this Statement, or
  - (3) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988
- (e) \_\_\_ After the mailing date of either a final action or a notice of allowance, but before payment of the issue fee. Petition hereby is made for consideration of this Statement and the required certification is indicated below.
  - (1) \_\_\_ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p), or
  - (2) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988.

4. Certification (if applicable)

- (a) \_\_\_ The undersigned hereby certifies that each item of information contained in this Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than 3 months prior to the filing of this Statement.
- (b) \_\_\_ The undersigned hereby certifies that no item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the undersigned's knowledge after making reasonable inquiry, no item of information contained in this statement was known to any individual designated in 37 C.F.R. 1.56(c) more than 3 months prior to the filing of this Statement.

5. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

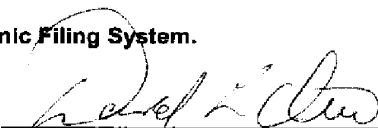
By   
 Donald L. Otto, Reg. No. 22,125

1621 Euclid Avenue, 19th Floor  
Cleveland, Ohio 44115  
(216) 621-1113

CERTIFICATE OF MAILING OR ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is \_\_\_ being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop \_\_, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.  
 \_\_\_X\_\_\_ being transmitted via the USPTO Electronic Filing System.

Date: February 2, 2007

  
 Donald L. Otto

Form PTO-1449 (Modified)  <b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)	Atty Docket No. <b>GLOLP0108USAL</b>	Serial No. <b>11/548,330</b>
	Applicant: <b>Jeffery R. Parker</b>	
	Filing Date <b>October 11, 2006</b>	Group

## U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	2,480,178	8/1949	Zinberg			
	3,043,947	7/1962	Albinger, Jr.			
	3,328,570	6/1967	Balchunas			
	3,241,256	3/1966	Viret et al			
	3,721,815	3/1973	Wall			
	3,752,974	8/1973	Baker et al			
	3,760,179	9/1973	Addington, Jr.			
	3,781,537	12/1973	Ramsey			
	3,892,959	7/1975	Pulles			
	3,958,113	5/1976	Termohlen			
	4,043,636	8/1977	Eberhardt et al			
	4,128,332	12/1978	Rowe			
	4,257,084	3/1981	Reynolds			
	4,277,817	7/1981	Hehr			
	4,323,951	4/1982	Pasco			
	4,373,282	2/1983	Wragg			
	4,446,508	5/1984	Kinzie			
	4,519,017	5/1985	Daniel			
	4,573,766	3/1986	Bournay, Jr. et al			
	4,630,895	12/1986	Abdala, Jr., et al			
	4,648,690	3/1987	Ohe			
	4,673,254	6/1987	Kato et al			
	4,677,531	6/1987	Szeles			
	4,714,983	12/1987	Lang			
	4,729,067	3/1988	Ohe			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /TS/

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	4,729,068	3/1988	Ohe			
	4,729,185	3/1988	Baba			
	4,751,615	6/1988	Abrams			
	4,761,047	8/1988	Mori			
	4,763,984	8/1988	Awai et al			
	4,765,701	8/1988	Cheslak			
	4,791,540	12/1988	Dreyer, Jr. et al			
	4,802,066	1/1989	Mori			
	4,811,507	3/1989	Blanchet			
	4,825,341	4/1989	Awai			
	4,890,201	12/1989	Joft			
	4,909,604	3/1990	Kobayashi et al			
	4,914,553	4/1990	Hamada et al			
	4,929,062	5/1990	Guzik et al			
	4,974,122	11/1990	Shaw			
	4,975,808	12/1990	Bond et al			
	4,978,952	12/1990	Irwin			
	4,985,809	1/1991	Matsui et al			
	5,005,108	4/1991	Pristash et al			
	5,027,258	6/1991	Schoniger et al			
	5,055,978	10/1991	Rogoff			
	5,070,431	12/1991	Kitazawa et al			
	5,093,765	3/1992	Kashima et al			
	5,134,549	7/1992	Yokoyama			
	5,136,483	8/1992	Schoniger et al			
	5,136,480	8/1992	Pristash et al			
	5,190,370	3/1993	Miller et al			
	5,207,493	5/1993	Murase et al			
	5,243,506	9/1993	Whitehead			
	5,262,928	11/1993	Kashima et al			
	5,283,673	2/1994	Murase et al			
	5,339,179	8/1994	Rudisill et al			
	5,349,593	9/1994	Blonde et al			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /TS/

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	5,375,043	12/1994	Tokunaga			
	5,377,084	12/1994	Kojima et al			
	5,390,085	2/1995	Mari-Roca et al			
	5,390,436	2/1995	Ashall			
	5,394,308	2/1995	Watanabe et al			
	5,467,208	11/1995	Kokawa et al			
	5,467,417	11/1995	Nakamura et al			
	5,477,423	12/1995	Fredriksz et al			
	5,479,275	12/1995	Abileah			
	5,485,291	1/1996	Qiao et al			
	5,600,455	2/1997	Ishikawa et al			
	5,613,751	3/1997	Parker et al			
	5,719,649	2/1998	Shono et al			
	5,947,578	9/1999	Ayres			
	5,999,685	12/1999	Goto et al			
	6,827,456	12/2004	Parker et al			

FOREIGN PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Country	Class	Sub-class	Translation	
						Yes	No

OTHER ART

Examiner Initial	Author, Title, Date, Pertinent Pages, etc.

EXAMINER /Thomas Sember/	DATE CONSIDERED 02/05/2008
--------------------------	----------------------------

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

**Information Disclosure Statement PTO-1449 (Modified)**

The identification of any reference is not intended to be, and should not be understood as being, an admission that such publication, in fact, constitutes "prior art" within the meaning of applicable law since, for example, a given reference may have a later effective date than first seems apparent or the reference may have an effective date which can be antedated. The "prior art" status of any reference is a matter to be resolved during prosecution.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /TS/

## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"3044947".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 16:57
L2	1	"3043947".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:00
L3	64	parker.in. and deformities.cfm. and "362"/\$. ccls.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:14
L4	1	"3328570".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:20
L5	1	"3043947".pn.	US-PGPUB; USPAT	OR	OFF	2008/02/06 17:22
L6	188	parker.in. and "362"/\$.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 17:49
L7	65	"4811507"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 17:59
L8	2	"4621306".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:06
L9	2	"4373282".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:06

L10	5	"3328570".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:07
L11	4	"3241256".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:07
L12	5	"3043947".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2008/02/06 18:08

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**Index of Claims**



**Application/Control No.**

11/548,330

**Applicant(s)/Patent under Reexamination**

PARKER, JEFFERY R.

**Examiner**

Thomas M. Sember

**Art Unit**

2885

√	<b>Rejected</b>
=	<b>Allowed</b>

—	<b>(Through numeral) Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

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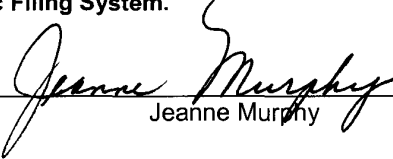
CERTIFICATE OF MAILING OR ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is

\_\_\_\_\_ being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop \_\_, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

being transmitted via the USPTO Electronic Filing System.

Date: November 29, 2007

  
\_\_\_\_\_  
Jeanne Murphy

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Attorney Docket GLOLP0108USAL

In re PATENT application of

Jeffery R. Parker

Serial No. 11/548,330

Confirmation No. 5221

Filed October 11, 2006

For: LIGHT EMITTING PANEL ASSEMBLIES

Art Unit 2885

Thomas M. Sember, Primary Examiner

**REPLY TO OFFICE ACTION OF OCTOBER 30, 2007**

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Sir:

In reply to the Office Action of October 30, 2007, applicant hereby elects the species of Figs. 3 and 5, on which claims 1-4, 6, 9-20, 22, 25-40, 42-44, 46 and 48-54 read.

## REMARKS/ARGUMENTS

Claims 1-54 are pending in the application.

According to the Examiner, this application contains claims directed to the following patentably distinct species: the species of Figure 1, the species of Figure 2, the species of Figures 3 and 5, the species of Figure 4a, the species of Figure 4b, the species of Figure 4c, the species of Figure 6, the species of Figure 7, the species of Figure 8, the species of Figure 9, the species of Figures 10-11a, the species of Figures 11-13, and the species of Figures 14-15.

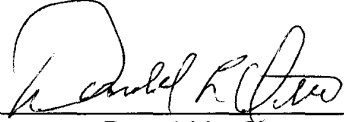
In response to this election of species requirement, applicant has elected the species of Figures 3 and 5, on which claims 1-4, 6, 9-20, 22, 25-40, 42-44, 46 and 48-54 read.

Claims 5, 7, 8, 21, 23, 24, 41, 45 and 47 read on the light extracting deformities shown in Figs. 4a-4c and are withdrawn from consideration. However, these light extracting deformities are applicable to all of the light emitting panel assemblies in this application, including the panel assembly of the elected species of Figs. 3 and 5. Accordingly, examination of claims 5, 7, 8, 21, 23, 24, 41, 45 and 47 is also respectfully requested.

In the event an extension of time is necessary, this should be considered a petition for such an extension. If required, fees are enclosed for the extension of time and/or the presentation of new and/or amended claims. In the event any additional fees are due in connection with the filing of this reply, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 (Attorney Docket GLOLP0108USAL).

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By   
Donald L. Otto  
Registration No. 22,125

1621 Euclid Avenue  
Nineteenth Floor  
Cleveland, Ohio 44115-2191  
Telephone: 216-621-1113  
Facsimile: 216-621-6165  
E-mail: [dotto@rennerotto.com](mailto:dotto@rennerotto.com)

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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	2525955
<b>Application Number:</b>	11548330
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	29-NOV-2007
<b>Filing Date:</b>	11-OCT-2006
<b>Time Stamp:</b>	16:08:30
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	GLOLP0108USALreply.pdf	69864 2116638c31ef9939d567a4baef8de5358a4d39f	no	3

### Warnings:

### Information:

Total Files Size (in bytes):

69864

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/548,330	10/11/2006	Jeffery R. Parker	GLOLP0108USAL	5221
23908	7590	10/30/2007	EXAMINER	
RENNER OTTO BOISSELLE & SKLAR, LLP			SEMBER, THOMAS M	
1621 EUCLID AVENUE			ART UNIT	
NINETEENTH FLOOR			PAPER NUMBER	
CLEVELAND, OH 44115			2885	
			MAIL DATE	
			DELIVERY MODE	
			10/30/2007	
			PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.





**DETAILED ACTION**

***Election/Restrictions***

1. This application contains claims directed to the following patentably distinct species: The species of figure 1, the species of figure 2, the species of figures 3 and 5, the species of figure 4a, the species of figure 4b, the species of figure 4c, the species of, the species of figure 6, the species of figure 7, the species of figure 8, the species of figure 9, the species of figures 10-11a, the species of figures 12-13, the species of figures 14-15. The species are independent or distinct because they claim patently distinct features from each of the other species.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claims are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species.

MPEP § 809.02(a).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

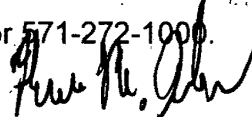
The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Sember whose telephone number is 571-272-2381. The examiner can normally be reached on M-F 9 a.m. - 5.30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong Suk (James) Lee can be reached on 571-272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Thomas M Sember  
Primary Examiner  
Art Unit 2885

**Index of Claims**



Application/Control No.

11/548,330

Examiner

Thomas M. Sember

Applicant(s)/Patent under Reexamination

PARKER, JEFFERY R.

Art Unit

2885

√	Rejected
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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/548,330	10/11/2006	Jeffery R. Parker	GLOLP0108USAL

**CONFIRMATION NO. 5221**

23908  
RENNER OTTO BOISSELLE & SKLAR, LLP  
1621 EUCLID AVENUE  
NINETEENTH FLOOR  
CLEVELAND, OH44115

**Title:** LIGHT EMITTING PANEL ASSEMBLIES

**Publication No.** US-2007-0153549-A1

**Publication Date:** 07/05/2007

### NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at [www.uspto.gov](http://www.uspto.gov). The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

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In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at [www.uspto.gov](http://www.uspto.gov) using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 703-305-3028.

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Pre-Grant Publication Division, 703-605-4283

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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY.DOCKET.NO, TOT CLAIMS, IND CLAIMS. Row 1: 11/548,330, 10/11/2006, 2875, 2700, GLOLP0108USAL, 54, 3

CONFIRMATION NO. 5221

23908
RENNER OTTO BOISSELLE & SKLAR, LLP
1621 EUCLID AVENUE
NINETEENTH FLOOR
CLEVELAND, OH44115

UPDATED FILING RECEIPT

Date Mailed: 03/23/2007

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

Applicant(s)

Jeffery R. Parker, Richfield, OH;

Assignment For Published Patent Application

Solid State Opto Limited, Road Town, VIRGIN ISLANDS, BRITISH

Power of Attorney:

Donald Otto--22125

Domestic Priority data as claimed by applicant

This application is a DIV of 10/784,527 02/23/2004 PAT 7,160,015
which is a DIV of 09/256,275 02/23/1999 PAT 6,712,481
which is a CIP of 08/778,089 01/02/1997 PAT 6,079,838
which is a DIV of 08/495,176 06/27/1995 PAT 5,613,751

Foreign Applications

If Required, Foreign Filing License Granted: 03/08/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US11/548,330

Projected Publication Date: 07/05/2007

Non-Publication Request: No

Early Publication Request: No

**Title**

LIGHT EMITTING PANEL ASSEMBLIES

**Preliminary Class**

362

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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**NOT GRANTED**

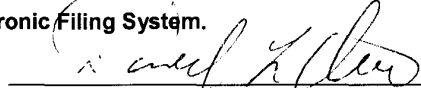
No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

CERTIFICATE OF MAILING OR ELECTRONIC TRANSMISSION

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is \_\_\_\_\_ being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop \_\_\_\_\_, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

being transmitted via the USPTO Electronic Filing System.

Date: March 14, 2007

  
\_\_\_\_\_  
Donald L. Otto

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Attorney Docket GLOLP0108USAL

In re PATENT application of

Jeffery R. Parker

Serial No. 11/548,330

Filed October 11, 2006

For: LIGHT EMITTING PANEL ASSEMBLIES

Art Unit 2875

Confirmation No. 5221

**RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

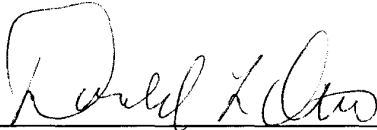
The Notice to File Corrected Application Papers mailed March 9, 2007 states that the drawings submitted in the above-identified application are not acceptable because the drawings have a line quality that is too light to be reproduced.

Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are submitted herewith.

In the event any fees are due in connection with the filing of these replacement drawings, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By  \_\_\_\_\_

Donald L. Otto  
Registration No. 22,125

1621 Euclid Avenue  
Nineteenth Floor  
Cleveland, Ohio 44115-2191  
Telephone: 216.621.1113  
Facsimile: 216.621.6165

Z:\SEC177\GLOLP108USAL\RESP TO NOTICE TO FILE CORRECTED PAPERS.doc

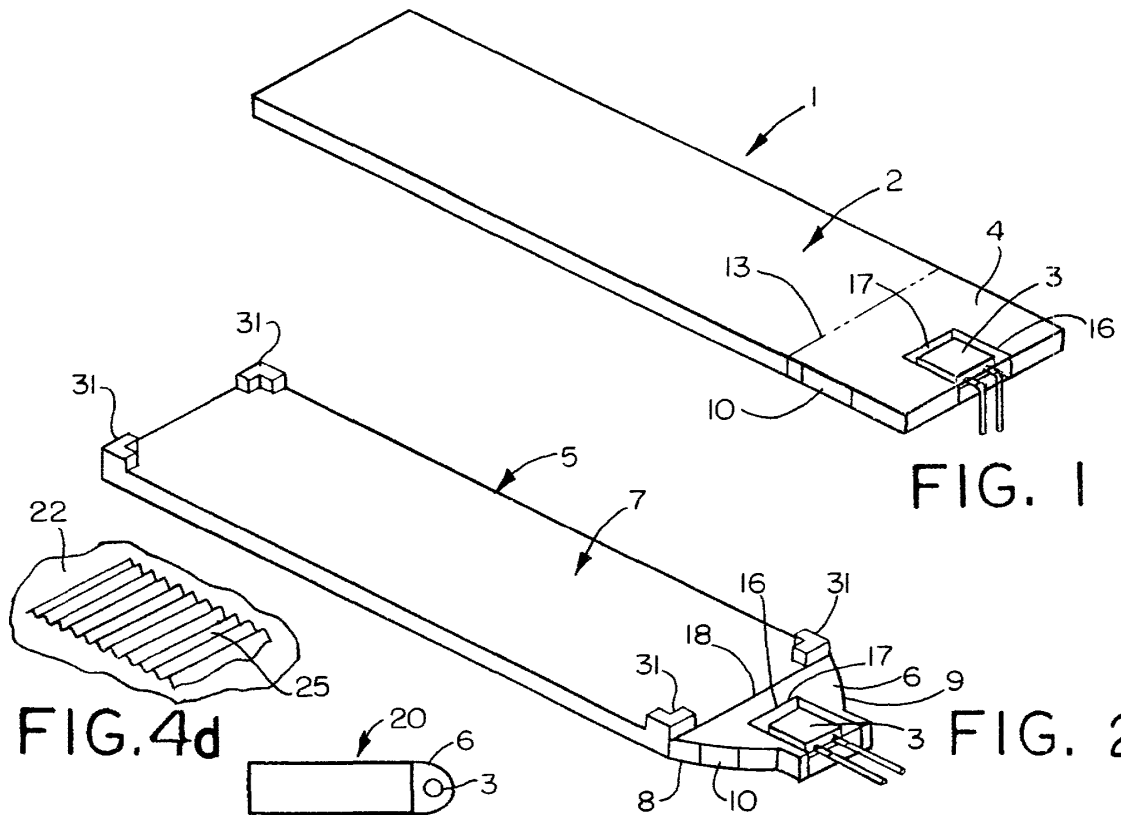


FIG. 1

FIG. 2

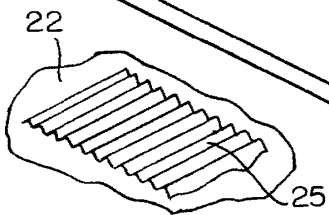


FIG. 4d

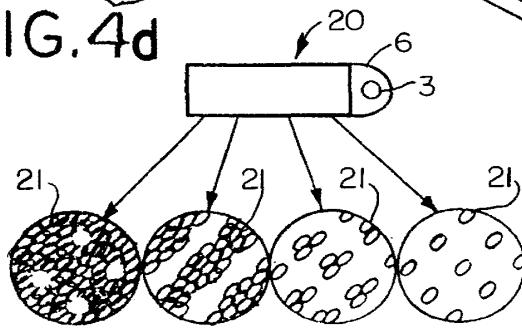


FIG. 4a

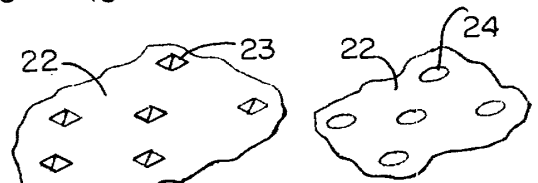


FIG. 4b

FIG. 4c

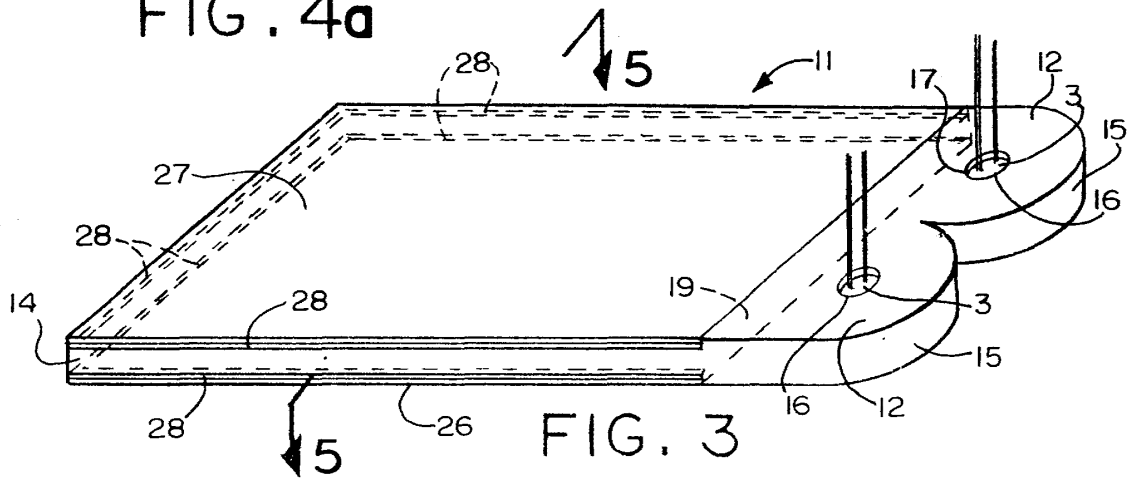
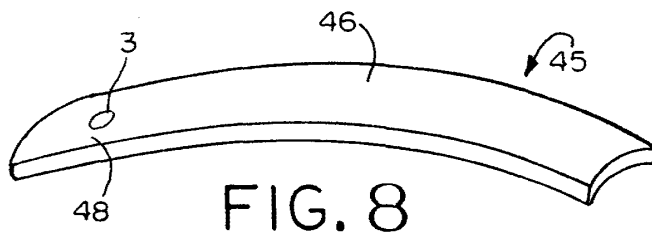
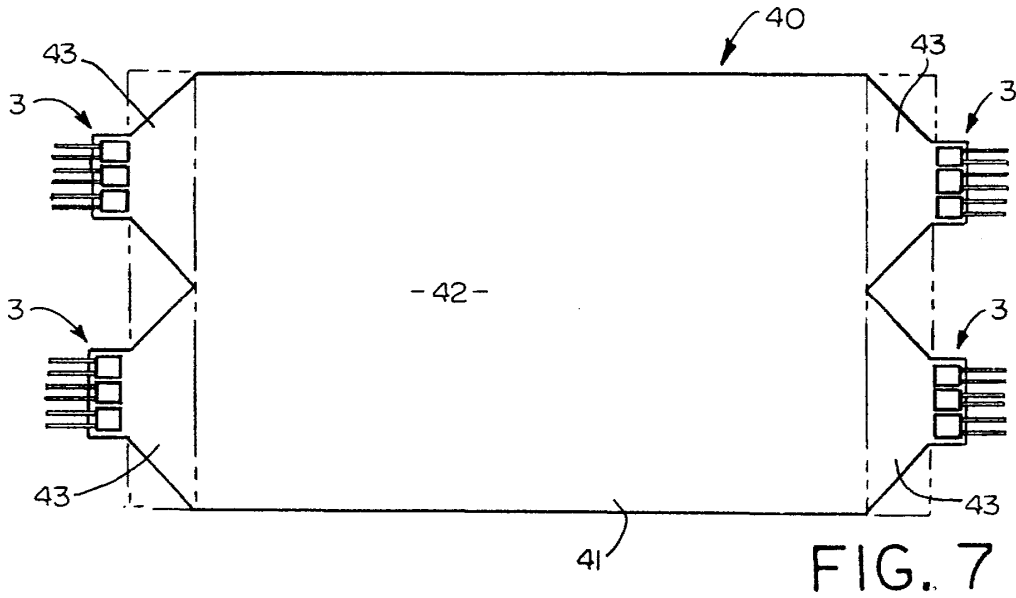
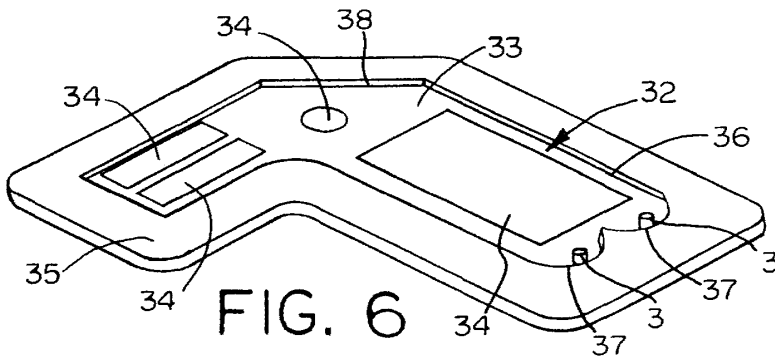
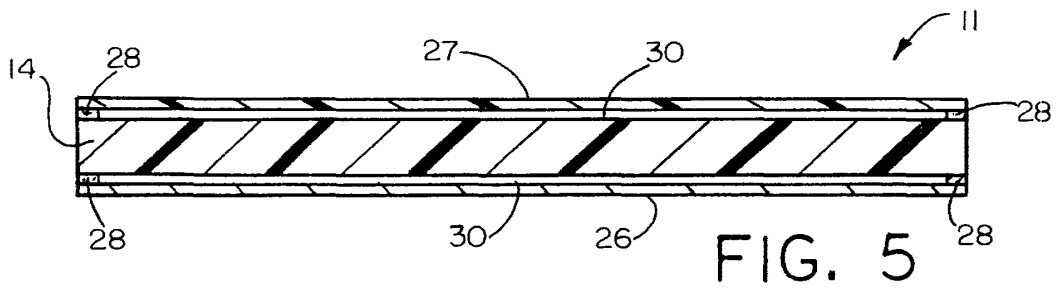


FIG. 3



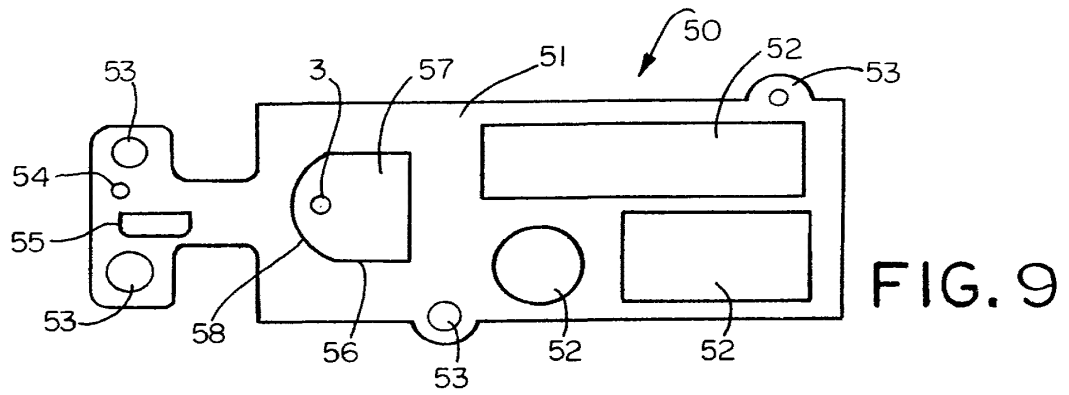


FIG. 9

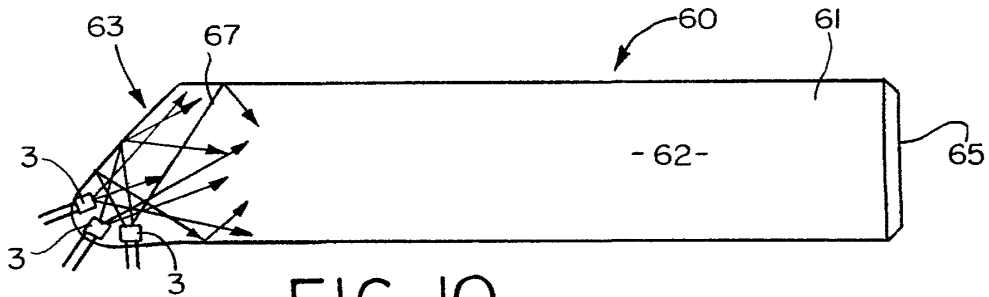


FIG. 10

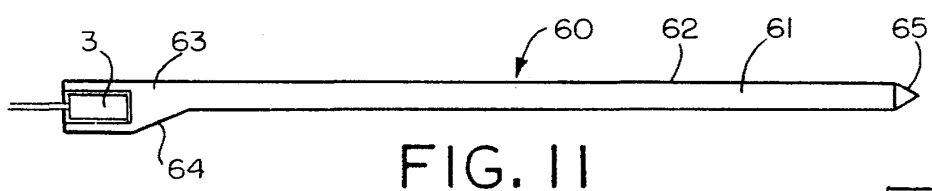


FIG. 11

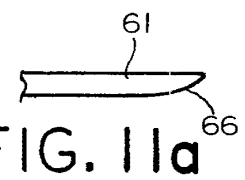


FIG. 11a

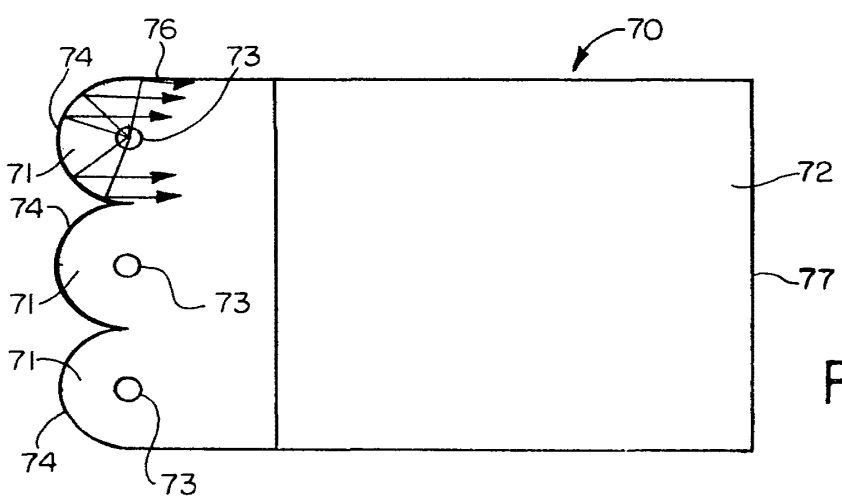
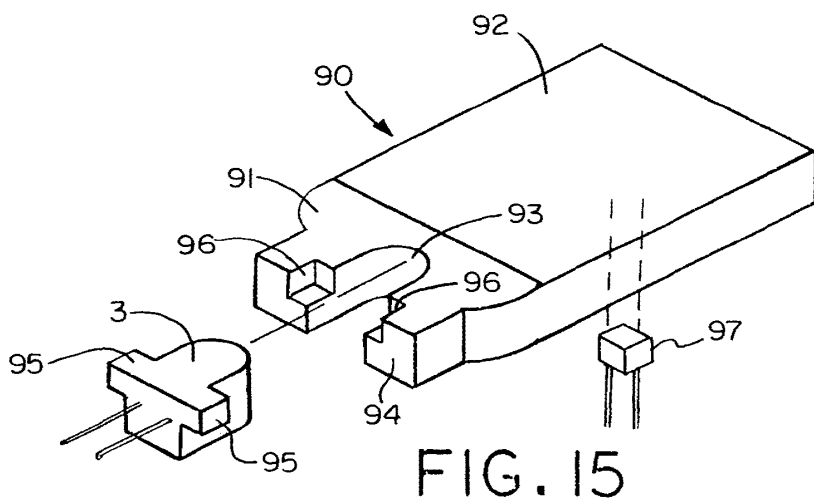
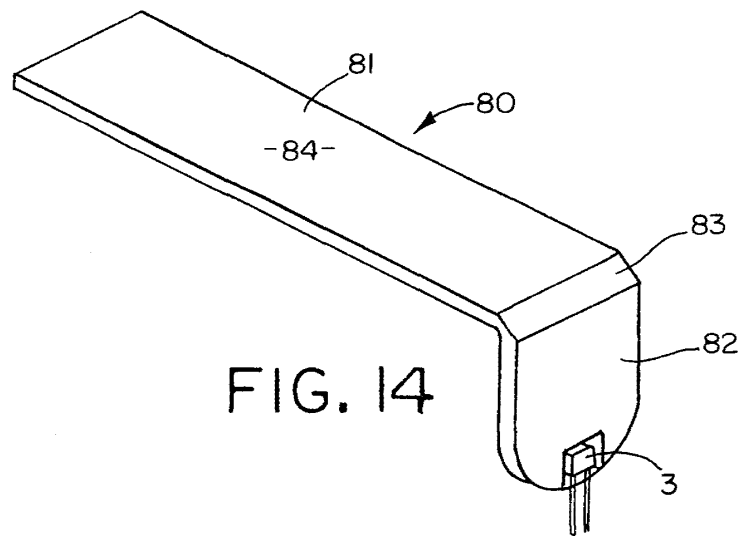
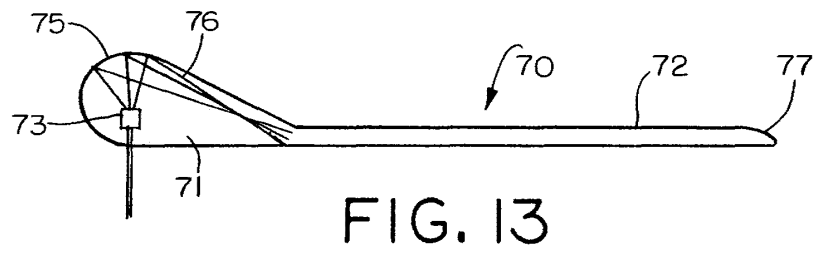


FIG. 12



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	1592348
<b>Application Number:</b>	11548330
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	14-MAR-2007
<b>Filing Date:</b>	11-OCT-2006
<b>Time Stamp:</b>	16:13:48
<b>Application Type:</b>	Utility

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	GLOLP108USAL_response.pdf	40961	no	2

### Warnings:



Information:					
2	Drawings	GLOLP0108USAL_drawings.pdf	88107	no	4
Warnings:					
Information:					
Total Files Size (in bytes):			129068		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/548,330	10/11/2006	Jeffery R. Parker	GLOLP0108USAL

23908  
RENNER OTTO BOISSELLE & SKLAR, LLP  
1621 EUCLID AVENUE  
NINETEENTH FLOOR  
CLEVELAND, OH 44115

CONFIRMATION NO. 5221  
FORMALITIES  
LETTER

Date Mailed: 03/09/2007

**NOTICE TO FILE CORRECTED APPLICATION PAPERS**

***Filing Date Granted***

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - The drawings have a line quality that is too light to be reproduced (weight of all lines and letters must be heavy enough to permit adequate reproduction) or text that is illegible (reference characters, sheet numbers, and view numbers must be plain and legible) see 37 CFR 1.84(l) and (p)(1)); See Figure(s) 3,12.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies should be mailed to: Mail Stop Missing Parts  
Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

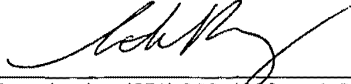
Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.  
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

SONY\_000190

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*If you are not using EFS-Web to submit your reply, you must include a copy of this notice.*

A handwritten signature in black ink, appearing to be "L. H. King", written over a horizontal line.

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199  
PART 3 - OFFICE COPY



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET.NO	TOT CLAIMS	IND CLAIMS
11/548,330	10/11/2006	2875	2700	GLOLP0108USAL	54	3

CONFIRMATION NO. 5221

23908  
RENNER OTTO BOISSELLE & SKLAR, LLP  
1621 EUCLID AVENUE  
NINETEENTH FLOOR  
CLEVELAND, OH44115

FILING RECEIPT

Date Mailed: 03/09/2007

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

**Applicant(s)**

Jeffery R. Parker, Richfield, OH;

**Assignment For Published Patent Application**

Solid State Opto Limited, Road Town, VIRGIN ISLANDS, BRITISH

**Power of Attorney:**

Donald Otto--22125

**Domestic Priority data as claimed by applicant**

This application is a DIV of 10/784,527 02/23/2004 PAT 7,160,015  
which is a DIV of 09/256,275 02/23/1999 PAT 6,712,481  
which is a CIP of 08/778,089 01/02/1997 PAT 6,079,838  
which is a DIV of 08/495,176 06/27/1995 PAT 5,613,751

**Foreign Applications**

**If Required, Foreign Filing License Granted: 03/08/2007**

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/548,330**

**Projected Publication Date:** To Be Determined - pending completion of Corrected Papers

**Non-Publication Request:** No

**Early Publication Request:** No

SONY\_000192

**Title**

LIGHT EMITTING PANEL ASSEMBLIES

**Preliminary Class**

362

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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**LICENSE FOR FOREIGN FILING UNDER****Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under

37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

**NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of

Applicant: Jeffery R. Parker  
Serial No.: 11/548,330  
Filed: October 11, 2006  
For: LIGHT EMITTING PANEL ASSEMBLIES  
Art Unit:  
Examiner:

**INFORMATION DISCLOSURE STATEMENT**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

1. Pursuant to 37 C.F.R. 1.97 and 1.98, and in compliance with 37 C.F.R. 1.56, the Office's attention is directed to the patents, pending applications, publications and other information listed on the attached PTO-1449. A copy of each listed document is enclosed, except for (a) those previously cited or submitted to the Office in the following application(s) upon which this application relies for an earlier filing date under 35 U.S.C. 120, and (b) any U.S. patent or U.S. patent application publication if the present application was filed after June 30, 2003 or entered the national stage under 35 USC § 371 after June 30, 2003:

Serial No.:	<u>10,784,527</u>	<u>09/256,275</u>	<u>08/778,089</u>	<u>08/495,176</u>
Filing Date:	<u>2/23/04</u>	<u>2/23/99</u>	<u>1/2/97</u>	<u>6/27/95</u>
Patent No.:		<u>6,712,481</u>	<u>6,079,838</u>	<u>5,613,751</u>

Regarding any document, publication or other information for which a date is not given on the attached PTO-1449, Applicant(s) believe(s) the same may qualify as "prior" art to this application and should be treated accordingly, although Applicant(s) reserve(s) the right to contest the prior art status of any document, publication or information, should issue arise.

2. Regarding each listed document that is not in the English language, an English-language translation accompanies this Statement as indicated on the attached PTO-1449 or a concise explanation of the relevance of the document is set forth in the following document(s):

- (a) \_\_\_ A copy of each English language version of a search report (or EPO Search Report) indicating the degree of relevance found by the foreign office of each document being submitted from the search report, is being submitted herewith or has previously been submitted.
- (b) \_\_\_ Attached is a "Concise Explanation of Relevance of Non-English Language Documents".

3. Pursuant to 37 C.F.R. 1.97(b) this Statement is being filed (one must be checked):

- (a) \_\_\_ Within 3 months of the filing date or date of entry into the National Stage.
- (b) X Before the mailing date of a first Office Action on the merits. If this Statement is not filed before the mailing date of a first Office Action on the merits, the required certification is given below or, in the absence thereof, the Office is authorized to charge the required fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988 for consideration of this Statement.
- (c) \_\_\_ Before the mailing date of a first Office Action on the merits after a first or second submission after final rejection under 37 C.F.R. 1.129(a).

- (d) \_\_\_ After the period set forth in 37 C.F.R. 1.97(b) but before the mailing date of either a final action or a notice of allowance.
- (1) \_\_\_ The required certification is given below, or
- (2) \_\_\_ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p) for consideration of this Statement, or
- (3) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988
- (e) \_\_\_ After the mailing date of either a final action or a notice of allowance, but before payment of the issue fee. Petition hereby is made for consideration of this Statement and the required certification is indicated below.
- (1) \_\_\_ Enclosed is a check covering the fee set forth in 37 C.F.R. 1.17(p), or
- (2) \_\_\_ Charge the fee set forth in 37 C.F.R. 1.17(p) to Deposit Account No. 18-0988.

4. Certification (if applicable)

- (a) \_\_\_ The undersigned hereby certifies that each item of information contained in this Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than 3 months prior to the filing of this Statement.
- (b) \_\_\_ The undersigned hereby certifies that no item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the undersigned's knowledge after making reasonable inquiry, no item of information contained in this statement was known to any individual designated in 37 C.F.R. 1.56(c) more than 3 months prior to the filing of this Statement.

5. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 18-0988.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By   
Donald L. Otto, Reg. No. 22,125

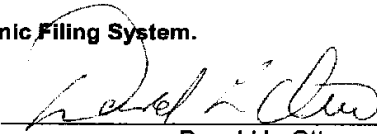
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Cleveland, Ohio 44115  
(216) 621-1113

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being transmitted via the USPTO Electronic Filing System.

Date: February 2, 2007

  
Donald L. Otto



Form PTO-1449 (Modified)  <b>LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT</b>  (Use several sheets if necessary)	Atty Docket No. <b>GLOLP0108USAL</b>	Serial No. <b>11/548,330</b>
	Applicant: <b>Jeffery R. Parker</b>	
	Filing Date <b>October 11, 2006</b>	Group

## U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	2,480,178	8/1949	Zinberg			
	3,043,947	7/1962	Albinger, Jr.			
	3,328,570	6/1967	Balchunas			
	3,241,256	3/1966	Viret et al			
	3,721,815	3/1973	Wall			
	3,752,974	8/1973	Baker et al			
	3,760,179	9/1973	Addington, Jr.			
	3,781,537	12/1973	Ramsey			
	3,892,959	7/1975	Pulles			
	3,958,113	5/1976	Termohlen			
	4,043,636	8/1977	Eberhardt et al			
	4,128,332	12/1978	Rowe			
	4,257,084	3/1981	Reynolds			
	4,277,817	7/1981	Hehr			
	4,323,951	4/1982	Pasco			
	4,373,282	2/1983	Wragg			
	4,446,508	5/1984	Kinzie			
	4,519,017	5/1985	Daniel			
	4,573,766	3/1986	Bournay, Jr. et al			
	4,630,895	12/1986	Abdala, Jr., et al			
	4,648,690	3/1987	Ohe			
	4,673,254	6/1987	Kato et al			
	4,677,531	6/1987	Szeles			
	4,714,983	12/1987	Lang			
	4,729,067	3/1988	Ohe			

Examiner Initial	Document Number	Date (MM/YYYY)	Name	Class	Sub-class	Filing Date if Appropriate
	4,729,068	3/1988	Ohe			
	4,729,185	3/1988	Baba			
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OTHER ART

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EXAMINER	DATE CONSIDERED

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**Information Disclosure Statement PTO-1449 (Modified)**

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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	1486459
<b>Application Number:</b>	11548330
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor/Applicant Name:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	02-FEB-2007
<b>Filing Date:</b>	
<b>Time Stamp:</b>	13:07:36
<b>Application Type:</b>	Utility

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed	GLOLP0108USAL-ids.pdf	228075	no	5

### Warnings:

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**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

TITLE: **LIGHT EMITTING PANEL ASSEMBLIES**

5

**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a division of U.S. Patent Application No. 10/784,527, filed February 23, 2004, which is a division of U.S. Patent Application No. 09/256,275, filed February 23, 1999, now U.S. Patent No. 6,712,481, dated  
10 March 30, 2004, which is a continuation-in-part of U.S. Patent Application No. 08/778,089, filed January 2, 1997, now U.S. Patent No. 6,079,838, dated June 27, 2000, which is a division of U.S. Patent Application No. 08/495,176, filed June 27, 1995, now U.S. Patent No. 5,613,751, dated March 25, 1997.

15

**BACKGROUND OF THE INVENTION**

This invention relates generally, as indicated, to light emitting panel assemblies each including a transparent panel member for efficiently conducting light, and controlling the light conducted by the panel member to be emitted from one or more light output areas along the length thereof.

20

Light emitting panel assemblies are generally known. However, the present invention relates to several different light emitting panel assembly configurations which provide for better control of the light output from the panel assemblies and for more efficient utilization of light, which results in greater light output from the panel assemblies.

25

**SUMMARY OF THE INVENTION**

In accordance with one aspect of the invention, the light emitting panel assemblies include a light emitting panel member having a light transition area in which at least one light source is suitably mounted for transmission of light to the  
30 light input surface of the panel member.

35

In accordance with another aspect of the invention, the light source is desirably embedded, potted or bonded to the light transition area to eliminate any air gaps, decrease surface reflections and/or eliminate any lens effect between the light source and light transition area, thereby reducing light loss and increasing the light output from the panel assembly.

In accordance with another aspect of the invention, the panel assemblies may include reflective or refractive surfaces for changing the path of a portion of the light, emitted from the light source, that would not normally enter the panel members at an acceptable angle that allows the light to remain in the panel members for a longer period of time and/or increase the efficiency of the panel members.

In accordance with another aspect of the invention, the light emitting panel members include a pattern of light extracting deformities or disruptions which provide a desired light output distribution from the panel members by changing the angle of refraction of a portion of the light from one or more light output areas of the panel members.

In accordance with still another aspect of the invention, the light source may include multiple colored light sources for supplying light to one or more light output areas, and for providing a colored or white light output distribution.

In accordance with yet another aspect of the invention, the panel assemblies include a transition area for mixing the multiple colored lights, prior to the light entering the panel members, in order to effect a desired colored or white light output distribution.

The various light emitting panel assemblies of the present invention are very efficient panel assemblies that may be used to produce increased uniformity and higher light output from the panel members with lower power requirements, and allow the panel members to be made thinner and/or longer, and/or of various shapes and sizes.

To the accomplishment of the foregoing and related ends, the invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but several of the various ways in which the principles of the invention may be employed.

30

## BRIEF DESCRIPTION OF THE DRAWINGS

In the annexed drawings:

Figs. 1 through 3 are schematic perspective views of three different forms of light emitting panel assemblies in accordance with this invention;

5 Fig. 4a is an enlarged plan view of a portion of a light output area of a panel assembly showing one form of pattern of light extracting deformities on the light output area;

Figs. 4b, c and d are enlarged schematic perspective views of a portion of a light output area of a panel assembly showing other forms of light extracting  
10 deformities formed in or on the light output area;

Fig. 5 is an enlarged transverse section through the light emitting panel assembly of Fig. 3 taken generally on the plane of the line 5-5 thereof;

Fig. 6 is a schematic perspective view of another form of light emitting panel assembly in accordance with this invention;

15 Fig. 7 is a schematic top plan view of another form of light emitting panel assembly in accordance with this invention;

Fig. 8 is a schematic perspective view of another form of light emitting panel assembly in accordance with this invention;

20 Fig. 9 is a schematic top plan view of another form of light emitting panel assembly in accordance with this invention;

Fig. 10 is a schematic top plan view of still another form of light emitting panel assembly in accordance with this invention;

Fig. 11 is a side elevation view of the light emitting panel assembly of Fig. 10;

25 Fig. 11a is a fragmentary side elevation view showing a tapered or rounded end on the panel member in place of the prismatic surface shown in Figs. 10 and 11;

Fig. 12 is a schematic top plan view of another form of light emitting panel assembly in accordance with this invention;

30 Fig. 13 is a schematic side elevation view of the light emitting panel assembly of Fig. 12; and

Figs. 14 and 15 are schematic perspective views of still other forms of light emitting panel assemblies in accordance with this invention.



## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now in detail to the drawings, and initially to Fig. 1, there is schematically shown one form of light emitting panel assembly 1 in accordance with this invention including a transparent light emitting panel 2 and one or more  
5 light sources 3 which emit light in a predetermined pattern in a light transition member or area 4 used to make the transition from the light source 3 to the light emitting panel 2, as well known in the art. The light that is transmitted by the light transition area 4 to the transparent light emitting panel 2 may be emitted along  
10 the entire length of the panel or from one or more light output areas along the length of the panel as desired to produce a desired light output distribution to fit a particular application.

In Fig. 1 the light transition area 4 is shown as an integral extension of one end of the light emitting panel 2 and as being generally rectangular in shape. However, the light transition area may be of other shapes suitable for embedding,  
15 potting, bonding or otherwise mounting the light source. Also, reflective or refractive surfaces may be provided to increase efficiency. Moreover, the light transition area 4 may be a separate piece suitably attached to the light input surface 13 of the panel member if desired. Also, the sides of the light transition  
20 area may be curved to more efficiently reflect or refract a portion of the light emitted from the light source through the light emitting panel at an acceptable angle.

Fig. 2 shows another form of light emitting panel assembly 5 in accordance with this invention including a panel light transition area 6 at one end of the light emitting panel 7 with sides 8, 9 around and behind the light source 3  
25 shaped to more efficiently reflect and/or refract and focus the light emitted from the light source 3 that impinges on these surfaces back through the light transition area 6 at an acceptable angle for entering the light input surface 18 at one end of the light emitting panel 7. Also, a suitable reflective material or coating 10 may be provided on the portions of the sides of the light transition  
30 areas of the panel assemblies of Figs. 1 and 2 on which a portion of the light impinges for maximizing the amount of light or otherwise changing the light that is reflected back through the light transition areas and into the light emitting panels.

The panel assemblies shown in Figs. 1 and 2 include a single light source 3, whereas Fig. 3 shows another light emitting panel assembly 11 in accordance with this invention including two light sources 3. Of course, it will be appreciated that the panel assemblies of the present invention may be provided with any  
5 number of light sources as desired, depending on the particular application.

The panel assembly 11 of Fig. 3 includes a light transition area 12 at one end of the light emitting panel 14 having reflective and/or refractive surfaces 15 around and behind each light source 3. These surfaces 15 may be appropriately shaped including for example curved, straight and/or faceted surfaces, and if  
10 desired, suitable reflective materials or coatings may be provided on portions of these surfaces to more efficiently reflect and/or refract and focus a portion of the light emitted for example from an incandescent light source which emits light in a 360° pattern through the light transition areas 12 into the light input surface 19 of the light emitting panel 14.

The light sources 3 may be mechanically held in any suitable manner in slots, cavities or openings 16 machined, molded or otherwise formed in the light transition areas of the panel assemblies. However, preferably the light sources 3 are embedded, potted or bonded in the light transition areas in order to eliminate any air gaps or air interface surfaces between the light sources and surrounding  
20 light transition areas, thereby reducing light loss and increasing the light output emitted by the light emitting panels. Such mounting of the light sources may be accomplished, for example, by bonding the light sources 3 in the slots, cavities or openings 16 in the light transition areas using a sufficient quantity of a suitable embedding, potting or bonding material 17. The slots, cavities or openings 16  
25 may be on the top, bottom, sides or back of the light transition areas. Bonding can also be accomplished by a variety of methods that do not incorporate extra material, for example, thermal bonding, heat staking, ultrasonic or plastic welding or the like. Other methods of bonding include insert molding and casting around the light source(s).

30 A transparent light emitting material of any suitable type, for example acrylic or polycarbonate, may be used for the light emitting panels. Also, the panels may be substantially flat, or curved, may be a single layer or multi-layers, and may have different thicknesses and shapes. Moreover, the panels may be

flexible, or rigid, and may be made out of a variety of compounds. Further, the panels may be hollow, filled with liquid, air, or be solid, and may have holes or ridges in the panels.

Each light source 3 may also be of any suitable type including, for  
5 example, any of the types disclosed in U.S. Patent Nos. 4,897,771 and  
5,005,108, assigned to the same assignee as the present application, the entire  
disclosures of which are incorporated herein by reference. In particular, the light  
sources 3 may be an arc lamp, an incandescent bulb which also may be colored,  
filtered or painted, a lens end bulb, a line light, a halogen lamp, a light emitting  
10 diode (LED), a chip from an LED, a neon bulb, a fluorescent tube, a fiber optic  
light pipe transmitting from a remote source, a laser or laser diode, or any other  
suitable light source. Additionally, the light sources 3 may be a multiple colored  
LED, or a combination of multiple colored radiation sources in order to provide a  
desired colored or white light output distribution. For example, a plurality of  
15 colored lights such as LEDs of different colors (red, blue, green) or a single LED  
with multiple colored chips may be employed to create white light or any other  
colored light output distribution by varying the intensities of each individual  
colored light.

A pattern of light extracting deformities or disruptions may be provided on  
20 one or both sides of the panel members or on one or more selected areas on one  
or both sides of the panel members, as desired. Fig. 4a schematically shows one  
such light surface area 20 on which a pattern of light extracting deformities or  
disruptions 21 is provided. As used herein, the term deformities or disruptions  
are used interchangeably to mean any change in the shape or geometry of the  
25 panel surface and/or coating or surface treatment that causes a portion of the  
light to be emitted. The pattern of light extracting deformities 21 shown in Fig. 4a  
includes a variable pattern which breaks up the light rays such that the internal  
angle of reflection of a portion of the light rays will be great enough to cause the  
light rays either to be emitted out of the panel through the side or sides on which  
30 the light extracting deformities 21 are provided or reflected back through the  
panel and emitted out the other side.

These deformities or disruptions 21 can be produced in a variety of  
manners, for example, by providing a painted pattern, an etched pattern, a

machined pattern, a printed pattern, a hot stamped pattern, or a molded pattern or the like on selected light output areas of the panel members. An ink or printed pattern may be applied for example by pad printing, silk screening, ink jet, heat transfer film process or the like. The deformities may also be printed on a sheet or film which is used to apply the deformities to the panel member. This sheet or film may become a permanent part of the light panel assembly for example by attaching or otherwise positioning the sheet or film against one or both sides of the panel member similar to the sheet or film 27 shown in Figs. 3 and 5 in order to produce a desired effect.

By varying the density, opaqueness or translucence, shape, depth, color, area, index of refraction, or type of deformities 21 on an area or areas of the panels, the light output of the panels can be controlled. The deformities or disruptions may be used to control the percent of light emitted from any area of the panels. For example, less and/or smaller size deformities 21 may be placed on panel areas where less light output is wanted. Conversely, a greater percentage of and/or larger deformities may be placed on areas of the panels where greater light output is desired.

Varying the percentages and/or size of deformities in different areas of the panel is necessary in order to provide a uniform light output distribution. For example, the amount of light traveling through the panels will ordinarily be greater in areas closer to the light source than in other areas further removed from the light source. A pattern of light extracting deformities 21 may be used to adjust for the light variances within the panel members, for example, by providing a denser concentration of light extracting deformities with increased distance from the light source 3 thereby resulting in a more uniform light output distribution from the light emitting panels.

The deformities 21 may also be used to control the output ray angle distribution of the emitted light to suit a particular application. For example, if the panel assemblies are used to provide a liquid crystal display backlight, the light output will be more efficient if the deformities 21 cause the light rays to emit from the panels at predetermined ray angles such that they will pass through the liquid crystal display with low loss.

Additionally, the pattern of light extracting deformities may be used to adjust for light output variances attributed to light extractions of the panel members. The pattern of light extracting deformities 21 may be printed on the light output areas utilizing a wide spectrum of paints, inks, coatings, epoxies, or the like, ranging from glossy to opaque or both, and may employ half-tone separation techniques to vary the deformity 21 coverage. Moreover, the pattern of light extracting deformities 21 may be multiple layers or vary in index of refraction.

Print patterns of light extracting deformities 21 may vary in shapes such as dots, squares, diamonds, ellipses, stars, random shapes, and the like, and are desirably .006 square inch per deformity/element or less. Also, print patterns that are 60 lines per inch or finer are desirably employed, thus making the deformities or shapes 21 in the print patterns nearly invisible to the human eye in a particular application thereby eliminating the detection of gradient or banding lines that are common to light extracting patterns utilizing larger elements. Additionally, the deformities may vary in shape and/or size along the length and/or width of the panel members. Also, a random placement pattern of the deformities may be utilized throughout the length and/or width of the panel members. The deformities may have shapes or a pattern with no specific angles to reduce moiré or other interference effects. Examples of methods to create these random patterns are printing a pattern of shapes using stochastic print pattern techniques, frequency modulated half tone patterns, or random dot half tones. Moreover, the deformities may be colored in order to effect color correction in the panel members. The color of the deformities may also vary throughout the panel members, for example to provide different colors for the same or different light output areas.

In addition to or in lieu of the patterns of light extracting deformities 21 shown in Fig. 4a, other light extracting deformities including prismatic surfaces, depressions or raised surfaces of various shapes using more complex shapes in a mold pattern may be molded, etched, stamped, thermoformed, hot stamped or the like into or on one or more areas of the panel member. Figs. 4b and 4c show panel areas 22 on which prismatic surfaces 23 or depressions 24 are formed in the panel areas, whereas Fig. 4d shows prismatic or other reflective or refractive

surfaces 25 formed on the exterior of the panel area. The prismatic surfaces, depressions or raised surfaces will cause a portion of the light rays contacted thereby to be emitted from the panel member. Also, the angles of the prisms, depressions or other surfaces may be varied to direct the light in different  
5 directions to produce a desired light output distribution or effect. Moreover, the reflective or refractive surfaces may have shapes or a pattern with no specific angles to reduce moiré or other interference effects.

As best seen in the cross sectional view of Fig. 5, a back reflector (including trans reflectors) 26 may be attached or positioned against one side of  
10 the panel member 14 of Fig. 3 using a suitable adhesive 28 or other method in order to improve light output efficiency of the panel assembly 11 by reflecting the light emitted from that side back through the panel for emission through the opposite side. Additionally, a pattern of light extracting deformities 21, 23, 24 and/or 25 may be provided on one or both sides of the panel member in order to  
15 change the path of the light so that the internal critical angle is exceeded and a portion of the light is emitted from one or both sides of the panel. Moreover, a transparent film, sheet or plate 27 may be attached or positioned against the side or sides of the panel member from which light is emitted using a suitable adhesive 28 or other method in order to produce a desired effect.

20 The member 27 may be used to further improve the uniformity of the light output distribution. For example, the member 27 may be a colored film, a diffuser, or a label or display, a portion of which may be a transparent overlay that may be colored and/or have text or an image thereon.

If adhesive 28 is used to adhere the back reflector 26 and/or film 27 to the  
25 panel, the adhesive is preferably applied only along the side edges of the panel, and if desired the end edge opposite the light transition areas 12, but not over the entire surface area or areas of the panel because of the difficulty in consistently applying a uniform coating of adhesive to the panel. Also, the adhesive changes the internal critical angle of the light in a less controllable manner than the air  
30 gaps 30 (see Fig. 5) which are formed between the respective panel surfaces and the back reflector 26 and/or film 27 when only adhered along the peripheral edges. Additionally, longer panel members are achievable when air gaps 30 are used. If adhesive were to be used over the entire surface, the pattern of

deformities could be adjusted to account for the additional attenuation in the light caused by the adhesive.

Referring further to Fig. 2, the panel assembly 5 shown therein also includes molded posts 31 at one or more corners of the panel 7 (four such posts being shown) which may be used to facilitate mounting of the panel assembly and providing structural support for other parts or components, for example, a display panel such as a liquid crystal display panel as desired.

Fig. 6 shows another form of light emitting panel assembly 32 in accordance with this invention including a panel member 33, one or more light sources 3, and one or more light output areas 34. In addition, the panel assembly 32 includes a tray 35 having a cavity or recess 36 in which the panel assembly 32 is received. The tray 35 may act as a back reflector as well as end edge and/or side edge reflectors for the panel 33 and side and/or back reflectors 37 for the light sources 3. Additionally, one or more secondary reflective or refractive surfaces 38 may be provided on the panel member 33 and/or tray 35 to reflect a portion of the light around one or more corners or curves in a non-rectangular shaped panel member 33. These secondary reflective/refractive surfaces 38 may be flat, angled, faceted or curved, and may be used to extract a portion of the light away from the panel member in a predetermined pattern. Fig. 6 also shows multiple light output areas 34 on the panel member that emit light from one or more light sources 3.

Fig. 7 is a schematic illustration of still another form of light emitting panel assembly 40 in accordance with this invention including a panel member 41 having one or more light output areas 42 and one or more light transition areas (mixing areas) 43 containing a plurality of light sources 3 at one or both ends of the panel. Each transition area mixes the light from one or more light sources having different colors and/or intensities. In this particular embodiment, each of the light sources 3 desirably employs three colored LEDs (red, blue, green) in each transition mixing area 43 so that the light from the three LEDs can be mixed to produce a desired light output color that will be emitted from the light output area 42. Alternatively, each light source may be a single LED having multiple colored chips bonded to the lead film. Also, two colored LEDs or a single LED having two colored chips may be used for a particular application. By varying the

intensities of the individual respective LEDs, virtually any colored light output or white light distribution can be achieved.

Fig. 8 shows yet another form of light emitting panel assembly 45 in accordance with this invention including a light emitting panel member 46 and a light source 3 in a light transition area 48 integral with one end of the panel member. In this particular embodiment, the panel member 46 is three-dimensionally curved, for example, such that light rays may be emitted in a manner that facilitates aesthetic design of a lighted display.

Fig. 9 schematically shows another form of light emitting panel assembly 50 in accordance with this invention, including a panel member 51 having multiple light output areas 52, and mounting posts and/or mounting tabs 53. This particular panel assembly 50 may serve as a structural member to support other parts or components as by providing holes or cavities 54, 55 in the panel member 51 which allow for the insertion of modular components or other parts into the panel member. Moreover, a separate cavity or recess 56 may be provided in the panel member 51 for receipt of a correspondingly shaped light transition area 57 having one or more light sources 3 embedded, bonded, cast, insert molded, epoxied, or otherwise mounted or positioned therein and a curved reflective or refractive surface 58 on the transition area 57 and/or wall of the cavity or recess 56 to redirect a portion of the light in a predetermined manner. In this way the light transition area 57 and/or panel member may be in the form of a separate insert which facilitates the easy placement of the light source in a modular manner. A reflector 58 may be placed on the reflective or refractive surface of the cavity or recess 56 or insert 57. Where the reflector 58 is placed on the reflective or refractive surface of the cavity or recess 56, the cavity or recess may act as a mold permitting transparent material from which the transition area 57 is made to be cast around one or more light sources 3.

Figs. 10 and 11 schematically show another form of light emitting panel assembly 60 in accordance with this invention including a panel member 61 having one or more light output areas 62. In this particular embodiment, an off-axis light transition area 63 is provided that is thicker in cross section than the panel member to permit use of one or more light sources 3 embedded or otherwise mounted in the light transition area that are dimensionally thicker than



the panel member. Also, a three-dimensional reflective surface 64 (Fig. 11) may be provided on the transition area 63. Moreover, a prism 65 (Fig. 11) or tapered, rounded, or otherwise shaped end 66 (Fig. 11a) may be provided at the end of the panel opposite the light sources 3 to perform the function of an end reflector.

5 The light sources 3 may be oriented at different angles relative to each other and offset to facilitate better mixing of the light rays 67 in the transition area 63 as schematically shown in Fig. 10 and/or to permit a shorter length transition area 63 to be used.

Figs. 12 and 13 schematically show still another form of light emitting  
10 panel assembly 70 in accordance with this invention which includes one or more light transition areas 71 at one or both ends of the panel member 72 each containing a single light source 73. The transition area or areas 71 shown in Figs. 12 and 13 collect light with multiple or three-dimensional surfaces and/or collect light in more than one plane. For example each transition area 71 shown  
15 in Figs. 12 and 13 has elliptical and parabolic shape surfaces 74 and 75 in different planes for directing the light rays 76 into the panel member at a desired angle.

Providing one or more transition areas at one or both ends of the panel member of any desired dimension to accommodate one or more light sources,  
20 with reflective and/or refractive surfaces on the transition areas for redirecting the light rays into the panel member at relatively low angles allows the light emitting panel member to be made much longer and thinner than would otherwise be possible. For example the panel members of the present invention may be made very thin, *i.e.*, 0.125 inch thick or less.

25 Fig. 14 schematically illustrates still another form of light emitting panel assembly 80 in accordance with this invention including a light emitting panel 81 and one or more light sources 3 positioned, embedded, potted, bonded or otherwise mounted in a light transition area 82 that is at an angle relative to the panel member 81 to permit more efficient use of space. An angled or curved  
30 reflective or refractive surface 83 is provided at the junction of the panel member 81 with the transition area 82 in order to reflect/refract light from the light source 3 into the body of the panel member 81 for emission of light from one or more light emitting areas 84 along the length of the panel member.

Fig. 15 schematically illustrates still another form of light emitting panel assembly 90 in accordance with this invention including a light transition area 91 at one or both ends of a light emitting panel member 92 containing a slot 93 for sliding receipt of an LED or other suitable light source 3. Preferably the slot 93 extends into the transition area 91 from the back edge 94, whereby the light source 3 may be slid and/or snapped in place in the slot from the back, thus allowing the transition area to be made shorter and/or thinner. The light source 3 may be provided with wings, tabs or other surfaces 95 for engagement in correspondingly shaped recesses or grooves 96 or the like in the transition area 91 for locating and, if desired, securing the light source in place. Also, the light source 3 may be embedded, potted, bonded or otherwise secured within the slot 93 in the light transition area 91 of the panel member 92. Light from a secondary light source 97 may be projected through the panel member 92 for indication or some other effect.

The various light emitting panel assemblies disclosed herein may be used for a great many different applications including for example LCD back lighting or lighting in general, decorative and display lighting, automotive lighting, dental lighting, phototherapy or other medical lighting, membrane switch lighting, and sporting goods and apparel lighting or the like. Also the panel assemblies may be made such that the panel members and deformities are transparent without a back reflector. This allows the panel assemblies to be used for example to front light an LCD or other display such that the display is viewed through the transparent panel members.

Although the invention has been shown and described with respect to certain preferred embodiments, it is obvious that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of the specification. The present invention includes all such equivalent alterations and modifications, and is limited only by the scope of the claims.

WHAT IS CLAIMED IS:

1. A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides are of a different type or shape than the light extracting deformities on or in the other side of the panel member.
2. The assembly of claim 1 wherein the deformities on or in one of the sides are prismatic.
3. The assembly of claim 1 wherein the deformities on or in one of the sides are lenticular.
4. The assembly of claim 1 wherein the deformities on or in one of the sides run the full length or width of the one side.
5. The assembly of claim 1 wherein the deformities on or in one of the sides are quite small in relation to the length and width of the panel member.
6. The assembly of claim 1 wherein the deformities on or in one of the sides have at least one diffuse surface.
7. The assembly of claim 1 wherein the deformities on or in one of the sides are etched dots.
8. The assembly of claim 1 wherein the deformities on or in one of the sides vary randomly.

9. The assembly of claim 1 wherein the panel member is flat.
10. The assembly of claim 1 wherein the panel member is tapered.
- 5 11. The assembly of claim 1 wherein the deformities on or in one of the sides vary in at least one of the following characteristics: slope angle, density, position, orientation, height or depth, and size.
- 10 12. The assembly of claim 1 further comprising at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.
- 15 13. The assembly of claim 12 wherein at least one side of the sheet, film or substrate has deformities or optical elements.
- 20 14. The assembly of claim 1 wherein the panel member has a transition region between the input edge and the pattern of light extracting deformities to allow the light from the light source to mix and spread.
- 25 15. The assembly of claim 14 wherein at least one side of the transition region contains optical elements for reflecting or refracting light.
- 30 16. The assembly of claim 15 wherein the optical elements are faceted.
17. A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a light source, the panel member having front and back sides and a greater cross sectional width than thickness, at least one of the sides having a pattern of light extracting deformities that are projections or depressions on or in the at least one side to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in the at least one side has at least two different types or shapes of light extracting

deformities and at least one of the types or shapes of deformities varies along at least one of the length and width of the panel member.

5           18.    The assembly of claim 17 wherein at least one of the types or shapes of deformities is prismatic.

          19.    The assembly of claim 17 wherein at least one of the types or shapes of deformities is lenticular.

10           20.    The assembly of claim 17 wherein the deformities on or in the one side run the full length or width of the one side.

          21.    The assembly of claim 17 wherein at least one of the types or shapes of deformities is quite small in relation to the length and width of the panel member.

15           22.    The assembly of claim 17 wherein at least one of the types or shapes of deformities has at least one diffuse surface.

20           23.    The assembly of claim 17 wherein at least one of the types or shapes of deformities is etched dots.

          24.    The assembly of claim 17 wherein at least one of the types or shapes of deformities varies randomly.

25           25.    The assembly of claim 17 wherein the panel member is flat.

          26.    The assembly of claim 17 wherein the panel member is tapered.

30           27.    The assembly of claim 17 wherein at least one of the types or shapes of deformities varies in at least one of the following characteristics: slope angle, density, position, orientation, height or depth, and size.

28. The assembly of claim 17 further comprising at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

5

29. The assembly of claim 28 wherein at least one side of the film, sheet or substrate has deformities or optical elements.

30. The assembly of claim 17 wherein the panel member has a transition region between the input edge and the pattern of light extracting deformities to allow the light from the light source to mix and spread.

10

31. The assembly of claim 30 wherein at least one side of the transition region contains optical elements for reflecting or refracting light.

15

32. The assembly of claim 31 wherein the optical elements are faceted.

33. A light emitting panel assembly comprising at least one light source, an optical panel member having at least one input edge for receiving light from a light source, the panel member having front and back sides and a greater cross sectional width than thickness, both the front and back sides having a pattern of light extracting deformities that are projections or depressions on or in the sides to cause light to be emitted from the panel member in a predetermined output distribution, where the pattern of light extracting deformities on or in at least one of the sides varies along at least one of the length and width of the panel member and at least some of the light extracting deformities on or in one of the sides vary in a different way or manner than the light extracting deformities on or in the other side of the panel member.

20

25

34. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in density.

30

35. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in slope angle.

5 36. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in position.

37. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in orientation.

10 38. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in height or depth.

39. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary in size.

15

40. The assembly of claim 33 wherein at least some of the deformities on or in at least one side do not vary.

20 41. The assembly of claim 33 wherein at least some of the deformities on or in at least one side vary randomly.

42. The assembly of claim 33 wherein at least one of the types or shapes of deformities is prismatic.

25 43. The assembly of claim 33 wherein at least one of the types or shapes of deformities is lenticular.

44. The assembly of claim 33 wherein the deformities on or in one of the sides run the full length or width of the one side.

30

45. The assembly of claim 33 wherein at least one of the types or shapes of deformities is quite small in relation to the length and width of the panel member.

46. The assembly of claim 33 wherein at least one of the types or shapes of deformities has at least one diffuse surface.

5 47. The assembly of claim 33 wherein at least one of the types or shapes of deformities is etched dots.

48. The assembly of claim 33 wherein the panel member is flat.

10 49. The assembly of claim 33 wherein the panel member is tapered.

50. The assembly of claim 33 further comprising at least one film, sheet or substrate overlying at least a portion of one of the sides of the panel member to change the output distribution of the emitted light such that the light will pass through a liquid crystal display with low loss.

15 51. The assembly of claim 50 wherein at least one side of the sheet, film or substrate has deformities or optical elements.

20 52. The assembly of claim 33 wherein the panel member has a transition region between the input edge and the pattern of light extracting deformities to allow the light from the light source to mix and spread.

53. The assembly of claim 52 wherein at least one side of the transition region contains optical elements for reflecting or refracting light.

25 54. The assembly of claim 53 wherein the optical elements are faceted.



## ABSTRACT

Light emitting panel assemblies include an optical panel member having a pattern of light extracting deformities on or in one or both sides to cause light to be emitted in a predetermined output distribution. The pattern of light extracting deformities on or in one side may have two or more different types or shapes of deformities and at least one of the types or shapes may vary along the length or width of the panel member. Where the light extracting deformities are on or in both sides, at least some of the deformities on or in one side may be of a different type or shape or vary in a different way or manner than the deformities on or in the other side.

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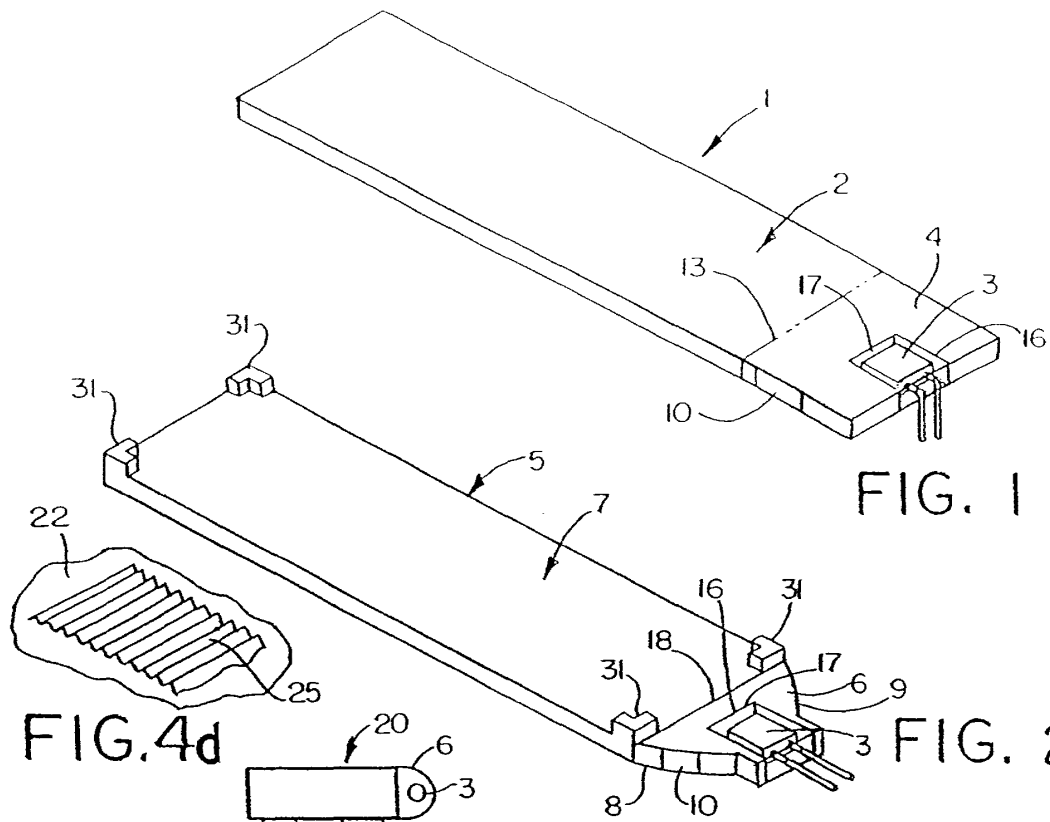


FIG. 1

FIG. 2

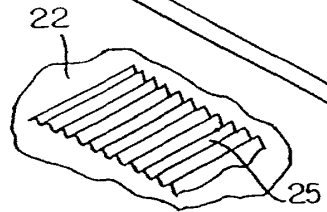


FIG. 4d

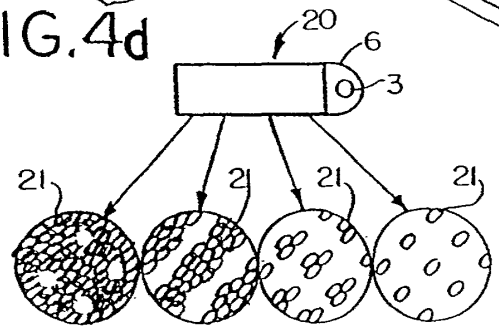


FIG. 4a

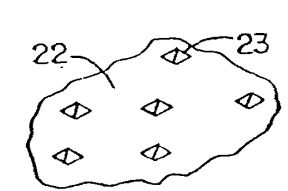


FIG. 4b



FIG. 4c

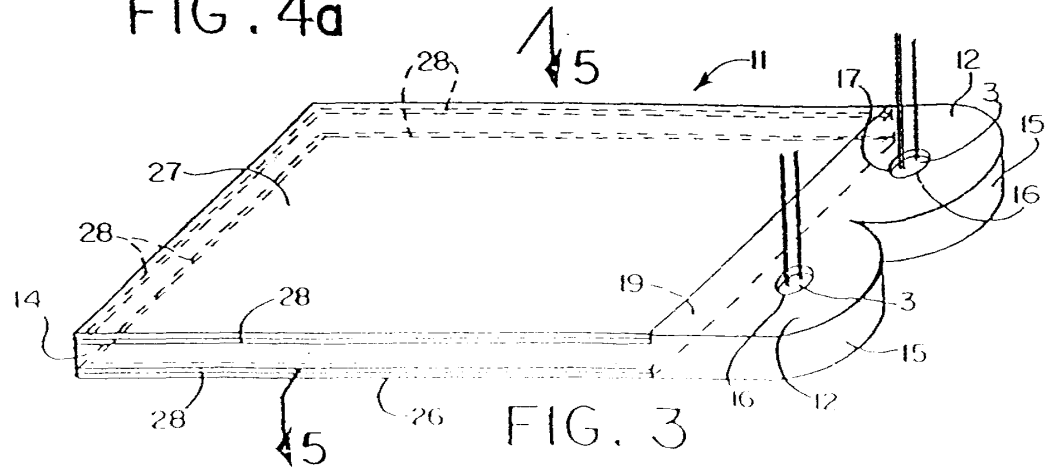


FIG. 3

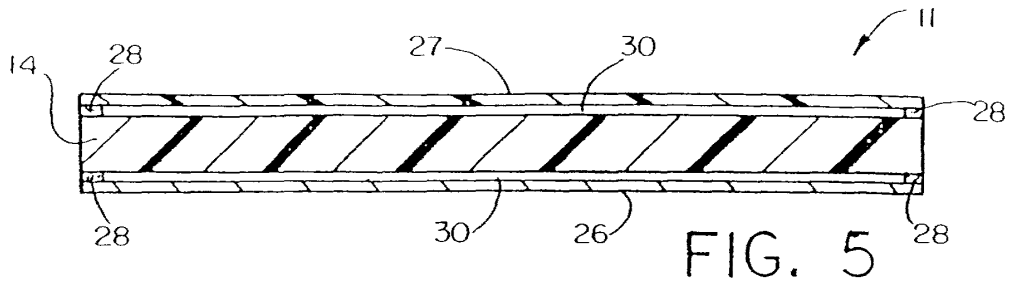


FIG. 5

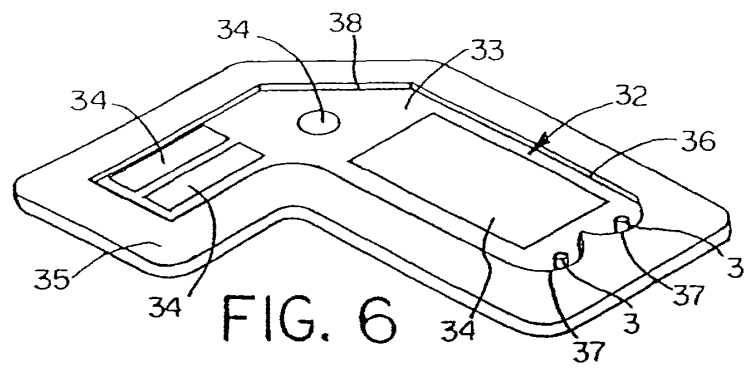


FIG. 6

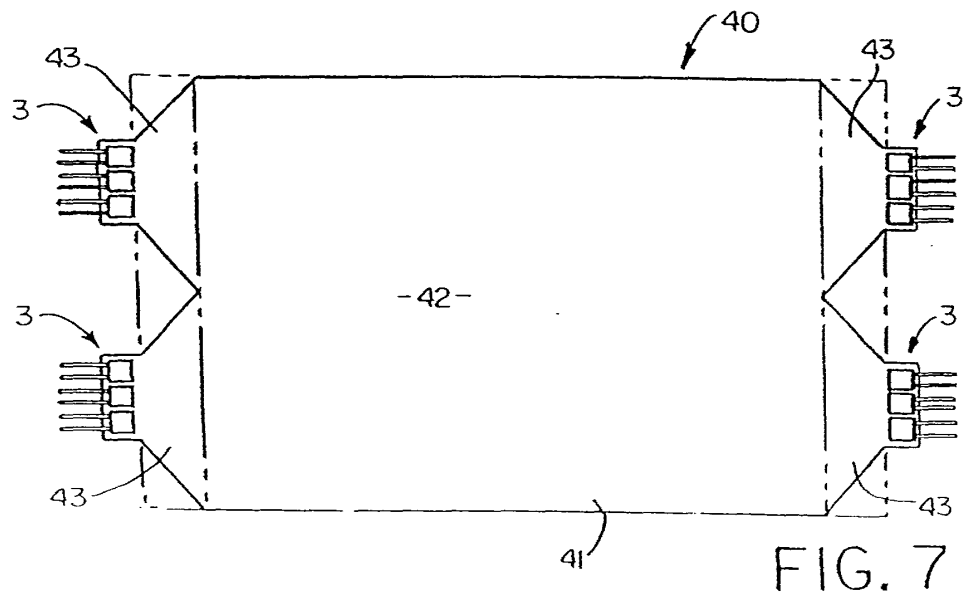


FIG. 7

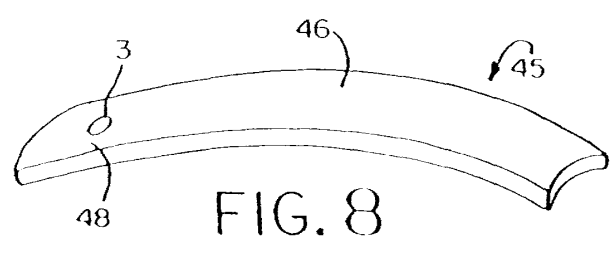


FIG. 8

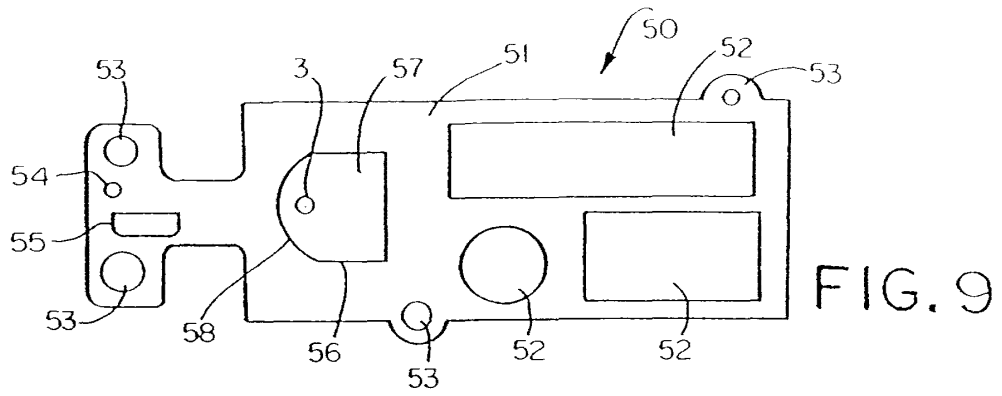


FIG. 9

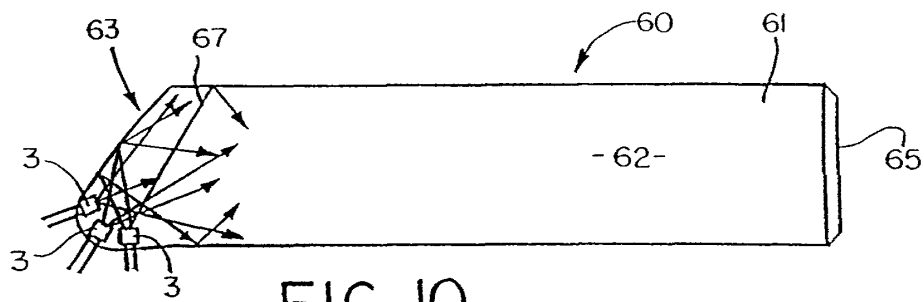


FIG. 10

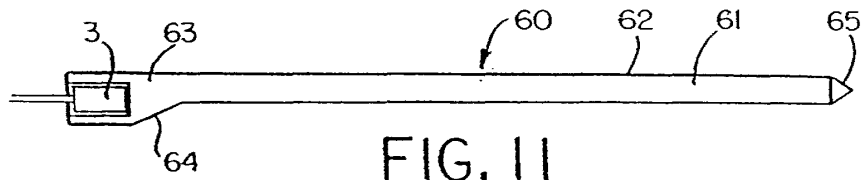


FIG. 11

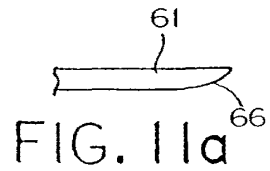


FIG. 11a

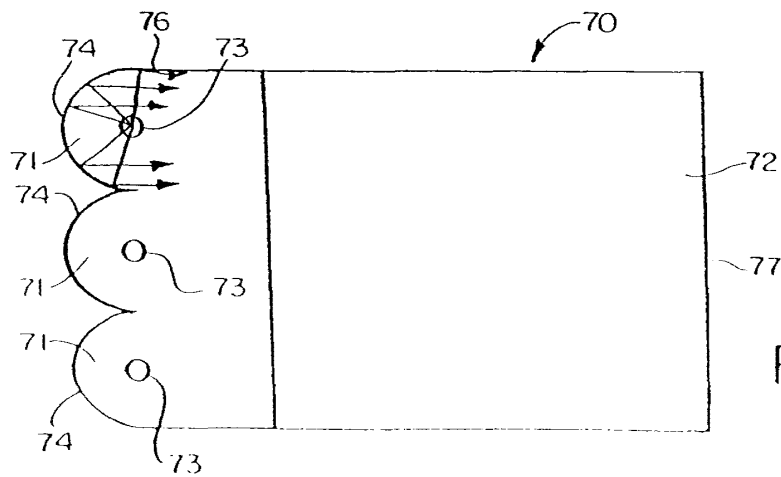


FIG. 12

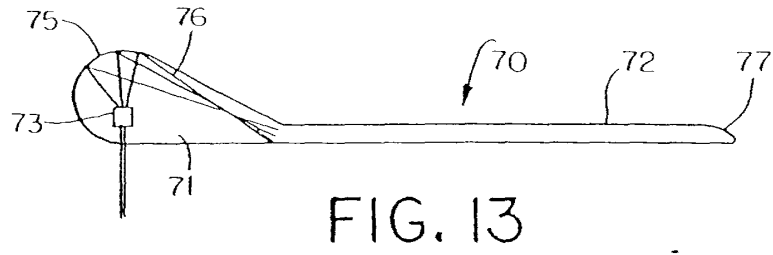


FIG. 13

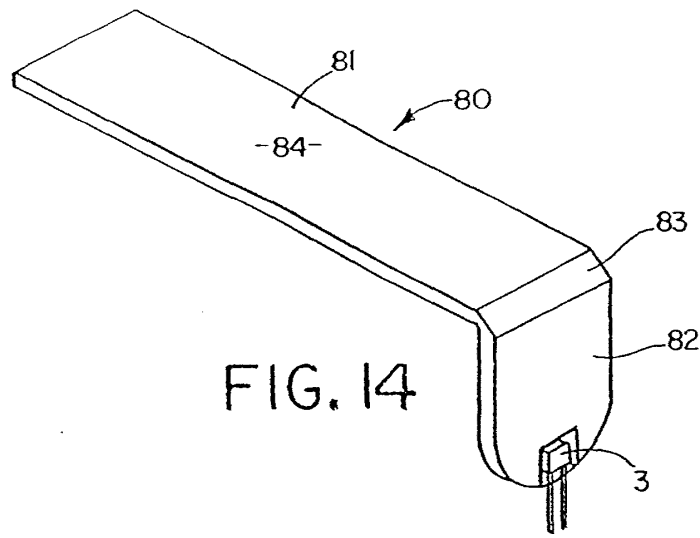


FIG. 14

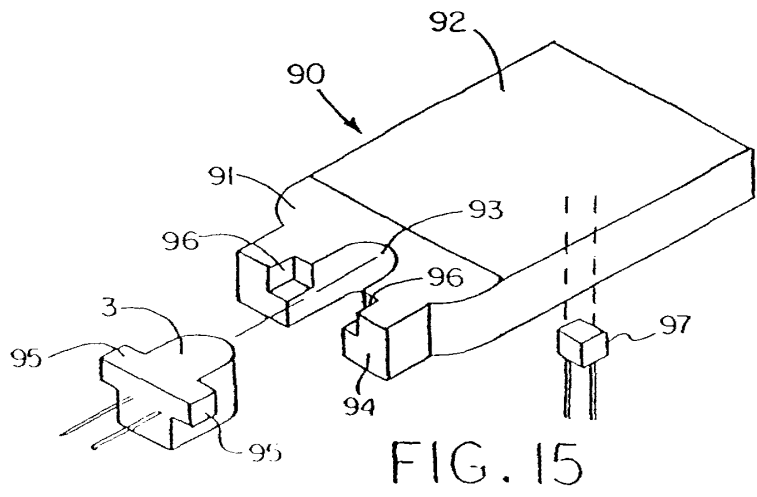


FIG. 15

## **Application Data Sheet**

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### **Applicant Information**

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Citizenship Country:: USA

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Fax number:: (216) 621-6165  
Electronic Mail:: dotto@rennerotto.com

### **Application Information**

Title Line One:: LIGHT EMITTING PANEL ASSEMBLIES  
Class:: 362  
Subclass:: 612  
Technology Center:: 2800  
Total Drawing Sheets:: 4  
Drawing Figure for Publication:: Figure 5  
Formal Drawings?:: Yes  
Application Type:: Utility  
Docket Number:: GLOLP0108USAL

### **Representative Information**

Representative Customer N<sup>o</sup>:: 23908

### **Domestic Priority Information**

This application is a:: DIV  
Application One:: 10/784,527  
Filing Date:: February 23, 2004

which is a:: DIV  
Application Two:: 09/256,275  
Filing Date:: February 23, 1999  
U.S. Pat. No.:: 6,712,481

which is a:: CIP  
Application Three:: 08/778,089  
Filing Date:: January 2, 1997  
U.S. Pat. No.:: 6,079,838

which is a:: DIV  
Application Four:: 08/495,176  
Filing Date:: June 27, 1995  
U.S. Pat. No.:: 5,613,751

### **Foreign Priority Information**

### **Assignee Information**

Assignee:: Solid State Opto Limited  
Postal Address Line One:: P.O. Box 957  
Postal Address Line Two:: Offshore Incorporations Centre  
City: Road Town, Tortola  
Country:: British Virgin Islands  
Postal or Zip Code::

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**COMBINED DECLARATION AND POWER OF ATTORNEY**  
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: **LIGHT EMITTING PANEL ASSEMBLIES**

the specification of which

is attached hereto, or

was filed as United States Application or Application No.:  
PCT International Application (*give (Express Mail Label No.)*  
*Express Mail label number and deposit* Filing Date:  
*date if Application number not yet (Deposit Date)*  
*known*): Amended on (*if applicable*):

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations § 1.56(a).

**CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S) UNDER 35 U.S.C. 120 AND/OR 35 U.S.C. 365(c)**

I hereby claim the benefit under 35 U.S.C. 120 and/or 35 U.S.C. 365(c) of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose material information as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Application No.	Filing Date	Patent Number
10/784,527	February 23, 2004	
09/256,275	February 23, 1999	6,712,481
08/778,089	January 2, 1997	6,079,838
08/495,176	June 27, 1995	5,613,751

**CLAIM FOR BENEFIT OF EARLIER U.S. PROVISIONAL APPLICATION(S) UNDER 35 U.S.C. 119(e)**

I hereby claim the benefit under 35 USC 119(e) of any United States provisional application(s) that is/are listed below



Application No.	Filing Date

**POWER OF ATTORNEY**

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Name	Registration No.	Name	Registration No.
Donald L. Otto	22,125		

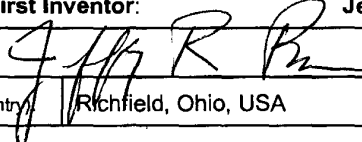
**Send Correspondence To:**

Donald L. Otto  
 Renner, Otto, Boisselle & Sklar, LLP  
 1621 Euclid Ave. - 19th Floor  
 Cleveland, Ohio 44115

**Direct Telephone Calls To:**

Name: Donald L. Otto  
 Tel. No: 216-621-1113  
 Fax No. 216-621-6165

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

<b>Full Name of Sole or First Inventor:</b> Jeffery R. Parker			
Inventor's signature:		Date:	10/2/06
Residence: (City & State/Country):	Richfield, Ohio, USA	Citizenship:	USA
Post Office Address:	3050 Whitetail Ct. Richfield, Ohio 44286		

<b>Full Name of Additional Joint Inventor (if any):</b>			
Inventor's signature:		Date:	
Residence: (City & State/Country):		Citizenship:	
Post Office Address:			

End of Declaration and Power of Attorney (D-US-1.FRM)

Z:\SEC177\GLOL\IP108USAL\DECLARATION.wpd

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES			
<b>First Named Inventor:</b>	Jeffery R. Parker			
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy			
<b>Attorney Docket Number:</b>	GLOLP0108USAL			
Filed as Large Entity				
<b>Utility Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
Utility application filing	1011	1	300	300
Utility Search Fee	1111	1	500	500
Utility Examination Fee	1311	1	200	200
<b>Pages:</b>				
<b>Claims:</b>				
Claims in excess of 20	1202	34	50	1700
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Patent-Appeals-and-Interference:</b>				
Post-Allowance-and-Post-Issuance:				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>2700</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	1246546
<b>Application Number:</b>	11548330
<b>Confirmation Number:</b>	5221
<b>Title of Invention:</b>	LIGHT EMITTING PANEL ASSEMBLIES
<b>First Named Inventor:</b>	Jeffery R. Parker
<b>Customer Number:</b>	23908
<b>Filer:</b>	Donald L. Otto/Jeanne Murphy
<b>Filer Authorized By:</b>	Donald L. Otto
<b>Attorney Docket Number:</b>	GLOLP0108USAL
<b>Receipt Date:</b>	11-OCT-2006
<b>Filing Date:</b>	
<b>Time Stamp:</b>	11:12:48
<b>Application Type:</b>	Utility
<b>International Application Number:</b>	

### Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	\$2700
RAM confirmation Number	1099
Deposit Account	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part	Pages
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1		GLOLP0108USAL.pdf	954822	yes	24
<b>Multipart Description</b>					
	<b>Doc Desc</b>		<b>Start</b>		<b>End</b>
	Specification		1		13
	Claims		14		19
	Abstract		20		20
	Drawings		21		24
<b>Warnings:</b>					
<b>Information:</b>					
2	Application Data Sheet	appdata.pdf	35901	no	2
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied ADS fillable form					
3	Oath or Declaration filed	dec.pdf	81214	no	2
<b>Warnings:</b>					
<b>Information:</b>					
4	Fee Worksheet (PTO-875)	fee-info.pdf	8451	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			1080388		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>11/548,330</b>
---	---

APPLICATION AS FILED – PART I			SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
	(Column 1)	(Column 2)						
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A	<b>300</b>	N/A	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A	<b>500</b>	N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A	<b>200</b>	N/A	
TOTAL CLAIMS (37 CFR 1.16(j))	<b>54</b>	<b>34</b>	X 25=		X 50=	<b>1,700</b>	X 200=	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	<b>3</b>	*	X 100=					
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR							
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A		N/A		N/A	
			TOTAL		TOTAL	<b>2,700</b>		

\* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II					SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
		(Column 1)	(Column 2)	(Column 3)						
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		X =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		X =		
	Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						N/A		N/A		
					TOTAL			TOTAL		
					ADD'T FEE			ADD'T FEE		

1, 17, 37

APPLICATION AS AMENDED – PART II					SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
		(Column 1)	(Column 2)	(Column 3)						
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		X =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		X =		
	Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						N/A		N/A		
					TOTAL			TOTAL		
					ADD'T FEE			ADD'T FEE		

- \* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
  - \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
  - \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
- The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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